



Regional Consultation Latin America and the Caribbean

18-20 April 2012, Mercosur Building, Montevideo, Uruguay



Groundwater Governance
A Global Framework for Action





Groundwater Governance
you are responsible to make it last

**Global Environment Facility Project “Groundwater Governance:
A Global Framework for Country Action”**
(FAO, GEF, IAH, UNESCO-IHP, World Bank)

**LATIN AMERICA and the CARIBBEAN
REGIONAL CONSULTATION**

18 – 20 April 2012

*MERCOSUR Building
Montevideo, Uruguay*

FINAL REPORT

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Groundwater Governance - A Global Framework for Action

Groundwater Governance - A Global Framework for Action (2011-2014) is a joint project supported by the Global Environment Facility (GEF) and implemented by the Food and Agriculture Organisation of the United Nations (FAO), jointly with UNESCO's International Hydrological Programme (UNESCO-IHP), the International Association of Hydrologists (IAH) and the World Bank.

The project is designed to raise awareness of the importance of groundwater resources for many regions of the world, and identify and promote best practices in groundwater governance as a way to achieve the sustainable management of groundwater resources.

The first phase of the project consists of a review of the global situation of groundwater governance and aims to develop a Global Groundwater Diagnostic that integrates regional and country experiences with prospects for the future. This first phase builds on a series of case studies, thematic papers and five regional consultations.

Twelve thematic papers have thus been prepared to synthesize the current knowledge and experience concerning key economic, policy, institutional, environmental and technical aspects of groundwater management, and address emerging issues and innovative approaches. The 12 thematic papers are listed below and are available on the project website along with a Synthesis Report on Groundwater Governance that compiles the results of the case studies and the thematic papers.

The second phase of the project will develop the main project outcome, a Global Framework for Action consisting of a set of policy and institutional guidelines, recommendations and best practices designed to improve groundwater management at country/local level, and groundwater governance at local, national and transboundary levels.

Thematic Papers

- No.1 - Trends in groundwater pollution; trends in loss of groundwater quality and related aquifers services
- No.2 - Conjunctive use and management of groundwater and surface water
- No.3 - Urban-rural tensions; opportunities for co-management
- No.4 - Management of recharge / discharge processes and aquifer equilibrium states
- No.5 - Groundwater policy and governance
- No.6 - Legal framework for sustainable groundwater governance
- No.7 - Trends in local groundwater management institutions / user partnerships
- No.8 - Social adoption of groundwater pumping technology and the development of groundwater cultures: governance at the point of abstraction
- No.9 - Macro-economic trends that influence demand for groundwater and related aquifer services
- No. 10 - Governance of the subsurface and groundwater frontier
- No.11 - Political economy of groundwater governance
- No.12 - Groundwater and climate change adaptation

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1. INTRODUCTION, CONTEXT and OBJECTIVES

The first regional consultation for the project *Groundwater Governance: A Global Framework for Country Action* focused on Latin America and the Caribbean and was held in Montevideo, Uruguay, from 18 to 20 April 2012. The project is the result of cooperation between the UNESCO International Hydrological Programme (IHP), the Global Environment Facility (GEF), the Food and Agriculture Organization of the United Nations (FAO), the International Association of Hydrogeologists (IAH) and the World Bank.

A key component of the project process is a series of five regional consultations organized by UNESCO-IHP.

In addition to Latin America and the Caribbean, regional consultations will be held in Africa (Kenya, from 29 to 31 May 2012), the Arab States (Jordan, from 8 to 10 October 2012) and Asia (China, in December 2012). The regional consultation for Europe, the United States of America and Canada, which will include a round table with private-sector institutions, will be hosted by the Netherlands during the first quarter of 2013.

These consultations aim to: (1) pool expertise on regional specificities from direct local sources – groundwater experts, resource managers and stakeholders in different areas; (2) discuss the issues arising from regional specificities, challenges and priorities on the basis of case studies prepared by national experts, and (3) create synergies between the multisectoral parties concerned, decision-makers and specialists.

It should be emphasized that these interregional exchanges will enable the regions to benefit from each other's experiences. The results of all the regional consultations will contribute to the preparation of a "Global Groundwater Governance Diagnostic", which will serve as the technical basis for the different stages in the process.

As a final result, the project will develop a Framework of Action, consisting of a set of effective governance tools such as policy guidelines, legislation, regulations and customary practices. The Framework of Action will foster the recognition of the value of groundwater as a critically important natural resource, and of the social, economic and ecological opportunities that the sustainable management of groundwater resources could provide through an interdisciplinary dialogue.

This will contribute to the project's overall objective, which is raising awareness about the importance of the proper management of groundwater resources to prevent and reverse the global water crisis.

The regional consultation for Latin America and the Caribbean was attended by 112 participants from 19 of the region's countries, including six from the Caribbean (Argentina, Bahamas, Barbados, Bolivia, Brazil, Chile, Colombia, Cuba, Costa Rica, Dominican Republic, El Salvador, Guatemala, Haiti, Mexico, Paraguay, Peru, Saint Lucia, Uruguay and Venezuela). Representatives from United Nations agencies such as FAO, UNESCO-IHP, GEF, the World Bank, the United Nations Industrial Development Organization (UNIDO) and the Economic Commission for Latin America and the Caribbean (ECLAC) were present, as were members of a number of regional bodies, institutes and centres, including the Organization of American States (OAS), the Fisheries Resource Conservation Council (FRCC), the Intergovernmental Coordination Committee for the Rio de la Plata Basin (CIC), the Caribbean Institute for Meteorology and Hydrology (CIMH) and the Caribbean Environmental Health Institute (CEHI). Other groups were represented, including government officials, decision-makers, private sector stakeholders, users, non-governmental organizations, academics, journalists, experts and members of professional associations such as the International Association of Hydrogeologists (IAH) and the Brazilian Groundwater Association (ABAS), among others. The list of participants is contained in Annex 2.

2. OPENING OF THE SESSION

The opening ceremony was chaired by Mr **Jorge Rucks, Director of the Uruguayan National Environmental Agency (DINAMA)**, who welcomed the participants.

Next, Ms **Graciela Muslera, Minister of Housing, Spatial Planning and Environment (MVOTMA)** and Mr **Luis Almagro, Minister of External Relations (MRREE)**, both from Uruguay, were invited to speak. Concluding the ceremony, Ms **Gretchen Kalonji, Assistant Director-General for Natural Sciences at UNESCO** took the floor.

Ms **Graciela Muslera** said that Uruguay had included in its Constitution concepts such as surface water and groundwater, which were integrated into the hydrological cycle and constituted a unitary resource that was subordinate to the general interest and part of the public domain.

She emphasized that the National Water Policy was based on sustainable management and solidarity with future generations, and that users and civil society participated in the planning, management and control of water resources, based on watersheds as basic units. The fundamental human right of access to safe drinking water and sanitation was officially recognized.

She noted that in order to comply with the Constitution, the National Water Directorate (DINAGUA) and the Regional Water Resources Councils had been established and the country's water policy had been formulated, encompassing groundwater.

The Uruguayan Government acknowledged that in the case of groundwater, there was lack of visibility of the problems generated. The Government assumed the responsibility of preserving the quality of the water and the aquifer recharge areas, but that required increased knowledge about the state and dynamics of the aquifers and their integrated role in the hydrological cycle.

Finally, Ms Muslera stressed the importance of involving all stakeholders involved in groundwater in order to progress from appropriate diagnoses to effective action for its use and conservation.

Mr **Luis Almagro** said that Uruguay was particularly honoured by the presence of experts from Latin America and the Caribbean at the regional consultation and welcomed the participation of Ms Gretchen Kalonji, Assistant Director-General for Natural Sciences at UNESCO. He said that Uruguay had a special bond with UNESCO and its Natural Sciences Sector, because since 1949, the country had hosted the Organization's Regional Office for Science and Technology for Latin America and the Caribbean (ROSTLAC), and he reaffirmed the Government of Uruguay's support to the Organization, indicating its potential to play a leading role in water cooperation.

He said that the country was working to establish a regional centre for groundwater integration and development in the form of a UNESCO category 2 centre, with the objective of having the scientific and technical capacity in the region to support the sustainable management of groundwater.

He recalled that the second edition of the United Nations World Water Development Report produced by UNESCO stated that "There is enough water for everyone. The problem we face today is largely one of governance: equitably sharing this water while ensuring the sustainability of natural ecosystems".

Mr Almagro acknowledged that the Latin America and the Caribbean region had a privileged position in the global context in terms of water availability. The region was nonetheless facing the impacts of climate change, droughts, floods and long-term effects of phenomena such as El Niño and La Niña.

He concluded that groundwater represented an invaluable resource to address future challenges, and since the region had a large number of transboundary aquifers, cooperation was becoming essential in the search for common solutions.

Ms **Gretchen Kalonji, Assistant Director-General for Natural Sciences at UNESCO**, said that the discussions that would take place during the three days of the consultation were timely and crucial. The results of the work on groundwater governance would have a significant impact on the way in which water resources were managed in the future and the inputs would help them to find a suitable and realistic definition of what was meant by good groundwater governance.

As a result, in the future, policy-makers would hopefully be able to take more informed and responsible decisions, capitalizing on the project's recommendations.

In connection with the United Nations Conference on Sustainable Development (Rio+20), which was scheduled to be held in June 2012 in Rio de Janeiro, she said that all participants realized that without proper governance of water resources, the possibilities for effective human, social and economic development were limited. She hoped that at Rio+20, those in positions of power would be able to send a strong message highlighting the need to protect and manage the world's groundwater resources properly and sustainably.

Ms Kalonji recalled that the world was currently facing unprecedented global environmental challenges, such as population growth. It was estimated that the world population would reach nine billion in the following four decades, which in turn would require food production to double over the following 30 years. Additional risks and uncertainties were posed by climate change, including extreme hydrological events such as floods and severe droughts, and biodiversity loss. In both cases, the formulation and implementation of appropriate water management strategies were therefore essential to ensure the survival of the planet. In most cases, however, achieving adequate water governance was hampered by a general lack of knowledge about groundwater resources.

She also recalled that UNESCO, through its flagship programmes on freshwater resources, had always been partners with the Latin America and the Caribbean region. An example of that close collaboration was the development of the Hydrogeological Atlas of Latin America that began in the 1980s. More recently, the UNESCO Office in Montevideo had served as Regional Coordinator in the Regional Process of the Americas for the Sixth World Water Forum.

The Assistant Director-General for Natural Sciences said that the recommendations of the three joint working days would be shared with experts and stakeholders from other regions, during the regional consultations for sub-Saharan Africa, the Arab States, Asia and North America and Europe. The participants' valuable contributions would shed new light on the topic and contribute to the preparation of a proper groundwater governance framework.

She said that she was pleased to be able to share the news that the United Nations General Assembly had declared 2013 as the International Year of Water Cooperation, for which UNESCO had been assigned a lead role. UNESCO was currently inviting all Member States to participate in the organization of that important year to demonstrate that water could be a real catalyst for cooperation. She thus urged all participants to contribute to the activities and the success of that United Nations International Year.

She reiterated UNESCO's strong commitment to placing issues relating to groundwater at the top of global political agendas. The Organization was highly honoured that on 9 December 2011 the United Nations General Assembly had encouraged the UNESCO International Hydrological Programme to continue to provide technical advice to countries, upon their request, on the management of transboundary aquifers.

Ms Kalonji concluded by thanking, on behalf of the Project Steering Committee, the Government of Uruguay for hosting the regional consultation, and all the participants for the important role they were playing in the consultation. She also expressed her gratitude to Mr Jorge Rucks, whose role as a member of the advisory group was essential to the project, as well as the GEF and Mr Alfred Duda, for enabling the project to become a reality.

3. PLENARY MEETINGS

The Final Agenda in Annex 1 lists the various plenary meetings of the regional consultation for Latin America and the Caribbean.

3.1 *Plenary meeting 1 – Overview of the Groundwater Governance Project*

Two presentations were made.

- The first was “**Introduction to the GEF Project on Groundwater Governance; Objectives, Concepts and Thematic Papers**”, by Mr **Jacob Burke** (FAO, Project Steering Committee member).
- The second was “**Objective of the Regional Consultations Component/Permanent Consultation Mechanism (PCM) of the Project/Links between PCM and GEF-IW: LEARN Groundwater Communities of Practice**” by Ms **Alice Aureli** (UNESCO-IHP, Project Steering Committee member).

Mr **Jacob Burke** explained that the purpose of “Good Groundwater Governance” (GGG), which the project was seeking to achieve, was to slow down or reverse the trend of groundwater depletion and degradation. He presented the definition of “groundwater governance” developed by the Working Group on GGG: “It is the process by which groundwater is managed through the application of responsibility, participation, information availability, transparency, custom, and rule of law. It is the art of coordinating administrative actions and decision-making between and among different jurisdictional levels – one of which may be global.” He said that the definition should be analysed by participants during the regional consultation. He then presented in detail the structure and architecture of the GEF project and the resources allocated for three years: \$1.75 million from GEF and \$2.7 million from participating agencies (FAO, UNESCO, IAH and the World Bank).

Ms **Alice Aureli** said that one of the objectives of the regional consultations was to learn and share through discussions. She explained the process and the rationale of the regional consultations; the dependence of countries worldwide on groundwater; the audiences and expected results in the regional consultations; and the Permanent Consultation Mechanism (PCM) and links with GEF International Waters Learning Exchanges and Resource Network (GEF-IW LEARN) and Groundwater Communities of Practice (GWCoP). She concluded by saying that all the PowerPoint presentations shown in the plenary meetings, the results of the working groups and the answers to the questionnaire on groundwater governance would be available online at www.groundwatergovernance.org.

3.2 *Plenary meeting 2 – Groundwater Governance Overview and Contributions from the Region*

Four presentations were made.

- The first was **Synthesis Report “Thematic perspective of groundwater governance: points for discussion (basis for the preparation of the regional consultations and the global diagnostic report)”**, by Mr **Jacob Burke** (FAO).
- The second was **Questionnaire: Answers Received from the Participants and Synthesis**, by Mr **Nelson Da Franca** and Ms **Zelmira May** (UNESCO-IHP for Latin America and the Caribbean (IHP-LAC)).
- The third was **Regional Perspective: Groundwater Resources and Environmental Sustainability in Latin America and the Caribbean** by Mr **Max Campos**, (Organization of American States (OAS)).

- The fourth was **Challenges in Aquifers Management: Lessons Learnt** by Mr **Humberto Peña (Senior Consultant, Chile)**.

The Chair of the plenary meeting was Ms **Andrea Merla (Senior Consultant UNESCO-IHP)** and the Rapporteur was Ms **Sharon Megdal (UNESCO-IHP Working Group on Groundwater Governance Policy, researcher at the Department of Hydrology and Water Resources, University of Arizona)**, who submitted the following summary.

Mr **Jacob Burke** opened plenary meeting 2 with a summary of the synthesis report. He noted that the results of the regional consultations would be reflected in the final document of the GEF project. He stressed the importance of involving all stakeholders related to groundwater quality and abstraction problems. He emphasized the need for indicators, since groundwater was often ignored by water policies and investments. He raised questions as to whether the economic, social and environmental consequences were sufficiently clear; whether the trade-offs between quantity and quality were understood; whether there was sufficient research on governance issues to formulate groundwater policies; and what kinds of changes were required to solve the current problems. He noted that groundwater systems were dynamic and that there were additional uncertainties linked to climate change. He showed the importance of examining the costs and benefits of alternative approaches to determine who benefited from GGG and what the associated costs were.

Ms **Zelmira May** and Mr **Nelson da Franca** then presented the synthesis report on the findings of the 12-question questionnaire distributed to all the participants. There were a total of 43 answers from 19 countries, which was much greater than expected by the consultation's organizers and therefore already considered a success. The questions were answered differently depending on the context, but common themes emerged. There was general agreement on the need for greater political support for groundwater governance. The priorities varied according to the country, from legal and institutional aspects in certain cases to technical aspects such as knowledge or funding in others. There was also agreement that groundwater should be included in national agendas and that existing government agencies needed to be strengthened. There was also a relative consensus that costs (charges) should be imposed on groundwater users. The points that were highlighted included the importance of reaching out to users and politicians together and the need for greater communication between government and groundwater users. The information gathered from responses to the questionnaire was considered very useful by participants and relevant to the GEF project.

Mr **Max Campos** stressed the importance of groundwater issues for the Department of Sustainable Development of the OAS. The OAS focused on the needs of future development and future generations. Using examples, he referred to the problems arising from over-exploitation and pollution – aspects concerning the quantity and quality of groundwater were matters of concern to OAS countries. He said that the social, economic and environmental factors were important, as was transparency. Climate change and other aspects of nature affected water-related problems, and the participation of all stakeholders was important. The OAS had access to politicians through multiple mechanisms, including the Summits of the Americas. He concluded by noting the importance of providing information to decision-makers.

Mr **Humberto Peña**, the last speaker of the meeting, explained that governance was a response to the current challenges. Groundwater and surface water interacted in complex ways and those interactions should be analysed. The implications of each action, such as over-abstraction for example, could take years to manifest, or changes could be rapid, in which case the policy response time should be quick also. In order to resolve the problems, those implications needed to be known, and that required investment in research. The regulatory system should be flexible but also provide security to investors. When there were groundwater connections with the environment, the ecosystem boundaries should be respected, so it was necessary to undertake studies. It should be ensured that future generations possessed the technical skills required. Water sector players must interact with other sectors. The nature of groundwater as a “common good”

associated it with “conflict” and “fraud”. The various groundwater users must agree with the regulations in order to accept and respect them. Finally, he noted that social conditions could no longer be overlooked.

During the discussion, several participants emphasized the need for a definition of groundwater governance. They wondered whether it should be very general; whether it should be placed in the context of sustainability; and how to define sustainability. One speaker noted that the use of groundwater could include a plan for limiting depletion. Another speaker commented that the definitions were not as important as the guidelines for the governance of groundwater. In addition, there was discussion over how the regional consultations would influence the project and how the results of the regional consultations would be shared. There was a word of warning on considering issues with only a top-down perspective and it was noted that the action level (local versus State/provincial versus national) was important. Several participants noted the specific features of groundwater, including the fact that it was invisible, that the time scale was usually very slow and that the geographical scale was often very different from that of surface water. All points raised by participants highlighted the need to develop a framework for the good governance of groundwater.

In summary, there was consensus on the need to include all stakeholders in discussions, including of course the politicians, and always to consider the context of financial/economic, environmental and social conditions.

In the final part of plenary meeting 2 – Groundwater Governance Overview and Contributions from the Region, there were questions and answers with journalists and the public, facilitated by Mr **Shammy Puri (IAH and Project Steering Committee)** and Mr **Luiz Amore (IAH-LAC)**, arousing considerable interest from the audience, with more than 20 questions asked on the presentations, in particular concerning the definition of groundwater, the involvement of all stakeholders, institutional and legal aspects as well as information and communication.

3.3 Plenary meeting 3 – Groundwater Governance and Sustainable Development: Urban and Rural Areas

Two keynote addresses were made and four case studies were presented.

- The first keynote address was **Perspectives for Groundwater Governance in Urban Areas** by Mr **Ricardo Hirata (Groundwater Research Centre – University of São Paulo (CEPAS/USP), Brazil)** and the second was **Groundwater Resources, Agriculture and Conflicts over its Use** by Mr **Mario Hernández (National University of La Plata (UNLP), Argentina)**.
- The first case study was **Groundwater Governance in Brazil, Examples of Successful Cases**, by Mr **Humberto Albuquerque (Brazilian Groundwater Association (ABAS))**.
- The second was **Water Resources Management: Vulnerability of Coastal Aquifers to Climate Change and Human Effects (UNESCO-GRAPHIC Project, North Andros)**, by Mr **Anthony Bostwick (Water Resources Management Unit of the Bahamas)**.
- The third was **Water Councils as Institutionalization Mechanisms for the Governance of Water Resources in Paraguay; Experiences from the Water Council of the Arroyo Capiibary Basin (CACHAC) 2008-2012** by Ms **Alicia Eisenkolbl (Catholic University of Paraguay)**.
- The fourth was **Water Committee, Pan de Azúcar Aquifer, La Serena, Chile** by Mr **Guido Soto (Water Centre for Arid and Semi-arid Zones in Latin America and the Caribbean (CAZALAC))**.

The Chair of the plenary meeting was Mr **Antonio Morales (FAO)**, the Facilitator was Ms **Amelia Díaz Pablo (National Meteorological and Hydrographic Service – SENAMHI, Peru)** and the

Rapporteur was Ms **Lourdes Batista (National Water Directorate (DINAGUA) Uruguay)**, who submitted the following summary.

In his keynote address, Mr **Ricardo Hirata** said that groundwater played a more important role in supplying water to urban areas than perceived by society. Governing bodies responsible for water resources and the environment often had insufficient technical knowledge and a limited perception of the importance of groundwater in cities.

In theory, groundwater was a local resource and should be managed locally with the participation of users and potential polluters; in practice, implementation capacity was generally inadequate due to lack of human resources and administrative commitments over the long term.

Mr Hirata said that aquifers and the negative impacts on groundwater were not easy to see, which limited the perception of the problem by users, society and government bodies. The “apparent” lack of conflicts over groundwater in urban areas did not mobilize society to implement more controls, and without that pressure, the State failed to act in terms of user control and compliance with laws. The lack of awareness was even greater when society (and even technicians) had no clear idea of the economic value of groundwater and how it contributed to the functioning of the city’s economy.

Overcoming the problems of illegal wells should be a constant, concrete priority. Owing to the characteristics of water abstraction from individual wells, more social communication tools should be employed in that effort.

Groundwater should be presented as a solution for cities and not a problem.

Mr **Mario Hernández** explained that groundwater was often used for agricultural purposes, which generated conflicts with other uses (public, industrial, mining and recreational). Owing to the general lack of knowledge about groundwater in society and to the fact that those conflicts had not been addressed in a timely manner, particularly in times of water shortages, he warned that the sustainable management of groundwater could become unlikely. If that lack of knowledge included leaders, decisions were not taken in time to avoid conflicts (by defining safeguard zones, for example).

Regarding the applications of groundwater in human activities, Mr Hernández said that there were several converging reasons as to why agricultural use was one of the most difficult areas in which to apply good groundwater governance: (1) agricultural use accounted for 65% to 72% of total water use, a proportion that could be reached also for groundwater, depending on the degree of development in each society; (2) governance was complicated for the various stakeholders - from the political authorities and administration to civil society – given the diversity of public and private interests at stake, and (3) there were considerable intrinsic and extrinsic conflicts generated between domestic, industrial, livestock farming, mining, recreational and ecological uses, both in terms of water quality and flow, and also because the associated pollution was mostly diffused.

In his case study, Mr **Humberto Albuquerque** spoke of Brazil and the integrated use of surface water and groundwater as a solution to conflicts over water use. He showed that Brazilian law was good and sufficient, but that implementation lacked in several aspects. In the meantime, on the negative side, the technical structures of Brazilian States lacked specialists, there was insufficient knowledge of aquifers and trained professionals were scarce. He nonetheless cited the success stories of the city of Ribeirão Preto, where local authorities had taken measures to stop the spread of property development projects in aquifer recharge areas; the city of Recife, where well construction in the metropolitan area had been limited; and the aquifer between the States of Ceará and Rio Grande do Norte, where a study had been carried out by the National Water Agency of Brazil (ANA) and clear rules for exploitation had been established.

Mr **Antony Bostwick** showed that in the Bahamas, owing to a lack of knowledge, tourism investment controlled the use of water resources. Scientific considerations should therefore be integrated into investment plans. Local conditions had been exacerbated by climate change, which had caused storms and a rise in the sea level. Although there were regulations applied to water resources in the Bahamas, know-how would be increased by a project on the protection of natural resources in the north of the island of Andros, under the IHP GRAPHIC programme.

Ms **Alicia Eisenkolbl** highlighted the action of water councils in Paraguay, which were composed of various stakeholders. The water councils were currently deliberative bodies and the existing legal framework would need to be modified to make them executive bodies. Their action included monitoring, environmental education and promoting good agricultural practices, but they could neither penalize bad practices nor establish safeguard zones. Achievements in the Arroyo Capiibary basin could be attributed to the joint efforts of local institutional actors and resident participation.

Lastly, Mr **Guido Soto**, referring to his case study on the Pan de Azúcar Participatory Water Monitoring Committee in the region of Coquimbo, Chile, said that although the country's Water Code provided for the creation of groundwater communities, the users were not required to set them up. Small farmers were the most affected when aquifer users were not organized. There were strong pressures on groundwater use in arid areas for mining and agriculture. Chile's Water Directorate had difficulty monitoring and overseeing effective water abstraction and water quality in the aquifers. Although the actions of the Participatory Water Monitoring Committee managed to prevent a mining company from increasing the abstraction, groundwater users in the country acted individually and did not see the need for or benefit of governance systems to improve water management and prevent conflicts.

During the discussions that took place at the end of the plenary meeting, participants addressed the issue of how groundwater was perceived. The conclusions were different, as there were countries in which groundwater was frequently discussed and others in which the subject was very restricted. Groundwater was made more visible by projects that considered communication and education aspects but also by problems of contamination. There was agreement on the need to inform and educate all stakeholders, including users and journalists. The meeting concluded with the statement that good governance involved the integrated use of surface water and groundwater.

3.4 Plenary meeting 4 – Groundwater Governance and Policy: Institutional Structure and Local Perspective

Two keynote addresses were made.

- The first was **Groundwater Governance: Socio-Political Dimensions of Intensive Use Management** by Mr **Héctor Garduño (Senior Consultant, Mexico)** and the second **Water Resources Governance in Brazil: The Contribution of the National Agenda of Groundwater** by Mr **Paulo Varella (National Water Agency (ANA), Brazil)**.
- The first case study was **Governance in the Management of a Transboundary Aquifer System – Case Study: the Guarani Aquifer System** by Mr **Julio Kettelhut (Secretariat or Hydrological Resources, Brazil – Guarani Aquifer System, GAS Project)**.
- The second was **Successful Case of Groundwater Governance: Sardinal Aquifer, Guanacaste, Costa Rica** by Mr **José Chacón (Regional Committee for Groundwater Resources (CRRH), Costa Rica)**
- The third was **The Guaraní Aquifer – Towards regional cooperation** by Ms **Lilián del Castillo-Laborde (University of Buenos Aires (UBA), Argentina)**.

- The fourth was **Integrated Water Resources Management: a Tool for Groundwater Governance in Caribbean SIDS** by Ms **Deborah Bushell (Caribbean Environmental Health Institute (CEHI))**.

The Chair of the plenary meeting was Mr **Daniel González (DINAGUA, Uruguay)**, the Facilitator was Mr **Alfred Duda (GEF)** and the Rapporteur was Ms **Ana Vidal (National Hydrographic Directorate (DNH), Uruguay)**, who submitted the following summary.

Mr **Héctor Garduño** said that groundwater governance required: (1) greater awareness of groundwater as public commons that must be regulated, franchised and monitored on account of its conditions and vulnerabilities; (2) incorporation of groundwater management and protection principles into all laws and legal rules; (3) as legal regulation was necessary but not sufficient, implementation must be strengthened through proper monitoring, as all countries had many laws that were not put into practice; (4) institutions in charge of planning, issuing permits and monitoring must become more aware and encourage user participation.

In the case of Brazil, outlined by Mr **Paulo Varella**, major progress had been achieved in water resource management after the implementation of the National Water Resources Act. Groundwater governance was in its infancy, and regional/local asymmetries and heterogeneities were obstacles that must be overcome, but some successful groundwater management experiments had been carried out and a nationwide groundwater management scheme was in place, consisting of three sub-schemes, namely (i) increase in hydrogeological knowledge; (ii) development of institutional and legal aspects; and (iii) mobilization, social participation and training; investment in the scheme for 2009-2020 had been estimated at \$145,000,000.

Mr **Julio Kettelhut** and Ms **Lilián del Castillo** said that the Guarani Aquifer System (GAS) project (transboundary), straddling the borders of Argentina, Brazil, Paraguay and Uruguay, was an effective regional mechanism for work and coordination among the four countries. Four successful experiments had been conducted in support of local management in pilot areas in which there had been key issues for achieving progress in aquifer management practices. Emphasis was laid on the importance of establishing administrative and legal channels between the subnational (States/provinces) and national tiers of government. Governance of transboundary aquifer management could apparently be strengthened more easily when connected with protection issues and management procedures and when concentrated along the border. Implementation depended on countries' decision to maintain established cooperation bodies and on resource availability. A management agreement had been signed by the four countries in 2010 and was being ratified by each country.

Mr **José Chacón** and Ms **Deborah Bushell** spoke of effective governance mechanisms in Costa Rica and in Caribbean small island developing States (SIDS). They highlighted civil society's participation in the drafting of standards and guidelines, in reporting potentially dangerous situations, in requesting information from the authorities, in participating in the drafting of monitoring plans and in cooperating in inspections. Knowledge of aquifer data and information was a basic requirement for good governance; such information must be set out in a simple and user-friendly manner to permit effective participation. Supervisory institutions with well-defined and sufficiently strong powers were required to enforce legal instruments. In the Caribbean, integrated water resources management (IWRM) was expected to entail intersectoral coordination and collaboration, in addition to boosting participation by interested parties, transparency, sustainable local management and the drafting of management plans. Local managers were needed and officials were required to understand and support solutions, as they must transmit the message to the general population, which was crucial to resource sustainability, within case-specific financial and institutional limits.

During the debates, the following pragmatic recommendations for improved groundwater governance were made:

- it was more prudent to act “concomitantly” than “sequentially” and to begin on a pilot scale; organizational mechanisms should be established or improved and tested in representative pilot aquifers; if laws and institutions must subsequently be improved, reforms that were more likely to be implemented could be proposed;
- governments and foreign aid agencies must be committed to taking up the sustainability, expansibility and replicability (SER) challenge and must be constantly and unobtrusively watchful in support of groundwater management in specific aquifers; agencies must incorporate groundwater management components into general-purpose water supply projects and grant gradually diminishing support conditional on governments’ commitment to provide growing support for those projects until they became fully responsible for them;
- an efficient information and communication system was key to transparency – and therefore to accountability – and must include technical information on the resource’s state, changes and vulnerabilities and on the complex network of agencies, users and other interested groups;
- social participation was vital to aquifer protection but must be based on scientific hydrogeology.

3.5 Plenary meeting 5 – Groundwater Governance: Management and Research

The presentations included a keynote address entitled “**How to Apply Policy to Reality**” by Mr **Luiz Amore (AIH)**, followed by six case studies.

- The first was **Management and Research, International Shared Aquifers of the Americas** by Mr **Alfonso Rivera (Geological Survey of Canada)**.
- The second was **Decision-making Tools for Groundwater Governance in Haiti – Case study on the Masacre Transboundary Aquifer** by Mr **Urbain Fifi (Quisqueya University, Haiti)**.
- The third was **Coordination of Action for the Management and Protection of Groundwater – Case Area: Aquifer in the Centre of Santa Fe Province** by Ms **Ofelia Tujchneider (National University of the Litoral (UNL), Argentina)**.
- The fourth was **Meeting Water Demands at Agrarian Reform Settlements in South Brazil: the Groundwater Governance Concept Put into Practice** by Mr **Roberto Kirchheim (Geological Survey of Brazil)**.
- The fifth was **Institutional and Social Participation in the Management of Groundwater in Venezuela** by Mr **Fernando Decarli (National Institute for Meteorology and Hydrology)**.
- The sixth was **The Integrated Management of Transboundary Aquifers in La Plata Basin** by Ms **Silvia Rafaelli** and Ms **Mónica Troadello (Coordination Unit, La Plata Basin Framework Project (CIC))**.

The Chair of the plenary meeting was Mr **Mario Arias Salguero (University of Costa Rica)**, the Facilitator was Mr **Vladimir Caramori (Brazilian Water Resources Association (ABRH), Brazil)** and the Rapporteur was Mr **Alberto Manganelli (DINAMA, Uruguay)**, who submitted the following summary.

In the plenary meeting, emphasis was laid on the importance of management and research to governance construction. The presentations of the various case studies therefore pointed up the strengths and weaknesses of the various management systems of the countries represented,

lessons learnt from the implementation of various projects and, lastly, the absolute need for proper research in the service of local communities with a view to changes – primarily in public policies – that would improve sustainable aquifer and groundwater management and governance.

The main topics covered in the presentations are summarized below.

Groundwater governance was predicated on groundwater knowledge that was very scant in many cases, owing to the lack of sufficient reliable data on individual countries' water requirements and resources.

Investments in basic research must therefore be made in order to promote the use of scientific findings in decision-making, produce benchmarks for public governance supported by scientifically informed regulation and set the amounts that might be withdrawn sustainably from an aquifer without affecting its quality, other users or ecosystems.

To design and implement governance frameworks based on a combination of science, management and policy, knowledge must be increased and integrated aquifer conservation and utilization management practices must be adopted.

Research findings and all recommendations deemed necessary for the environmentally sustainable management of an exploited aquifer system must in turn be explained clearly and in a participatory manner. Centralization of groundwater management and utilization caused regional and local disharmony.

In all cases there must be political will to implement and make headway in aquifer system management and governance. Time and enduring public priorities and policies were in turn required to build intersectoral commitment and trust.

Policy and institutional change became simpler when users were empowered and then mobilized. That was clear from the case study in which peasants acted through their cooperatives to improve the level of their demands and ultimately achieved municipal and State public-policy changes. The agenda had thus been set from below.

Institutionally, such policies required stable professionals, trained to a high standard and capable of interaction and coordination with other areas in terms of both knowledge and policy, since groundwater governance covered much more than groundwater, for it was connected with land-use, social, economic and other issues.

Lastly, cooperation (regional, international, etc.) was crucial to support for research capacity and governance creation.

3.6 *Plenary meeting 6 – Groundwater Governance and Economics: What investments can support groundwater resources assessment and protection?*

At the meeting one keynote address was given and five case studies were presented.

The keynote address on **The United Nations ECLAC Experience** was given by Ms **Caridad Canales (Economic Commission for Latin America and Caribbean (ECLAC))**

- The first case study was **The Montevideo Refrescos Model for Water Management and the Protection of Water Sources** by Ms **Rosalía Rodríguez (Coca-Cola Uruguay)**.
- The second was **Water Supply Programme for Small Towns and Rural Schools** by Mr **Pablo Decoud (National Sanitary Works Agency (OSE), Uruguay)**
- The third was **Relevant Stakeholders in the Destruction of Aquifers and Possible Remedies** by Mr **Miguel Solanes (IMDEA Water Foundation, Spain)**.

- The fourth was **Drinking Water Monitoring by the Regulatory Unit** by Mr **Daniel Greif (Water and Sanitation Services Regulator (URSEA), Uruguay)**.
- The fifth was **Prioritization of Groundwater Investment – A Caribbean Perspective** by Mr **Karl Payne (Caribbean Institute for Meteorology and Hydrology, Barbados)**.

The Chair of the plenary meeting was Mr **Daniel García (Water Resources Authority, Paraguay)**, the Facilitator was Mr **Marcus Wijnen (World Bank)** and the Rapporteur was Mr **Humberto Peña (Consultant, Chile)**, who submitted the following summary.

The purpose of the meeting was to showcase achievements by the countries of the region in relation to groundwater knowledge and protection and specific experiments by the region's firms whose work involved groundwater governance or aquifer knowledge.

Ms **Caridad Canales (ECLAC)** stressed that the region's laws, geared to efficient, equitable and environmentally sustainable water resources management, had gradually incorporated and had taken more effectively on board concepts such as integrated management, participation and water-cycle management in particular regard to groundwater. She also stressed that such achievements had begun at a time of major urbanization, poverty reduction and concern over food, energy and water security in the region.

She then spoke of Chile as an example of change wrought by domestic legislation enacted to bring them up-to-date with new groundwater issues. Chile had incorporated into its laws the new concept of groundwater rights based on the setting of annual abstraction volumes, the requirement of long-term sustainability of abstractions, the relation of surface water to groundwater, higher allocations to the Administration in order to restrict new users' access to aquifers, incentives for artificial recharge projects and encouragement of groundwater-user organizations.

She noted that countries would face a series of future challenges, such as stronger State involvement, the lack of an appropriate groundwater management culture and of suitable practices, the development of new management bodies, institutional training, land planning, ecosystem conservation, consensus building, socialization of the water issue, reform of the economic system reform and adaptation to climate change.

Ms **Rosalía González** spoke of the water management model used by the Coca-Cola Company in Uruguay, which involved waste-water processing, minimization and retrieval with a view to proper water protection and efficient use of existing resources.

She accordingly described the way in which water resource protection required a vision, evaluation (taking on board the need for sustainability, security, economy and due regard for social and local issues), the setting of targets and goals, implementation and monitoring. She stressed that in implementing the adopted solution, consideration should be given to the protection of sources and to worker education. She also stressed the importance ascribed to the appointment of a Water Resources Chief by the company.

The lesson learnt by the company was the importance of understanding its use of water resources in a broader context, the way in which it influenced groundwater management and the way in which it was itself affected by others' acts (she gave the example of other parties' earlier acts that had caused pollution and had necessitated a change of supply source) – thence the need to be involved in persuading other stakeholders to act properly.

Mr **Pablo Decoud** gave an outline of the OSE project designed to solve the problems of supplying Uruguay's hamlets and rural schools and their various components, especially in regard to community development. The purpose of the project was to supply 13% of the rural sector, namely isolated areas that were hard to reach, had no electricity supply, whose water sources were in poor condition and which experienced other supply-side problems. It was a project with strong social

content associated with recognition of access to water as a basic right, participation by users and civil society and completion of multi-institutional arrangements for its proper governance.

Furthermore, he stressed the importance to its implementation of linkages to local society, by showing that joint endeavours had permitted effective implementation of existing legislation and the achievement of the project's equity component.

Mr **Miguel Solanes**, speaking on aquifer destruction issues, stressed the importance in those regards of two situations: an absent State that did not discharge its responsibilities at all or fulfilled them only in form but not in substance; and a State fettered by interest groups. In that connection, he gave the example of cases in which aquifer deterioration had been linked to the award of agricultural subsidies, even when there had been no general interest at stake. He stressed that the best in the general interest was not always good for a group.

He noted that legal instruments were sometimes deemed sufficient in themselves. While they might be necessary, they often took no account of the effect on users' behaviour of the economic incentives that occasionally complemented those legal provisions. Furthermore, he stressed the importance of allocating sufficient resources to ensure that the regulatory body could effectively enforce the law.

He then spoke of the potentially adverse effect of international treaties on the protection of foreign investments when they were not complemented by other international documents enshrining principles relating to natural resources and the environment.

Mr **Daniel Greif** spoke about the monitoring of drinking water by URSEA, the regulatory body in Uruguay, and explained that its regulatory tasks included monitoring the quality of the groundwater used for general water supplies. Such monitoring entailed testing 33 different parameters and reporting on them fortnightly, half-yearly or yearly, depending on the unit.

Findings were reported against standards.

Lastly Mr **Karl Payne** spoke of the training and research support that the Barbados-based Caribbean Institute for Meteorology and Hydrology (CIMH) provided to Caribbean countries. Groundwater was of great importance to the subregion's achievement of the Millennium Development Goals owing, in particular, to climate variability. Many Caribbean aquifers were threatened by pollution and diminished replenishment associated with land-use changes.

The importance of good groundwater governance in the region was spotlighted by incidences of salt-water intrusion, and progress in the incorporation of integrated water resources management principles had been observed in some countries. He stated that good governance of groundwater management must be reflected in risk reduction. In that connection, studies had shown that the main risk-reduction investment must concern specialized human resources. Other aspects reviewed included the establishment of data and information bases and general public awareness-raising.

The plenary meeting was followed by a debate, in which it was stated that other users, such as farmers, participated in the institutional coordination mentioned in connection with project management for small communities in Uruguay. It was also stated that the case of Chile was not upheld as a model for others to follow, as the issue was specific to each country's real-life situation.

3.7 Plenary meeting 7 – Effective Participation of Stakeholders in Groundwater Governance

At this meeting one keynote address was given and five case studies were presented.

The keynote address by Mr **Francisco Sancén** dealt with Mexico's Technical Groundwater Committees (COTAS).

The case studies were:

- **“The Essential is Invisible to the Eye”: Story of the Project for the Sustainable Management of the Guarani Aquifer through the Dialogue of Knowledge and Enhancement of Local Cultures** by Mr **Antonio Graziano** (Casa Bertolt Brecht, Uruguay);
- **Tri-national Experience in Groundwater Governance** by Mr **Miguel Pineda** (Trifinio Plan);
- **Good Water Governance in Itaipú** by Mr **Nelton Friedrich** (Itaipu Good Water-Governance Scheme);
- **Governance of Shared Waters: Towards Effective Participation of Multiple Actors** by Mr **Rocío Córdoba** (International Union for Conservation of Nature (IUCN));
- **Use of Groundwater from the East Coast Aquifer in the Dominican Republic** by Ms **Xiomara Lluberas** (National Water Resources Institute, Dominican Republic).

The Chair of the plenary meeting was Ms **Mayra Montero** (Ministry of External Relations, Bolivia). The Facilitator was Mr **José Luis Genta** (Intergovernmental Committee for Coordination among La Plata Basin countries (CIC)) and the Rapporteur was Ms **Gabriela Pignataro** (Environmental Culture, Uruguay), who submitted the summary below.

In addressing the topic of effective local stakeholder participation in groundwater governance, six presentations were made. The first three focused on integrated water resources management bodies and the last three on the prospect of integrating local knowledge, knowledge production and community awareness-raising.

In his presentation, Mr **Francisco Sancén** reviewed the experience gained by Mexico's Technical Groundwater Committees (COTAS), as exemplified by the Valle de San Juan del Río aquifer COTAS, which comprised a total of 1,273 users and a governing body elected democratically by assemblies, in which the various uses were represented, among other features. A participatory planning methodology was used to draft an integrated aquifer management plan that comprised lines of action for a 12-year period and studies were produced on aquifer vulnerability, the regulation of aquifer use and other subjects. He pointed to the need to encourage action by users, strengthen monitoring and the authorities' control over activities and amend the existing legal framework.

In his presentation, Mr **Miguel Pineda** spoke of the tri-national experience gained in groundwater governance under the Trifinio Plan implemented by El Salvador, Guatemala and Honduras, in which commitment to the development of environmental management in the Trifinio region, duly taking social aspects into account, had been outstanding from the outset. Its outcomes included a tri-national treaty, a 2010-2020 strategic plan, a tri-national water agenda, involvement of the scientific community with local stakeholders and municipal authorities, an effort to manage transboundary water conflicts, installed technical capacities and resource information management tools (tri-national hydrological map, database, aquifer monitoring and educational and awareness-raising experiments). That approach was based on the IUCN's definition of water governance.

Ms **Xiomara Lluberas**, of the National Water Resources Institute in the Dominican Republic, stressed the importance of the country's aquifers, existing pollution-control tools (quality control network, sea-water intrusion control network and piezometric network) and East-coast conflicts

over the exploitation of public aquifers on privately owned land for tourist sector purposes. She described the water availability studies conducted but said that further information was required in order to draw up a national water plan. Groundwater governance was in its infancy in the Dominican Republic, and so more information, greater rigour in complying with rules and laws, the establishment of governance principles, estimates on use-impact risks and the designing of schemes for integrated groundwater and surface water use were required.

Mr **Nelton Friedrich** spoke of the “Porã Good Water Governance” scheme conducted by Itaipú, the bi-national institution (Brazil-Paraguay). The scheme faced the challenge of a new model of management, cooperation and association between government and society that had led to the formation and integration of various bodies such as the Itaipú Technological Estate (PTI), the Centre for Socio-Environmental Knowledge and Care of the Plata Basin and the Itaipú Renewable Energy Platform. Some of the scheme’s implementation stages included microbasin identification for the conduct of the experiment, future-oriented workshops, the establishment of the microbasin management committee, the signing of “water agreements” and a host of other collective activities in which local communities had always participated.

Mr **Antonio Graziano** outlined the “Guarani Aquifer through the Dialogue of Knowledge and Enhancement of Local Cultures” case study conducted in Rivera department, Uruguay. The results of that experiment included the conduct of training activities in water issues, the formation of the Guaraní Aquifer network, the development of participatory communication tools and international exchange among Uruguay, Brazil and Italy. The salient points of that study were the people’s interest in GAS and the importance of working in and with local authorities, of listening to local communities and of devising a new language that reflected the various viewpoints.

Mr **Rocío Córdoba** reviewed action lines and experiments in line with the IUCN’s approach to local governance. He described initiatives taken in border areas, such as Water and Nature, on the one hand, and water management experiments in shared transboundary basins and adaptation to climate change, on the other. While those experiments were not confined to groundwater, he clearly stated the need for effective participation by all stakeholders and gave details on key water governance criteria or basic factors, such as the need for a flexible management structure, the setting of clear criteria, the distribution of benefits, the creation of a favourable context and the establishment of conflict-resolution mechanisms.

4. WORKING GROUPS

Five working groups, mirroring the various focal points, were formed during the regional consultation for Latin America and the Caribbean.

Group 1 – Groundwater Governance and Policy

Group 2 – Groundwater Governance: Legal and Institutional Frameworks

Group 3 – Development of Groundwater Governance Studies and Research

Group 4 – How to Increase the Level of Investment for Groundwater Governance

Group 5 – Groundwater Governance and Stakeholder Participation

Those groups aroused great interest and engaged in lively discussions and debates, as summarized below.

4.1 Group 1 – Groundwater Governance and Policy

This group's Facilitator was Ms **María Concepción Donoso (Global Water for Sustainability Programme (GLOWS), USAID)** and its Rapporteur was Mr **Alejandro Pastori (National University (UdelaR) Uruguay)**, who submitted the following report.

In accordance with the guidelines, Group 1 focused on the analysis of three key points:

- 4.1.A – the concept of governance, language issues and thematic documents;
- 4.1.B – identification and establishment of guiding principles for good governance;
- 4.1.C – discussion of the general "recommendations" contained in the Steering Committee's Overview.

4.1.A **Concept of governance**

In that connection, Group 1 agreed to request the Project Steering Committee to revise the definition and conceptualization of groundwater in particular, taking into account discussions held and contributions made during the consultation. It was reiterated that governance was an integrative construct covering both surface water and groundwater.

Language issues – Group 1 agreed to propose to the Project Steering Committee that the most important documents be translated into Portuguese and Spanish.

Thematic documents – Executive summary – It was proposed that an executive summary be drawn up for each thematic document.

4.1.B **Identification and establishment of guiding principles for good governance**

Group 1 considered that it would be advantageous for countries to enhance knowledge of their groundwater situation and of processes that can affect its future condition, and to monitor changes; it also considered that it should recommend the promotion of social participation in order to guarantee efficient, equitable and sustainable groundwater use for the benefit of society and future generations.

Principles

- Sustainability (environmental, economic and social)
- Transparency in a broad sense
- Inclusive participation in all phases of governance

- Responsibility shared among all stakeholders
- Integration, in the context of integrated water resources management covering the water cycle in its entirety
- The precautionary principle (new in the project background document “Overview”), for example within the meaning used in Uruguay’s laws, which provided that lack of technical or scientific certainty is no defence – in view of the risk of serious damage to water resources – for not taking steps for prevention, in mitigation and for replenishment”.

The Group considered that “Assess and attribute groundwater risks” and “Protect recharge areas and processes”, which featured as principles in the document, were not principles but lines of action derived from previously stated principles.

Brief discussion of the general “recommendations” contained in the Overview

The representatives considered that the “recommendations” textually merited analysis at greater length; they nonetheless noted that:

- it was important to identify which specific governance challenges should be addressed, bearing country-specific realities in mind;
- it was vital to address knowledge and skill issues, bearing in mind differences in the region’s laws.

4.2 Group 2 – Groundwater Governance: Legal and Institutional Frameworks

The Facilitator was Mr **Max Campos (OAS)** and the Rapporteur was Ms **Virginia Chiesa (Santa Fe Government, Argentina)**, who submitted the following report.

- In regard to the legal status of water, Group 2 noted that the resource was generally public commons in Latin America and the Caribbean.
- Countries, be they unitary or federal, tended to establish their institutions in accordance with their constitutional political organization.
- Water legislation must have the necessary authority and institutional and financial resources for effective implementation.
- Without generalizing, the establishment and continuous updating of water registers and of registers of water usage rights were crucial to laying the foundations of groundwater management in Latin America and the Caribbean.
- From the 1987 Brundtland report to date, the leading groundwater governance management model had been marked by the paradigm of sustainable development, which implied that water use must meet social, environmental and economic needs equitably in order not to limit current and future generations’ development opportunities.
- The social, economic and environmental aspects of water must be covered by law.
- In that regard, it was stressed that while the sustainable water management concept had been incorporated by all of the region’s legal systems, it was still very difficult to put it materially into practice.
- For example, there had been cases of unsustainable groundwater exploitation that compromised long-term development.

- **Mechanisms inherently conducive to good groundwater governance** included:
 - **civil-society participation:** effective civil-society participation took the form of the establishment of basin committees, users’ organizations and public hearings, to mention but a few;
 - operating **capacity** included the incorporation of training, knowledge and economic instruments such as the charging of rates for the various water uses and for wastewater disposal;
 - **transparency**, a polysemous word, had been taken to mean availability and accessibility of public information;
 - **accountability** was the evaluation of effectiveness in fulfilling set water policy goals;
 - **access to justice:** although there were various means of access to justice in Latin America and the Caribbean, the importance of establishing environmental courts had been acknowledged; investment disputes, however, were usually submitted for settlement to international arbitration tribunals that were under no obligation to take notice of prevailing water-law principles;
 - **integrity.**
- Although there had been significant progress in regard to shared aquifer systems, greater legal, institutional and organizational (national-international) development was still required so that they could be managed sustainably.
- Cooperation between regional and international organizations must be more effective.
- Emphasis was therefore laid on the importance of the role of UNESCO’s IHP in the generation of groundwater information and knowledge. GEF’s financial support, in addition to its capacity to establish transfers of experience and practices in its fields of competence, was required. The World Bank and FAO, too, would play a specific role in boosting investments and in backstopping policy formulation for sustainable groundwater use and food production. IAH professionals’ skills and experience were invaluable to ensuring that decisions rested on technical certainty and had a positive political and social impact. The OAS, too, played a great role in supporting the IHP in the region’s transboundary aquifer issues.

4.3 Group 3 – Development of Groundwater Governance Studies and Research

The group’s Facilitator was Ms **Nilda González (Latin American Association of Groundwater Hydrology for Development (ALHSUD))** and its Rapporteur was Mr **Joram Gil (UNESCO Chair on Sustainable Management of Water Resources, Guatemala)**, who submitted the following report.

Points agreed as bases for action to acquire knowledge, studies or research

- 1. Assessment of basic knowledge** (three tiers of decision-makers)
 - Basic information – georeferenced aquifer delineation, inventory, water use and quality.
 - Hydrogeological data – aquifer conceptual model for analytical purposes, identification of charge and discharge areas, hydrogeological parameters, aquifer vulnerability, aquifer dynamics; water balance, isotopic studies.

- Management model supported by a physical model, use of remote sensors, data access.

2. Who acquires or generates knowledge

State geological agencies or institutions, line ministries, universities, cooperation agreements.

3. Funding

Governmental and State bodies, universities, users and subject-specific private sector bodies (environmental impact).

4. Online information systems

Such systems must be public, readily accessible and easily understood by the countries' users or citizens.

5. Communication and dissemination

Designed to deliver information and education, messages intended for users, politicians and managers must be clear and tailored by resource persons with excellent communication skills (scientific journalists).

6. Monitoring

Monitoring yielded feedback for storing reliable data and for checking conceptual, numerical and management models. It was recommended that water-quantity-and-quality monitoring networks be established and maintained.

7. Training

Staff training to form a critical specialist mass through national and international cooperation between governmental bodies and universities (example: UNESCO's IHP).

Applied research (tools)

- Remote sensors.
- Isotopes.
- Geophysical applications (example: gravimetry/storage changes).
- Groundwater-surface water interrelation.

Recommendations

- Inclusion of groundwater as a subject in curricula as from primary education.
- Human-resources training in groundwater issues for knowledge transmission in various disciplines.
- Rise in development bodies' budget for research and training in hydrogeological issues.
- Planning of activities in terms of scale for the quantity of information required at the relevant level (municipal, provincial or national).
- Encouragement of research centres to engage in extension work.

- (f) Researchers and representatives of scientific centres to be taken into account in decision-making.

4.4 Group 4: How to Increase the Level of Investment for Groundwater Governance

This Group's Facilitator was Mr **Jorge Santa Cruz (University Buenos Aires (UBA), Argentina)** and its Rapporteur was Ms **Marcela Ruiz (DINAGUA)**, who submitted the following report.

The state of the local groundwater governance varied widely among the countries of the regions.

Facts for the Global Diagnostic Report

Several countries of the region had no specific groundwater management policy.

Water management primarily concerned surface-water management.

Investment levels in Latin America were generally insufficient for the conduct of proper groundwater management that embodied factors of sustainability.

Monies collected on water permits or for the use of water were not invested in management.

There was a dearth of institutional settings for implementing groundwater management and, in particular, for creating conditions to charge water rates; there was also a lack of funds for solving problems in areas where they had been identified or where there were indications of future uses and of the corresponding need for protection.

Case studies

During the consultation, the situation was found to differ in the two subregions:

- *Latin American countries*, where water was sourced both from groundwater and surface water, reflecting a variety of situations (for example, countries that did not charge water rates or, in the case of Brazil, charged rates for the use of surface water but not for the use of groundwater, etc.), problems of inefficient planning and management and the need for institution building;
- *Caribbean islands*, such as Bahamas and Barbados, where groundwater was the main source, faced the constant risk of salt-water intrusion, water being a crucial factor of their basic economic activity (tourism); the challenge was therefore one of making the various islands' governments aware of the importance of coordinating and strengthening water governance (more professionals, more knowledge and improved regulation in countries) and of drawing on joint efforts to that end.

Overall framework for investment analysis

Existence of inefficiencies

There were process inefficiencies all along the line from governance in general to groundwater management to users. Those inefficiencies had economic effects and various kinds of costs.

In some cases, for example, there were no intermediary bodies to promote effective interrelations among water management stakeholders, or managers might lack or fail to make effective use of skills available in the country to improve water governance.

Inefficiencies stemmed from inappropriate use of existing institutions and from the lack of sufficient managerial staff, both administrators and geologists, and were reflected in the existence of a large number of illegal wells.

Furthermore, most management institutions were centralized, thus receiving their budget from general government revenue.

Review of externalities and various associated costs

The decision on groundwater uses implied various externalities (adverse factors) that were not duly appraised in governance, such as the lowering of the water table, lower river level, pollution from disposed waste and likelihood of unmet future demand. Knowledge of externality costs (social, environmental and economic) must be improved.

Governments might decide to harness groundwater, presuming that they would reap only benefits, and might in so doing ignore or minimize any undesirable effects (externalities) and related costs.

Changes to ideas about desirable investments

Initially, agencies funding services and public works agreed to grant loans for the sinking of wells, on the assumption that they were investing in infrastructure, which was considered to be a desirable investment. They did not therefore require prior environmental and social feasibility studies. With the passage of time, both lending agencies and governments acknowledged that to be a mistake when they became aware of the importance of requiring prior studies to substantiate investments crucial to governance and to making management institutions stronger and accountable.

General recommendations

Water rates should be charged generally. Groundwater franchises for commercial and industrial water uses must not be granted free of charge, and the rate must be tied to the end-use.

1. Governance should be paid on the basis of actual water-resource use. The managing institution must collect the rates and invest that revenue in management in order gradually to create a virtuous circle.
2. Investments in knowledge and in the provision of human and material resources must be increased for inspection purposes.

Specific recommendation

The following instruments and activities were required for borehole and water rates collection registers:

- future users must obtain a permit and register the works;
- for illegal users: electricity consumption data; monitoring based on detailed piezometric maps; other;
- drillers must register with the relevant authority and be under an obligation to perform registered works, the relevant information being crosschecked with tax returns;
- borehole-drilling input providers must register the address of registered or authorized borehole works and of the driller who would perform the work; crosschecking of information.

Steps proposed for deciding on the most appropriate investments (to be assessed)

Once the groundwater management institution obtained income by charging water rates, it could proceed as noted hereafter. Such receipts could be used initially to improve all features of governance such as studies, monitoring, modelling and control. Once the state of knowledge and

of activity coordination had improved, the institution could then proceed to the next stage, which would consist in assessing loan applications to financial agencies for institution-building purposes, which would enable it to act more effectively and/or to invest in a clearly defined governance improvement project.

4.5 Group 5: Groundwater Governance and Stakeholder Participation

Ms Carmen **Curbelo (UNESCO Chair on Water and Culture, Uruguay)** was the group's Facilitator and its Rapporteur was Ms **Milenka Sojachenski (Global Water Partnership (GWP), South America)**, who submitted the report below.

Main premises of recommendations formulated by Group 5

Governance must be a means of achieving the human right to water. For its construction, society must be empowered on the basis of the democratization of power, the prime objective being the individual user of groundwater.

Groundwater, an invisible resource, was associated with latent conflicts faced by individuals and society. The Group proposed an approach to the transformation of groundwater conflicts that was based on social and environmental studies.

Identification of stakeholders

All persons directly or indirectly involved must be identified by geographical area (at very different scales) and by taking a multidisciplinary approach in order to acknowledge the value of groundwater (economic, social, environmental and symbolic) within the society and thus permit empowerment and action.

As the following identification had been drawn up without assessing impact levels, the Group recommended that they be qualified according to the relevant working context.

1. Direct stakeholders (water users)
 - 1.1 Users (private/State)
 - 1.1.1 Communities
 - 1.1.2 Economic activities
 - 1.1.2.1 Industry and mining
 - 1.1.2.2 Agriculture
 - 1.1.2.3 Livestock
 - 1.1.2.4 Tourism
 - 1.1.3 Drinking-water supplier
 - 1.1.4 Private supply
 - 1.2 Ecological schemes (river ecosystems/wetlands, lagoons)
2. Indirect stakeholders (who exert influence on the sector/are affected positively or adversely by the sector)
 - 2.1 Planning/decision-making bodies
 - 2.2 Financial institutions/banks
 - 2.3 Research/educational bodies
 - 2.4 Development institutions
 - 2.5 Civil society/professional associations
 - 2.6 Media/journalists

Recommendations

Specific strategies

- Awareness-raising for all.
- Public hearings.
- Pilot projects.
- Opinion polls.
- Basic, social participatory and environmental research.
- Inclusion of mass communication as a project component.
- Groundwater syllabus in the curriculum of educational institutions.

Expected result

Formation of interest groups/stakeholders (high participation and representativeness) to achieve **social consensus** (especially in urban areas) and thus trigger change and overcome resistance to the introduction of new policies based on logical scientific and economic criteria for the protection and proper management of groundwater.

General strategies

- Proclamation of “International Groundwater Year”.
- Groundwater training schemes for journalists, especially those who were not interested in the subject.
- Capacity-building for groundwater managers in government bodies and staff training.
- Easier regional exchange of success stories publicized in other regions for possible replication.
- Interaction with other institutions on specific groundwater issues.
- Establishment of competitive funds for the strengthening of groundwater management policy and groundwater management by local communities.
- Implementation by UNESCO of an international groundwater ambassadors programme.
- Support by GEF, under the Small Grants Programme, for one-off community-based groundwater projects.
- Greater World Bank investment in groundwater sustainability education.

4.6 Plenary meeting 8: Submission of reports

At the end of the working groups’ meetings, **Plenary meeting 8**, chaired by Mr **Andrea Merla (Senior UNESCO-IHP Consultant)**, was held. During that meeting Mr **Nelson da Franca (Senior UNESCO-IHP LAC Consultant)** reported on the plenary meetings of the general consultation. The rapporteurs of each working group reported immediately afterwards under the chairship of Ms **María Concepción Donoso (GLOW-USAID)** and Mr **Alfred Duda (ex-GEF)**.

5. CONTRIBUTIONS OF LATIN AMERICA AND THE CARIBBEAN TO THE GLOBAL GROUNDWATER DIAGNOSTIC AND TO THE RECOMMENDATIONS FOR THE FRAMEWORK OF ACTION

The following contributions by Latin America and the Caribbean have been drawn from the various thematic presentations, the case studies, the findings of the working groups and the debates of the plenary sessions, summarized above.

The contributions of the various components of the project, the Global Groundwater Diagnostic and the Recommendations for the Framework of Action, are presented below in connection with the following themes:

- 5.1 The project: The definition of groundwater governance – The Thematic Papers
- 5.2 Institutional structure
- 5.3 Policies and legislation
- 5.4 Studies and research
- 5.5 Sustainable development: urban and rural areas
- 5.6 Increase of investments
- 5.7 Participation and communication
- 5.8 International and regional organizations
- 5.9 Communications concerning groundwater governance

5.1 *The project: The definition of groundwater governance – The Thematic Papers*

The governance of groundwater essentially entails making and implementing decisions with a view to research, exploitation and sustainable use of that resource and the subject must be constantly discussed **with all of the interested parties including politicians**, always in the context of the financial, economic, environmental and social conditions of each country, department and municipality.

During the Regional Consultation the definition presented as the basis for discussion by the Project's Steering Committee was as follows: **"The governance of groundwater is the process through which that resource is administered, by means of the application of the principles of responsibility, participation, information and transparency, and legal rules. It is the art of coordinating administrative actions and decision-making between the different spheres of competence and territorial levels – one of which could be global. (Adapted by the group from Saunier and Meganck 2007. Dictionary and Introduction to Global Environmental Governance)"**.

This definition will have to be revised and improved, taking account of the proposition that governance is a mechanism of integration which covers both groundwater and surface water.

The Project's Thematic Papers presented by the Steering Committee **were the subject of several observations by participants who pointed out that, in view of their academic character, they should be adapted in order to achieve the objective:** to provide guidance to participants in the process of governance in each country.

Moreover, although the document entitled "Synthesis of Thematic Papers/Case Studies" has been made available, it does not provide a synthesis of each separately but regroups the subject matter. The participants thus recommend **making available the current version of each separately**, along with a **separate summary** to make it easier to understand and highlight the main aspects.

5.2 Institutional structure

In all of the countries of Latin America and of the Caribbean there are various institutions connected with groundwater governance, at national/federal level, at departmental/State level and, in some cases, at local level.

- In the countries of the region groundwater is in the national domain. The only exceptions are Argentina and Brazil where groundwater is in the domain of the department/State.
- In the larger countries, there are a large number of institutions whereas in countries with a smaller area there are few institutions responsible for the governance of groundwater, especially in the Caribbean where, in each island State, there is generally at most an agency that coordinates planning, exploitation and use of groundwater together with surface water.
- The countries of Latin America and the Caribbean consider, in general, that there are adequate groundwater institutions at national/departmental level. The exception is almost always governance at local/municipal level.
- In practically no country of the region is it thought that new national institutions should be set up. What is lacking is greater institutional coordination, clear channels for coordination and reinforcement of such as already exist.
- In all countries there should be greater political support for the institutions involved in the groundwater governance.

5.3 Policies and legislation

- In some countries there are already institutionally defined priorities at government level, as in Costa Rica (National Development Plan 2011-2014), Brazil (National Water Resources Plan) and Argentina (Federal Water Plan).
- Elsewhere there are defined priorities but what is needed is:
 - to pass the General Water Law (El Salvador, Honduras and Guatemala)
 - to draw up the Integrated Groundwater Plan (Haiti)
 - to establish an Integrated Water Resources/Groundwater Plan (Peru)
 - to formulate a Programme for Improved Water Quality Control (Dominican Republic)
 - to implement the National Integrated Water Resources Management Plan (Uruguay).
- In other countries the priorities set are technical, concerned with the management of aquifers:
 - to improve knowledge and monitoring of aquifers (Costa Rica and Venezuela).
 - to stabilize overexploited aquifers (Mexico)
 - to extend control and supervision of groundwater (several countries).
- In some countries of the region, including Argentina, Brazil, Chile, Jamaica, Mexico, Peru and the Dominican Republic, there are formal policies and legislation on water resources, including groundwater.
- In general, legislation is applied at national/federal and departmental/State level but there is often a shortage of technicians at local/municipal level, preventing the application of legislation and supervision.

- A framework for the region is provided by the Groundwater Management Agreement adopted by the Guarani Aquifer System Project (Argentina, Brazil, Paraguay, Uruguay) which is being ratified by each country.
- It should be noted that each country faces specific challenges and obstacles impeding good groundwater governance but certain problems are common to almost all:
 - lack of knowledge about groundwater, its potential, its use and its vulnerabilities on the part of the population in general, the media, parliamentarians and the various levels of government.
 - lack of better organization on the part of groundwater users, in particular the agricultural, mining and drinking water sectors.
 - lack of production and updating groundwater studies, lack of monitoring networks and hydrogeological databanks with adequate resources; lack of training programmes.
 - lack of qualified staff with specific knowledge in the organizations concerned; inadequate legislation and law enforcement powers.
- As contributions to the solution of these problems several countries make the following recommendations:
 - placing groundwater on the national agenda.
 - reinforcing government bodies concerned with groundwater and avoiding administrative discontinuity.
 - changing the belief that groundwater is free and anyone can do what they want.
 - improving basic knowledge of groundwater resources at all levels and interaction between all stakeholders.
 - improving the training of specialists and well drilling teams.
 - creating incentives to encourage the efficient use of groundwater and its conservation, especially in the islands of the Caribbean.

5.4 *Studies and research*

- Groundwater governance depends on knowledge of the resource. Such knowledge is however limited in various parts of the region, as a rule because of the lack of adequate reliable data.
- It is therefore necessary to invest in basic research in order to promote scientific results in decision-making and to create frameworks of public governance backed by regulations that take science into account for the purpose of determining, for example, how much can be sustainably extracted from an aquifer without affecting its quality or other users, including ecosystems.
- In order to design and implement governance frameworks based on a combination of science with management and policy it is necessary to increase knowledge and adopt integrated management practices for the conservation and use of aquifers.

- The principal problems connected with the quality/quantity of groundwater in Latin America and the Caribbean are in general specific and located in clearly defined areas. At the same time, the aggregate in some small countries converts them to a national scale.
- These problems are:
 - in relation to exploitation: (1) falling levels and (2) salt-water infiltration in coastal areas.
 - pollution related to (1) urbanization – particularly from nitrates and pathogenic microorganisms; (2) phytosanitary products in the rural environment; (3) soil salination; (4) mining areas; (5) poor well construction; (6) geological problems.
- In Argentina there is a regional problem of quality because of the excessive quantities of arsenic, fluoride and other substances found in association, especially in the Chaco-Pampeana region and in the north-west of the country
- The small island developing States of the Caribbean could profit from a joint regional approach. The formation of a “Groundwater Group” would be useful for the development and execution of research; capacity-building is essential in order to achieve shared regional development. The Caribbean Institute for Meteorology and Hydrology (CIMH) could play a dominant role in achieving such a result, as the seat for the group.
- Another recommendation presented during the consultation entails the inclusion of the subject of groundwater in the educational curriculum, starting at the primary level.

5.5 *Sustainable development: urban and rural areas*

- In Latin America and the Caribbean groundwater plays a more important part in the urban water supply than is realized by society. In many cities groundwater constitutes 100% of the supply source.
- As a fundamental component of the water cycle in urban areas, groundwater should always be taken into account in regional planning and in the development of local infrastructure but it almost always remains off the policy agenda for the management of urban resources.
- Agricultural use in the region represents approximately 70% of the total volume of groundwater extracted from wells which creates conflicts with other uses.
- Regarding the applications of groundwater in human activities, it is a known fact that agricultural use is one of those uses which present the greatest difficulties for sound governance of the resource.
- The proper construction of wells, their exploitation and monitoring are important factors in the development of groundwater for both agricultural and urban purposes. This point is considered to be of great importance throughout the region in view of the difficulty of official control of boreholes.

5.6 *Increase of investments*

- Investment levels in Latin America are generally insufficient to support the satisfactory management of groundwater with a degree of sustainability.
- There is substantial agreement in most of the countries regarding the need to increase the level of investment in groundwater at local/sub-national/national level through the

implementation of national and provincial groundwater plans, programmes of information and training and for the strengthening of the groundwater institutions, the implementation of legislation, charges for the use of groundwater and for the improvement of management.

- The principal investment requirements also include studies to improve knowledge of aquifers, monitoring of quality and quantity, staff reinforcement and institution building, continuing technical training, installation of easy-access databanks (information systems), increased coverage of groundwater in the media, protection of water recharge areas and areas of risk of pollution.
- The specific recommendations on charging for the use of groundwater discussed by the consultation include:
 - general introduction of a water charge; the licensing of a groundwater supply for commercial and industrial water use should not be free of charge and its value should be related to the intended use;
 - governance should be paid for, if possible, by the actual use of the resource. The management institution must collect and set aside the income for management, in order to establish a virtuous circle.

5.7 Participation and communication

- The countries discussed how to establish and maintain an interdisciplinary dialogue on groundwater governance between public actors, the private sector, the academic world and civil society, as well as between society in rural and urban areas. Various ideas were presented and may be summed up in three main proposals:
 - first, by including the subject of groundwater in national, provincial and local agendas, thus according a political and administrative priority to the subject;
 - secondly, through the support of the communication media, circulating government plans relating to groundwater;
 - thirdly, the strengthening of institutions of public participation such as the Basin Committees (Brazil), Cotas (Mexico), Local Water Authorities and Autonomous Water Authorities (Peru), Water Resource Councils (Uruguay). A good example is the Itaipú “Cultivating Good Water” programme (Brazil).
- It is important to point out that people’s perception of groundwater in the countries and even within one country varies a great deal. Whereas the subject is discussed in a few countries, in most such discussion is very limited.
- Nonetheless it is very important for society to participate in the formulation of norms and guidelines and to report situations of risk, to request information from the authorities, to take part in the preparation of monitoring plans and to help with supervision.

5.8 International and regional organizations

- Groundwater is a social, economic and environmental resource and it is advisable for regional and international organizations to contribute, on the basis of their specialist fields and expertise, to the conversion of those aspects into practical actions and activities within projects in Latin America and the Caribbean.

- Specifically, the important role of UNESCO's IHP is highlighted in the fundamental task of information and knowledge production and in political contacts with the countries and regions involved in the Project, in addition to its leadership role in inter-agency coordination.
- The assistance and financial support of GEF is also required as well as its capability in the transfer of experience and practice globally.
- It is important for the World Bank and the FAO to play a specific part too in support of countries and regions, both with regard to incentives for investment and to the support necessary in the formulation of policies providing for the sustainable use of groundwater and food production.
- The Organization of American States (OAS) must continue to support UNESCO-IHP in addressing the issue of aquifers in the hemisphere; transboundary aquifers are an issue of particular importance for countries.
- The International Association of Hydrogeologists (IAH) also brings together a large group of professionals with valuable capabilities and experience, ensuring that the Project has a level of quality that reduces uncertainty and providing support for decisions with a positive political and social impact.
- Various regional institutions, programmes and projects such as the "Andean Strategy for the Management of Water Resources" (Andean countries), the "Trifinio Plan" (Central America), the "Intergovernmental Committee of the River Plate Basin (CIC)" and the "Amazon Cooperation Treaty Organization (ACTO)" with their transboundary projects, and CARICOM, inter alia, must be brought into the process of regional cooperation on groundwater governance.

5.9 *Communications concerning groundwater governance*

Various communications concerning the governance of groundwater were presented by the countries of Latin America and the Caribbean and must be taken into account by the GEF Project in its Global Diagnostic and in the recommendations of the Plan of Action.

- Groundwater is invisible to the public, to politicians and even to engineers, and therefore its impact takes time to become apparent (Costa Rica).
- "Groundwater should be treated as a factor for integration, bringing together users, technicians and politicians" (Brazil).
- Groundwater represents a strategic resource for countries, hence the particular attention paid to its specific aspects at national level and its international implications, its protection and rational use, which should be considered with great interest by civil society and the State (Uruguay).
- Each country should increase its investments – financial, technical, institutional – in order to improve the governance of groundwater (Mexico).
- Inasmuch as groundwater resources constitute the planet's largest reserve of freshwater, their governance, management and protection should represent a priority for all. Accordingly, multilateral dialogue between all stakeholders is fundamental and groundwater governance must be coordinated with the integrated management of water resources (Argentina).

- The governance of groundwater must be targeted at all who participate in its management at local, departmental, national and international level. The diversity of approaches and vision which form the basis of coexistence must be respected by creating practical mechanisms for the coordination and convergence of management processes, considering water as a unifying factor and balancing the technical and political input (Bolivia).
- The governance of groundwater will depend on the management structures, and the proposed legal and institutional developments involving all stakeholders at all administrative levels (IAH LAC).
- The effective governance of groundwater requires proactive measures by the State and a cultural change among users (Chile).
- Good governance of groundwater requires good legislation, effectively applied (El Salvador).
- It is necessary to reinforce the institutions that apply the laws and enable the bodies governing groundwater to act with the full power of the law to prevent the quality and quantity of this resource being affected by communities, which often act in ignorance of policies for the protection of the resource, without realizing the damage they are causing (Dominican Republic).
- With a view to groundwater governance it is necessary to increase planning, education and control of that vital resource in all sectors of society and to use groundwater rationally (Cuba).
- Groundwater governance must be taught as a formal course in schools, colleges, universities and rural communities since almost the entire population is unaware of it. The first step would be to train staff to publicize the subject (Guatemala).
- Groundwater is vital for the health, the environment and the economy of countries. Good governance of groundwater makes this possible, enabling the sustainability of the resource for future generations. This requires the participation of all users (public and private institutions, NGOs, professional associations etc.) and the identification in each country of the priorities and challenges for better management of the resource (Haiti).
- Sustainable groundwater governance is vital for the agriculture, industry, human needs, tourism and environmental viability of countries, especially with the impact of climate change. Politicians, decision-makers, technocrats and the population must be alert to the issue and its importance (Jamaica).
- For some time, groundwater in Mexico has been considered as a national security priority for the country, which is how it is treated by the National Water Resources Law of 2004. Still, there is currently a growing awareness of the water crisis and its impact on the physical environment and on society; but there is not yet any agreement in society on the way to mitigate it. The change needed to achieve such agreement would involve proactive initiatives by all stakeholders including the authorities the participation of society in decisions and government commitment at three levels: federal, State and local. These requirements are fundamental in relation to groundwater in order to confront the crisis (several overexploited aquifers already) with the participation of all stakeholders in decisions, in such a way as to ensure acceptance of the measures adopted and their effectiveness, since that is the root of one of the major problems in the management of basins and aquifers.

- Within one region, the particular features of each country and the different areas within countries prevent the concoction of detailed recipes for groundwater governance. It is nevertheless possible to pinpoint lines of analysis which help to identify common obstacles for groundwater governance and to disseminate successful experience and failures through communication and popularization facilities in order to assist decision-making. With the participation of all those concerned with each aquifer in particular, objectives should be established as well as a common agenda. Academic institutions can provide support for this process, with the development of monitoring systems, training workshops, information seminars, human resources training, development of technological tools such as computer simulation models, and links with other institutions (Mexico).

6. CLOSING SESSION

The closing session was coordinated by Mr **Daniel González (DINAGUA)**. The Facilitators were Mr **Nelson da Franca** and Mr **Andrea Merla (Senior Consultants UNESCO-IHP)** and the panellists Mr **Jacob Burke (FAO)**, Mr **Shammy Puri (AIH)**, Ms **Alice Aureli (UNESCO-IHP)**, all members of the Steering Committee of the Groundwater Governance Project, and Mr **Alfred Duda (ex-GEF)**.

At the closing session the panellists presented a positive assessment of the regional consultation for Latin America and the Caribbean, indicating that the results and recommendations would help to guide the organization and development of the other four regional consultations to be held in Kenya, Jordan, China and the Netherlands, as well as the preparation of the Global Diagnostic and the Framework of Action of this GEF Project.

At the end of the closing session tribute was paid to Mr Alfred Duda (ex-GEF) in recognition of his work in Latin America and the Caribbean over the last 20 years. On behalf of the Government of Uruguay and the participants in the Montevideo consultation, Mr Jorge Rucks presented him with a gift as a memento of his action in the region.

The Regional Consultation for Latin America and the Caribbean was closed on 20 April 2012 at 6 p.m.

7. FINAL CONSIDERATIONS

The regional consultation for Latin America and the Caribbean was attended by several journalists and was reported on in many articles appearing in the national and regional press. One such article, by the journalist Hernán Sorhuet Gelós, was published in the El País newspaper (Uruguay) in Montevideo, on 25 April 2012. In view of its relevance it is reproduced below.

A HIDDEN AQUATIC TREASURE

Although the water system of the country and region includes both surface water and groundwater, the fact that we cannot see aquifers seems to be a sufficient reason for ignoring them.

No-one disputes the essential nature of water. Yet the negligence or indifference of public opinion to the importance of groundwater is well known. This may explain the failure to develop the joint management of surface water and groundwater, which is essential in order to ensure the sustainability of the resource. We have good technical and scientific information and considerable experience in water management -registering successes but, mainly, mistakes.

There is no doubt that the path to follow is the one towards sound water governance or to a different way of making important decisions that would result in the sustainable economic, social and institutional development of the resources, based on a better balance between the State, civil society and the market. A balance – as yet undetermined – should be sought between the State and civil society, based on consensus and participation. What is at stake is the quality of life for everyone.

Governance means making decisions and implementing them. It is clear that economic, political, social and environmental considerations are fundamental, not only in order to guarantee proper use of water resources but also to ensure their sustainability.

What is costing too much is the effort to inspire decision-making, as soon as possible, with this vision and thus be able to redefine policies and design medium- and long-term action plans.

Aware of the importance of the issue, UNESCO and FAO held last week in Montevideo a regional consultation for Latin America and the Caribbean on groundwater governance. What is particularly worrying is the degree of depletion and degradation of groundwater, the lack of good governance being responsible for many of the problems. Since all stakeholders in the use and conservation of aquifers – and of surface water - have a responsibility, a change of direction is required on the issue.

One of the concerns that pervaded the meeting of experts was how to make progress with regard to participation. A great deal of scientific knowledge is available but greater involvement is required from the political sector (decision-makers) and local communities (users), which brings us onto the rather neglected terrain of communication.

Up till now, the situation has been that the scientific and academic sector –the source of the fundamental knowledge required to establish any form of sustainable management of water resources – has not known how to communicate clearly and simply with the political sector and civil society. This is an obstacle to progress in groundwater governance.

One of the proposals made at the international meeting was to include in every project a more solid and clearly defined communication component than has been the case up to the present time. This would involve the organization of public hearings with the communities concerned.

Aquifers must “emerge” as key issues in sustainable development.

ANNEXES

ANNEX 1: FINAL AGENDA (Spanish-English)

File to follow

ANNEX 2: List of participants

File to follow

ANNEX 3: List of acronyms

ABAS	Brazilian Groundwater Association
CEHI	Caribbean Environmental Health Institute
CIMH	Caribbean Institute for Meteorology and Hydrology
CRRH	Regional Water Resources Committee (Costa Rica)
ECLAC	Economic Commission for Latin America and the Caribbean
FAO	Food and Agriculture Organization of the United Nations
GEF	Global Environment Facility
IAH	International Association of Hydrogeologists
ICC	Intergovernmental Coordinating Committee for the Plata Basin Countries
IHP	International Hydrological Programme (UNESCO)
IUCN	International Union for Conservation of Nature
LAC	Latin America and the Caribbean
OAS	Organization of American States
UNESCO	United Nations Organization for Education, Science and Culture
UNIDO	United Nations Industrial Development Organization
IBRD	World Bank