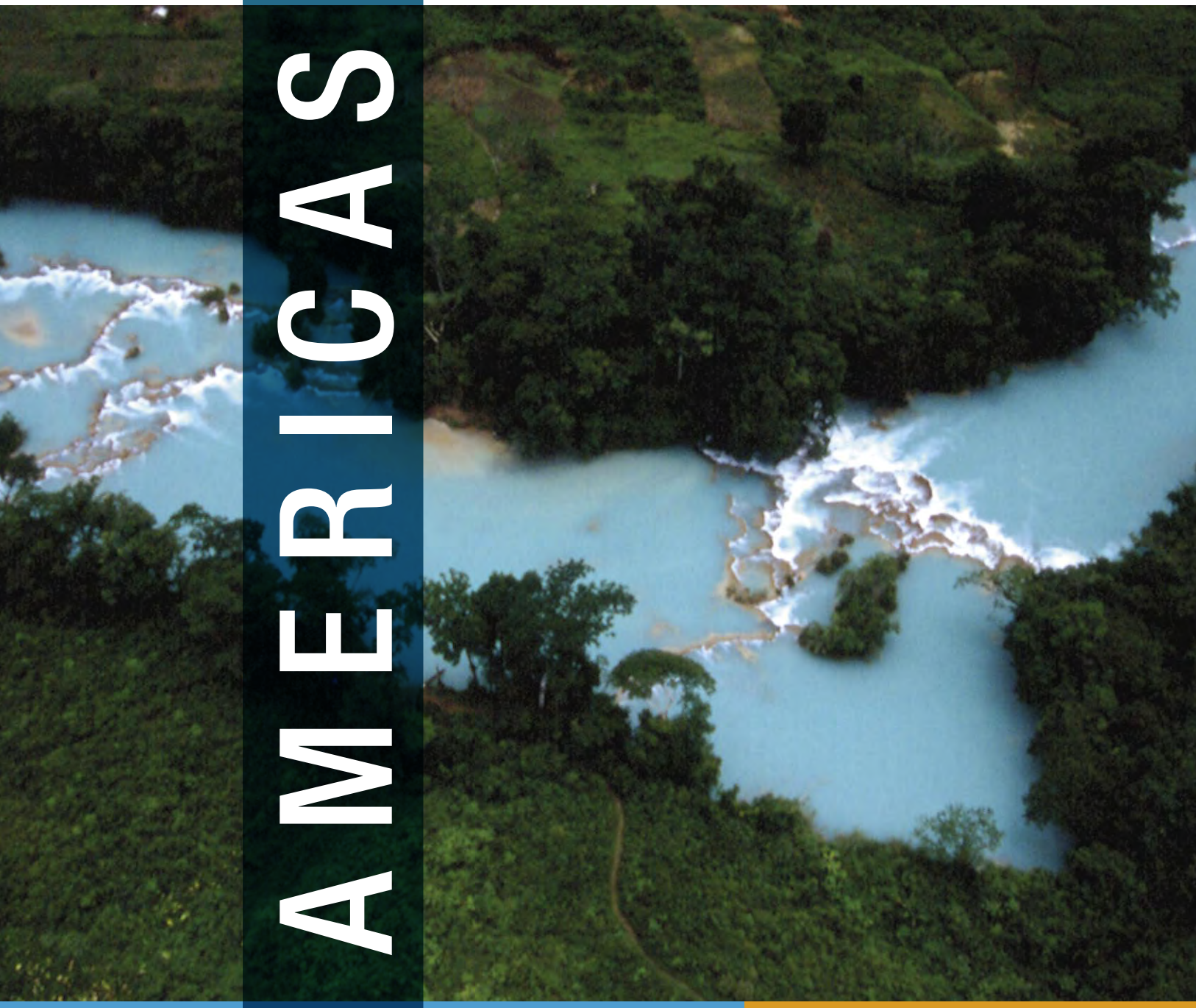
Mexico 2006
4th World Water Forum

AMERICAS

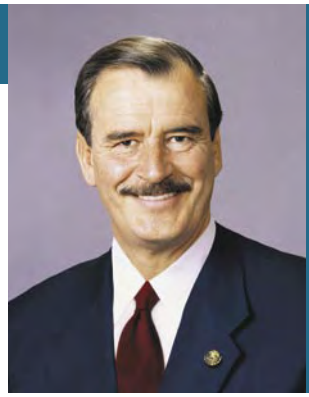


Regional Document

Local Actions for a Local Challenge

CONAGUA
Comisión Nacional del Agua

World Water Council
4th World Water Forum



Vicente Fox Quesada
President of Mexico

People, organizations and nations are more interested in sharing their own experiences and in knowing how effective solutions have been implemented to solve different challenges regarding water issues.

We know that waste and scarcity of this resource might affect social welfare and limit the development.

Therefore, World Water Fora have become one of the most important events at the international level.

The 4th World Water Forum was organized by the National Water Commission of Mexico and the World Water Council. This important event was held in Mexico City on March, 2006.

With the purpose of facilitating the organization of the Forum, the world was divided into the following five regions:

- Africa.
- Americas.
- Asia-Pacific.
- Europe.
- Middle-East and North Africa.

Each Region was organized in a specific way and as part of its important work, they produced a document that shows the main water related problems in the region, that explains the progress made so far in their solution and that evaluates the future perspectives.

These documents are a very important source of knowledge and I am sure that they will become a key reference in the future.

Finally, I would like to reiterate my recognition to the superb job performed by the different specialists, institutions and organizations involved in the regional process. Their professionalism, enthusiasm and commitment have been outstanding.

REGIONAL DOCUMENT FOR THE AMERICAS

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FOREWORD

This document presents a broad picture of our diverse region, about its richness and contrasts. It is about what has happened with water in the Americas since the 3rd World Water Forum in Kyoto, Japan, in March 2003; but it also attempts to highlight the region's strengths and weaknesses along with its successes and failures with respect to water management.

The challenges facing water conservation, management and development in the Americas are also presented. As such it attempts to reflect what communities, local and national governments, international organizations, NGOs and civil society organizations are doing to face these challenges. The purpose of the document is to share experiences with other regions and to search for answers that are yet to be found. It is about what unifies us but also what differentiates us; where we think alike and where we differ. Most of all, it is about our shared conviction that mistakes of the past should not be repeated in the future; and that the search for solutions continues in pursuit of what we think is "right".

And thus, this document is not a document of consensus. There is no consensus in the Americas about what is "right", rather it presents different perspectives about the consequences of actions across the region. Therefore, a cross section of the different approaches, actions, activities, and on-going controversies in the Americas is presented in the hope that these will help illustrate the many ways in which water contributes to improving the economic, social and environmental conditions across the Americas, and the role water plays in the fight against poverty, the promotion of growth and development across and supporting the region's wealth of biodiversity.

Inputs, comments, and contributions have been received from the persons listed below, whose collaboration is sincerely appreciated. That does not mean, however, that all, or any of these persons are in agreement with everything that is stated in the document. Special recognition is afforded to Abel Mejía, Marcus Wishart and Shelley McMillan for their contribution in editing the text.

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and we extend our most sincere apologies.
The Editors

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EXECUTIVE SUMMARY

Any discussion about water in the Americas has to take into consideration two basic background settings. First, the natural, cultural, and socioeconomic diversity of the Americas and second, the complex interactions of water with the social, economic and political realities of an increasingly globalized world.

Diversity

Nature. Extending from the northern to the southern pole, the region encompasses a diversity of natural landscapes, a wealth of natural resources and significant stocks of global biodiversity, with 4 of the world's 10 mega-diverse countries. Brazil has the world's highest levels of animal and plant richness, with between 10% and 20% of all species described. This is due in part to the diverse topography and variable climatic conditions. Annual precipitation in the region averages around 1,084 mm per year, contributing 44 000 km^3 of renewable water resources, more than 55% of the global total. Rainfall is highly seasonal, being concentrated in 4-5 months and unevenly distributed. Two-thirds of the region is classified as arid or semi-arid, with 30% receiving less than 300 mm/yr, contrasting huge tracts of pristine forest, rich in water. The Amazon, Orinoco, São Francisco, Paraná, Paraguay and Magdalena rivers carry more than 30% of the world's continental surface water, with the Amazon basin alone covering about one third of all South America and discharging 20% of all freshwater flowing from the world's rivers. The Amazon's annual discharge (6,700 km^3) is 5 times the volume of water from the Congo River, the world's second largest river, and the number of fish species in the basin, estimated at over 3000, is thought to be more than that found in all of the world's basins. The Amazon fixes more than a hundred trillion tons of carbon and vegetation in the basin releases 7 trillion tons of water into the atmosphere through evapotranspiration.

Society, Culture, Politics and Economy. The Americas are characterized by diversity and stark contrasts. The region encompasses 35 countries and an estimated 872 million people, who speak Spanish, Portuguese, English, French, or one of the more than 400 indigenous languages. Ethnic and cultural diversity is also a characteristic of the region with Southern Mexico, Northern Central America, and the Andean countries of Ecuador, Bolivia and Peru having the largest concentrations of indigenous population. Accounting for 30% of the world's land mass, the region has only 14% of the global population and, with 22 inhabitants/km^2, a relatively low population density compared to the world average of over 43 inhabitants/km^2 and countries like China (133 inhabitants/km^2) and India (309 inhabitants/km^2). Despite the low population density, 75% of the region's people live in and around cities, the majority of whom are concentrated along the more that 617,000 km of coastal margins, making it the most urbanized region in the developing world. The region contributes 36% of the world's GDP, of which 95% is generated by Brazil, Canada, Mexico and the USA. The latter alone accounts for an estimated 80% of the total. These large global economies contrast some of those from the smaller, low-income countries like Haiti and Nicaragua. Average GDP highlights some of the challenges facing the region —per capita GDP averages US$ 31,043 in North America, contrasting US$ 2,240 in Central America, US$ 3,256 across South America and US$ 1,192 among the Caribbean. In Latin America and the Caribbean, about 128 million of the region's 525 million people live in poverty, with 50 million considered extremely poor (living on less than $ 1 a day).

Water-related issues also cannot be considered in isolation of the socio-political scenarios and tendencies prevailing in the countries at a certain point in time. In the Americas, the intricate relationship of water with the social, cultural, environmental, economic, commercial, and political scenes and points of view has been Jauja[1] for both advocates and opponents of various causes. As a result, the water discussion could not and has not remained solely within the realm of science or engineering but has transitioned into the social, economic and political dimensions of society.

Water-related Aspects

Natural Hazards. The region is particularly prone to natural disasters, the effects of which are often accentuated by inequality and high urban concentrations. Risks include persistent droughts in the arid and semi-arid areas of northeast Brazil and the USA and the Northwest

[1] Spanish popular term for heaven or bliss

areas in Mexico, floods and volcanic eruptions in Central America, and floods and associated land-slides in several metropolitan and peri-urban areas throughout the Americas. Cyclonic activity is a pervading threat along most of the Atlantic coast, particularly hazardous for those low-lying island states of the Caribbean. Natural disasters associated with climatic variability have increased in frequency and intensity. The region experienced an average of 8.3 disasters per year between 1900 and 1989 which rose to 40.7 per year between 1990 and 1998, a figure surpassed only by Asia. Substantial human and economic losses are attributable to these events. These have similarly substantially increased over the last decade. In Colombia, 4 million people were affected by natural disasters between 1993-2000 at an annual cost of US$ 453 million. Climate change has the potential to significantly accentuate these impacts and alter existing patterns of natural resources and land use. Some potential impacts include reductions in rainfall; salt-water intrusions that may exacerbate inundation of river deltas, such as those of the Magdalena, Amazon, Orinoco and Paraná; sea level increases threatening coastal areas; glacier melting and shrinkage; and increased magnitude and frequency of natural disasters such as hurricanes, floods and droughts.

Water Withdrawals. Given the region's huge resources, only a small proportion (average 3.2%) of total renewable water resources is withdrawn to meet the demands of the population and economic activities. This compares to the global average of 8.7%. With few exceptions, irrigated agriculture is the primary consumer accounting for about 60% of all withdrawals. Levels of irrigation water use show homogeneity across South America and the Greater Antilles, varying between 9,000 m^3/ha/year and 12,000 m^3/ha/year. Given the socioeconomic characteristics and long history of investments in water resources development, figures for Mexico are slightly higher, averaging 13,500 m^3/ha/year. These figures are even higher in Central America, due to the development of important, permanent economic crops (banana, sugar cane, etc.) and the high levels of cultivation in temporary, intensive crops such as rice. Industrial water accounts for approximately 25% of withdrawals across the Americas but is especially important in Canada, where 69% of water is withdrawn for industrial use, far in excess of those for agriculture (12%). Similar situations are observed in the United States, where industrial water use accounts for 46% of withdrawals compared to 41% for agriculture; Trinidad and Tobago, where 6% of withdrawals are for agricultural use compared to 27% for industrial use; and in Belize, where 89% of water is withdrawn for industrial use. Domestic water use accounts for 15% of total water withdrawals across the region.

Water Supply and Sanitation. Considerable advances have been made in the region to provide these services for all its inhabitants. Compared to global figures, levels of water supply and sanitation coverage within the America's are generally higher. Access to adequate water supply is all but universal in North America, while access across Latin America and the Caribbean is typically above 90% for urban populations and estimated at around 70% for rural populations. Although more variable, access to sanitation among urban populations in Latin America is relatively high: from 52% to 99%. However, rural sanitation remains a challenge –coverage in Bolivia, Brazil, Dominican Republic, El Salvador, Haiti, Mexico, Peru and Venezuela remains less than 50%. Several service models (public, private and combinations thereof) are in use throughout the region with varying levels of success. For example, in Santa Cruz, Bolivia, cooperatives are the only water suppliers for the city's one million people, and no municipal utility, public or private, has ever been established. In Cordoba, Argentina, private providers account for approximately 10 to 15% of water services, covering about 38,200 households. On the other hand, Uruguay became the first country in Latin America to enshrine the right to drinking water and sewage services in its Constitution and a referendum allows private provision of water and sanitation services. The greatest persisting challenge is effective wastewater treatment. In most countries, only a marginal percentage (less than 10%) of the wastewater is treated, resulting in continued environmental degradation and health impacts in downstream populations. The environmental, social and economic costs of this degradation are only beginning to emerge. In Peru, the economic impacts associated with environmental degradation accounts for approximately 4% of the country's GDP. This cost is associated with various factors, including waterborne diseases (1.06%), over fishing (0.36%), soil degradation (0.35%) —particularly soil salinization and erosion, deforestation

(0.26%) and solid waste disposal (0.05%). Similarly, data from Colombia estimates the cost of water sanitation hygiene at a little over 1% of GDP, equivalent to about US$ 1M a year.

If the effort made by the Latin American and Caribbean countries in the 1990s is maintained, it seems like the region, as a whole, will meet its commitments to the MDGs. Individually some countries are more likely to meet them than others, but this commitment has attracted attention to the problem by all governments in the region. The effort needed, however, is not trivial.

Water Regulation and Hydropower. Of the 25,400 large dams registered in the International Commission of Large Dams, over 33% are located in the Americas. While the majority of these are situated in North America (7,905), significant numbers and storage volumes are found across South (979) and Central America (105). Given water availability within the region, there is a large potential for the development of hydropower, of which technically feasible options could provide around 2.6 million GWh/yr of economically exploitable hydroelectric power. Of the 1.6 million GWh/yr of economically exploitable hydroelectric potential in Latin America, 33% has been developed, compared to 70% of the potential 1.0 million GWh/yr in North America. Potential hydropower in Asia is estimated at 3.6 million GWh/yr, of which 21% has been developed to date, while in Africa current hydropower development is estimated at 6% of the potential 1.0 million GWh/yr. Hydropower represents around 10% of the total energy production in North America, but more than 60% in Latin America and while hydropower provides around 17% of the world's electricity supply, it accounts for more than 90% of total energy production in Brazil.

An increase in smaller infrastructure projects developed through private sector involvement and user pay models is visible across the region. At the same time however, there is increasing recognition of the need for large water infrastructure projects in support of economic growth. But the latter must be accompanied by appropriate management, environmental and social measures to ensure sustainability.

Water Resources Management. Although the region has adopted the principle of sustainable development, there remains a need to develop effective mechanisms to resolve competing sectoral water demands in relation to balancing economic, social, and environmental objectives. In the 2002 Johannesburg Conference, the countries adopted a resolution to have approved, by 2005, IWRM and efficiency plans. By 2004, 108 countries worldwide (22 from Latin America) showed some progress in this regard. Of the Latin American countries, 3 showed good progress, 14 had taken some steps, and 5 were in the initial stages. Costa Rica and Mexico have practically finished their IWRM strategies, Bolivia, Brazil, and Guatemala have taken some steps, and the Dominican Republic and Panama are in the initial stages. Brazil has proposed a common water resources management strategy for the Latin American and Caribbean countries, towards the adoption of common measures for poverty alleviation and for reducing the restrictions to development imposed by inadequate access to water in the hemisphere. The strategy pivots on common long-term actions to address the major water resources management problems in national and transboundary waters. The convergence of national water policies for the sustainable use of water as well as South-South cooperation processes for the creation of a Common Water Resources Development Fund, among others, are posed as specific objectives of the strategy.

The conclusions of the V Ibero-American Forum of Environment Ministers held in Colon, Panama in September 2005 include 14 items related to water. They underline four prerequisites for IWRM: a strategy for IWRM including groundwater, an adequate environmental valuation of water, the existence of adequate basic infrastructure for water supply and sanitation, and the existence of an adequate policy and institutional framework.

Challenges for Consensus Building

It is evident that the region has made substantial advances towards better management and conservation of its valuable water resources; however ongoing debate regarding the linkages between water and socioeconomics, socio-politics and ideology exists. There still are, however, many questions and areas requiring more study in search of answers, such as the role of water in public policies; the types of water institutions needed; the role of hydraulic infrastructure, irrigation and hydropower; the role of river basin organizations in participative river basin and transboundray river basin management; the practical application of integrated water resources management; cost-effective pollution control measures; the prospect of reaching the MDGs in water supply and sanitation; the effectiveness of public and private participation; as well as improved risk management. Some of the main controversies are posed in the following paragraphs. It is important to note that these divergent views are healthy and will continue in search of convergence with the national realities of each country. It is also hoped that at least some of these will be debated at the 4th Fourth World Forum.

Implementing Integrated Water Resources Management. In the 1990s, integration moved out of the water resources realm into the realm of integration with other sectors and actors outside the traditional water community, prompting debates ranging from the meaning of IWRM itself, to the usefulness or practicality of its implementation. There is also much discussion as to how to resolve the conflicts created by competing sectoral demands for water.

Water as an economic good vs. water as a human right. A concentrated effort was made in the region to regard water as an economic good which has resulted in efficiency improvements. However, it has also prompted a reaction from civil society groups that regard this effort as taking into consideration only the more affluent population groups and not adequately considering the poor. An impassionate debate has since evolved between those that regard water as an economic good and those that regard water as a human right.

The infrastructure and financing debate. There have been many discussions regarding the real contribution of infrastructure to development against the role of the more "soft" components of water management, and regarding the adequate balance between "hard" and "soft" components. It is apparent, however, that the region has realized that infrastructure is a key element for solving water-related problems but that it has to be accompanied by social and environmental considerations. It has also been learnt that no infrastructure can be built free of environmental cost and that no environmental safeguard is free of economic cost. Furthermore, the region in general, has seen a change towards de-emphasizing the role of central governments and promoting the participation of the private sector in financing water-related projects. Different models of financing continue to be the source of debate, which is often overshadowed by social and political polemics. Private financing has certainly increased and the cases of Argentina (especially Buenos Aires) and Chile are extensively called, cited, and used to prove or disprove both the advantages and the shortcomings of concessions. There are signals, however, that a complete substitution of public with private financing will never take place and that financing should first be sought from public funds or from the direct beneficiaries themselves, when these can be identified before considering private sector participation. An adequate consideration of all these factors is the new challenge.

Institutional and legal reform. The institutional framework for water management continues to evolve in the region. However, there has not been a model or tendency that could be qualified as regional. Each country has either maintained the traditional institutional framework of the 1940-1980 era; has tried a new model based on successful European models, or has tried a new model according to its national characteristics. There have also been interest and initiatives in the region to modernize the legal frameworks, especially in Latin America. All of which today shows mixed results, prompting debate and some resistance on multiple fronts.

Facing the Challenges

Despite many advances made across the region, several significant challenges remain. Facing these challenges requires an integrated approach that addresses persisting inequalities, including economic strategies for growth defined within sustainable limits. How to achieve this remains controversial with continued debate between contrasting views of water as an economic good and as a universal human right. In order to achieve sustainable solutions, existing **institutional and policy frameworks** need to be harmonized; **tools and mechanisms** need to be implemented to maximize the productivity of existing water

resources; and **strategic investments** and **management strategies** supported to address shifting demands and ensure sustainable development. In response to these challenges, the region has devoted significant human and financial resources to develop innovative options and ensure negotiated solutions to effective water resources management. Since the 3rd World Water Forum was held in Kyoto, Japan, in 2003, despite some failures, significant advances have been made in **policy development**, including stronger **institutional and legislative frameworks** accompanied by the definition of rules and guidelines for more efficient and equitable water allocation.

Improvements have also been made in modernizing the water supply and sanitation sub-sector and towards meeting the relevant Millennium Development Goals (MDGs), with most countries likely to meet the MDG targets. However, continued development and commitment to supply-driven solutions to service delivery are often contrary to sustainable water management practices. **Capacity building** continues, but still there is much to be done in this area for effective decentralization, water governance, management and regulation of services to be realized. This is a topic of great interest for the 4th World Water Forum, with 30% of all local action proposals submitted to the Forum Secretariat relating to this subject.

Significant advances have been made regarding **stakeholder participation** for more efficient risk management, but the social and economic costs of natural hazards are still too high.

Although the region has adopted the principle of sustainable development, there remains a need to develop effective mechanisms to resolve competing sectoral water demands in relation to balancing economic, social, and environmental objectives. The effects of regional free-trade agreements, increasing globalization and the privatization of service provision is stimulating debate among social, environmental and economic sectors. The challenge of ensuring sustainable **financial resources** for water resources management continues to be a struggle. As mentioned earlier, this is reflected in the increase in smaller infrastructure projects developed through private sector involvement and user pay models. However, there is increasing recognition of the need for large water infrastructure projects in support of economic growth but accompanied by appropriate management, environmental and social measures to ensure sustainability. Significant advances have been made regarding local participation for efficient **risk management**, but the region continues to be devastated by natural hazards - 2005 sadly being a milestone year in this regard. Interestingly, only 5% of the local action proposals were related to risk management (the lowest among the five thematic areas of the 4th World Water Forum).

As a result of the preparatory process for the 4th World Water Forum, civil society organizations put forward six principles to the Forum, related to water as a fundamental human right, water as a priority within public policies, participation of civil society in a binding manner in decision making, equity in use and distribution of water, secure water supply access for rural communities, and conservation of the water-related function of forests, wetlands and other natural vegetation.

Successful local actions in the Region.

The Regional Committee of the Americas was the only one that established an Evaluation Committee for the selection of local actions. The criteria for selecting the members of this Committee ensured appropriate geographic, gender and civil society representation, knowledge and experience on the theme according to each thematic topic, and acceptance of the nomination and commitment to accomplish the task.

The 885 local actions submitted by countries in the Americas represent 57% of local actions submitted by all countries worldwide, with 75% of local actions submitted from North America. The geographical setting for the local actions submitted by the Americas was predominantly by basin (45%), followed by those by country (25%). It is interesting to note, however, that the smaller geographical settings dominated, as both basin and cities, taken together, represent 63% of the total, against 37% corresponding to the larger geographical settings of district and country. Since actions submitted by organizations of the civil society were 27% of the total, only surpassed by those submitted by national and local governments (30%), it can be said that the "bottom-up" approaches are well represented. This aligns nicely with the main theme of the 4th World Water Forum —**Local Actions for a Global Challenge**. Regarding the thematic areas of the Forum, 251 local action proposals (28%) were received under **Implementing Integrated Water Resources Development**; 208 proposals (24%) were received for **Water Supply and Sanitation for All**; 199 proposals (22%) were received under **Water for Growth and Development**; 183 proposals (21%) were received for **Water Management for Food and the Environment**; and 44 proposals (5%) were received under **Risk Management**.

The cross-cutting issue of capacity building and social learning was present in 466 proposals, application of science, technology and knowledge was found in 458, institutional development and political processes was in 280, new models for financing local water initiatives was in 191, and targeting, monitoring and implementation assessment found in 170 proposals.

The Road Ahead

Despite its diversity, issues among the countries of the Americas pertaining to water do not vary significantly, only in the priority of individual concerns. Overcoming the challenges facing the water sector in the Americas will require the definition of appropriate mechanisms that address existing inequalities and ensure sustained economic growth throughout the region. How to achieve this remains the subject of much debate with contrasting views of water as an economic good and water as a universal human right. Emerging priority issues for North America appear more related toward water quality and water efficiency, while financing water sector investments in support of social and economic development is a more important concern to many Latin America and Caribbean countries. Given the increasing importance of agricultural exports to the region's development, irrigation technology and water management models that address cross-sectoral water allocations and use, including those of the environment, are critical elements in supporting growth.

The required financial investments in the water sector need to be accompanied by continuing programs of institutional development and strengthening of management that builds on the participation and experience of all stakeholders. Such a balanced approach will help advance the sustainable development of water resources, both in terms of quantity and quality, and promote continued and more equitable growth for the region. In recognition of the integrated nature of water resources management, improved mechanisms are also needed to promote better coordination between the water sector and related sectors, such as urban and land-use planning, solid waste management, health and environmental protection.

Achieving sustainable water management and development in support of socioeconomic growth will require dedicated commitment and effort, taking into consideration national priorities and individual contexts while also drawing from the rich and diverse experience within the region. In general, the region has accepted the premises of sustainable development and the need for a combination of economic, social, and environmental goals suitable to the characteristics of each country. But the balance between these objectives is still the subject of much discussion. The tradition is that governments establish priorities and this is still the norm in Latin America and the Caribbean. But this too is changing with the introduction of decentralization and the consideration of market-based approaches to guide water-related investments so as to attain the largest incremental benefits for limited water resources.

Although some unanswered questions remain, countries across the Americas have committed themselves to the sustainable development process and are continuing to respond to the challenges.

1. INTRODUCTION

The water scenario in the Americas reflects the region's diversity and contrasts, ranging from by abundance —with the world's largest river in the Amazon basin— to scarcity in the world's driest desert, the Atacama. Ancient populations throughout the region have developed mechanisms to establish some of the world's most advanced civilizations. Today, the Americas are continuing to adapt and develop measures appropriate to the modern context. Within this setting the region is hosting the 4th World Water Forum so that people, governments, multinational and regional organizations from across the world can gather to discuss water-related issues.

Water issues have achieved global prominence and international attention over the last four decades. The first major worldwide gathering related to water in the 20th century was the United Nations Water Conference in Mar del Plata, Argentina, in March 1977. The Mar del Plata Action Plan[2] set the stage for water management worldwide and included more than 290 recommendations for water management (UNDP 1994, ECLAC 1998). It also gave rise to the "International Water Supply and Sanitation Decade 1980-1990" (IWSSD80-90), which helped to improve coverage of both water and sanitation services in Latin America and the Caribbean. The last decade of the 20th Century saw renewed international effort aimed at better water management, mostly related to water supply and sanitation[3], capacity building[4], integrated water resources management (IWRM) and the relationship between water and the environment[5]. The "Dublin Principles" were established and these remain the paradigm for modern water management.

The new millennium brought the United Nations Millennium Conference in 2000, adopted by 191 countries. Among its 18 targets was to halve, by 2015, the proportion of people without sustainable access to safe drinking water and adequate sanitation. These Millennium Development Goals (MDGs) were reemphasized in the Sustainable Development Summit of Johannesburg, South Africa in 2002, and have since been included in the development strategies of developing countries as well as the international financing organizations. Latin America and the Caribbean face many challenges however in realizing these goals. Safe water supply will have to be provided to more than 120 million additional persons and basic sanitation will have to additionally benefit more than 238 million (IDB 2005).

The 21st Century also saw the development of the World Water Fora[6]. The theme of the 2nd World Water Forum was "From Vision to Action" and produced a series of valuable thematic and regional vision documents for North, Central and South America and the Caribbean. These documents have been used as guidelines for the water actions in the region and were presented and discussed in the "Day of the Americas" (October 2002) mostly by the regional organizations. In the 3rd World Water Forum, seven challenges for water security were identified, among them, poverty alleviation. The Americas' Day greatly gained in regional participation and representation as compared to the Second Forum and produced a declaration, which is still valid **(Box 1.1).** The Declaration of the Americas at the 3rd World Water Forum in Kyoto reflected the concern of the Latin American and Caribbean countries for the existence of subsidized agriculture in the developed world; the effects of international and bilateral commercial agreements on local and national water rights; effective decentralization and participative governance; effective regulation of water supply and sanitation services; equity in effective distribution of water for poverty alleviation in urban and rural areas; effective natural hazard management; due regard for the inclusion of the environmental variable following an ecosystems approach and tradable environmental services; reducing water pollution and

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[2] Report of the United Nations Water Conference, Mar del Plata, March 1977, E/CONF.70/29, New York, UN, 1977.

[3] Global Consultation on Safe Water and Sanitation for the 1990s, New Delhi, India, 1990; Conference on Water and Sanitation Utilities, Brussels, Belgium, 1992; Round Table on Water and Health, Sophia Antipolis, France, 1994; Ministerial Conference on Drinking Water and Environmental Sanitation, Noordwijk, The Netherlands, 1994.

[4] Symposium "A Strategy for Water Sector Capacity Building", Delft, The Netherlands, 1991.

[5] International Conference on Water and the Environment, Dublin, Ireland, 1992; United Nations Conference on Environment and Development-Chapter 18, Rio de Janeiro, Brazil, 1992.

[6] The first was held in Marrakech, Morocco in 1997; the second in The Hague, The Netherlands, in 2000; the third in Kyoto, Japan, in 2003; and the fourth will be held in Mexico City, Mexico, in 2006.

Box 1.1 Declaration of The Americas at the 3rd World Water Forum

We will use our experience as well as our available logistic and financial resources to seek and negotiate solutions to the following water priority problems facing the region:

- Negotiate the elimination of subsidies for agriculture in the developed world.
- Seek transparency of international and bilateral commercial agreements about their effects on local and national water rights.
- Effective decentralization, participative governance, and regulation of water services.
- Development of water policies, including regulations for equity and effective distribution of water and poverty alleviation in rural and urban areas, maximizing the use of available technology.
- Establishment of participative and efficient systems for natural hazard management at the local and national levels.
- Inclusion of the environmental variable in water resources management by watersheds, following an ecosystems approach and including tradable environmental services.
- Improve water quality for human use and reduce pollution.
- Meeting of financial needs to increase and improve water sector infrastructure, to provide safe water for the poor and to increase their income in order to meet the MDGs.

SOURCE: Day of the Americas Organizing Committee (2003)

improving water quality for human use; and meeting of financial needs to improve water sector infrastructure to provide safe water for the poor and to increase their income in order to meet the MDGs.

Both the 2nd and 3rd World Water Fora benefited from preparatory meetings in Paris[7] and Mexico City[8] respectively. The Mexico Declaration referred to the need to define different decision levels for the river basin organizations, the need for poverty alleviation, the adoption of IWRM, the need for a new water culture, and the need for innovative financing. Over the last decade and a half, there has been intense meeting activity in the Americas regarding water —among them, five Inter-American Dialogues and one Inter-American Conference[9]— mainly to bring together governments, private sector, academia, NGOs, and intergovernmental organizations and provide inputs for hemispheric summits and World Water Fora[10].

The main theme of the March 2006 Mexico City 4th World Water Forum is "Local Actions for a Global Challenge". The thematic content includes five framework themes: (1) Water for Growth and Development; (2) Implementing Integrated Water Resources Management; (3) Water Supply and Sanitation for All; (4) Water Management for Food and the Environment; and (5) Risk Management. These themes will be analyzed from, but not limited to, five crosscutting perspectives: (a) New Models for Financing Local Water Initiatives; (b) Institutional Development and Political Processes; (c) Capacity-building and Social Learning; (d) Application of Science, Technology and Knowledge; and (e) Targeting, Monitoring and Implementation Assessment. All these themes are important for the Americas region and the sharing of experiences from the local standpoint will have important regional and global benefits.

[7] International Conference on Water and Sustainable Development, Paris, France, March 1998; http://www.oieau.fr/ciedd/esp/frames/final/progractprio.htm

[8] Water for the Americas in the XXI Century, Mexico City, Mexico, 2002.

[9] The Inter-American Dialogues sponsored by OAS, IDB and other organizations: I in Miami, Florida in 1993, which resulted in the creation of the IWRN; II in Buenos Aires, Argentina, on IWRM; III in Panama, on the Vision for the Americas; IV in Foz de Iguaçu, Brazil, whose theme was "In Search of Solutions", and V in Montego Bay, Jamaica in 2005, on "Strengthening Local Capacity to Achieve Global Challenges". The Conference: Evaluation and Water Resources Management in Latin America and Caribbean, San José, Costa Rica, in 1996, sponsored by WMO and IDB.

[10] Hemispheric Summit on Sustainable Development in 1996; Second World Water Forum in 2000; International Freshwater Conference in 2001; World Summit for Sustainable Development in Monterrey, 2002; 3rd World Water Forum in 2003; 4th World Water Forum in 2006.

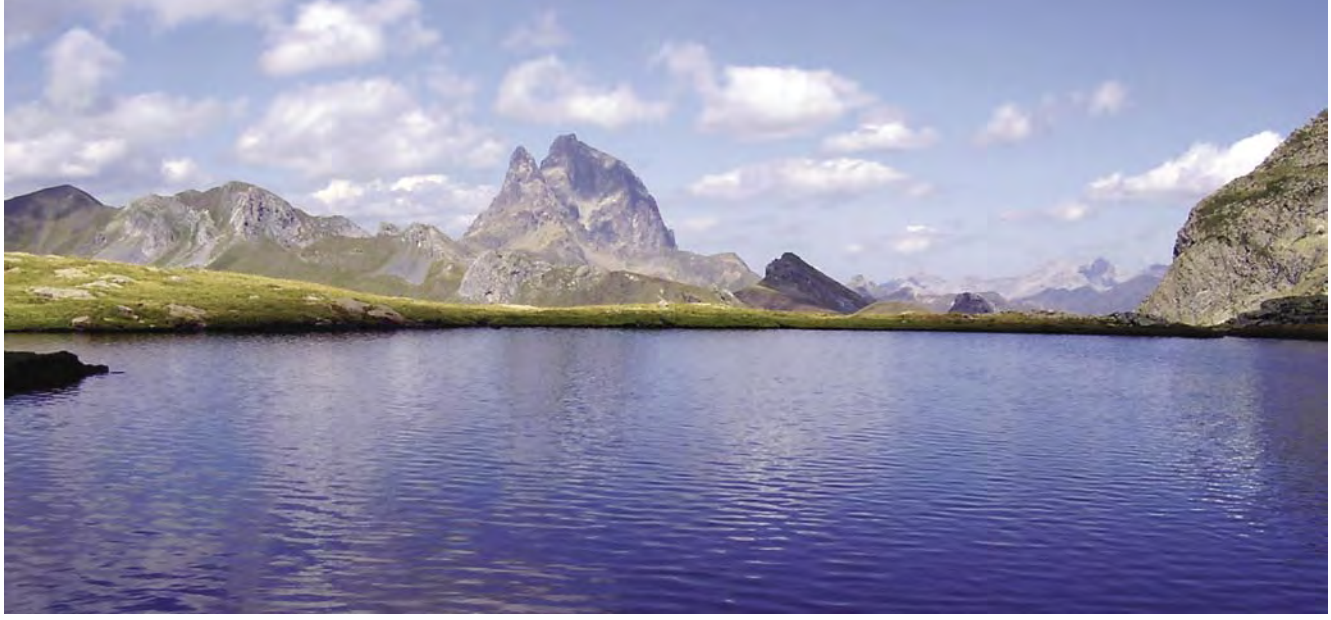
2. PRESENTATION
of the regional document

Under each of the framework themes included in the 4th World Water Forum, the Americas have confronted and still confront numerous problems that, though universal in general terms, are marked by country-specific characteristics. Likewise, novel and ingenious solutions have been tried in the region, succeeding in some cases and failing in others. Problems and solutions registered in the region reflect the diversity and size of the economies; climatic and hydrologic particularities; the nature of the legal, institutional, and political regimes; cultural and social differences, and particularly distinct forms of intervention and participation of the local actors.

Purpose and benefits of the Regional Document. The Regional Document draws a cross-cutting profile of a host of water-related experiences in the Americas. It is an important output of the process undertaken in the region towards developing a common view of the main challenges pertaining to the development and management of water as confronted by the countries of the region. The Regional Document will also help to facilitate the exchange of experiences with the other regions. The document tries to showcase the important achievements and lessons learned under the five framework themes that could provoke the interest not only of stakeholders from the Americas but those from other regions as well.

The Preparatory Process in the Americas. Attending the invitation from the Secretariat of the 4th World Water Forum, a number of institutions and organizations were convened to participate in the regional preparatory process. With a view of a more inclusive and participatory process, an Operative Committee and a Consultative Network were formed to constitute the Regional Committee of The Americas.

The members of the Operative Committee included Mexico's National Water Commission; World Water Council; Organization of American States; World Bank; Inter-American Development Bank; Global Water



Partnership; US Army Corps of Engineers; Mexico's Water Advisory Council, and Fresh Water Action Network - Central America. The Committee operated under a rotating chair and its objectives were defined as: (i) advancing the identification of successful experiences and local actions. (ii) identifying the solutions adopted in the region in connection with its main water problems and incorporating the resulting lessons learned into the Regional Document of The Americas to be presented at the 4th World Water Forum; and (iii) ensuring wide participation of the different water actors and the civil society during the preparatory process of the Forum.

The Consultative Network reached the interest of 64 institutions and organizations representative of the plurality and geography of the region, including: 3 National Institutions; 32 Civil Society Organizations (NGOs); 8 Academic Institutions; 4 Regional Financing Organizations; 13 Technical Assistance Organizations; 1 Professional Organization, and 3 Institutions and Organizations from the Private Sector. The Consultative Network has mobilized interested parties and actors all across The Americas collecting their concerns and aspirations but perhaps most importantly; helping to determine what has been achieved realistically in terms of "local actions for a global challenge".

Meetings. The interest and initiative of both the Operative Committee and the Consultative Network is reflected in the numerous regional, sub-regional and local meetings in the run-up to the 4th World Water Forum that accommodated participation of a wide range of people involved in water issues, including Ministers, Governors, Mayors, legislators, water users, water utilities, universities, NGOs and the media. The Operative Committee held six meetings and the Consultative Network organized three. These as well as other meetings organized by several organizations as part of the preparatory process for the 4th World Water Forum are listed in Annex 1. The organizations represented in the Consultative Network of the Committee of the Americas are listed in **Annex 2**.

Structure of the Regional Document. In accordance with the Terms of Reference provided by the Secretariat of the 4th World Water Forum, the remaining sections of the Regional Document focus on presenting the specific problems and experiences of The Americas. Section 3 presents the basic characteristics of the region that are relevant to understand the water scenario. Section 4 offers a brief general discussion about the main challenges faced by the region regarding water issues, as identified by the stakeholders. Section 5 concentrates on the strategies to address the challenges prioritized by the relevant actors. Section 6 comments on the successful local actions presented by the countries to address the water issues discussed in the previous section. Section 7 collects the main conclusions and lessons learned from the region and offers a perspective for the future of water development and management in the Americas, taking into consideration the present trends and the changes that may occur in the near future. Section 8 lists the references used for this report. A series of Annexes at the end of the document complements the main text of the report.

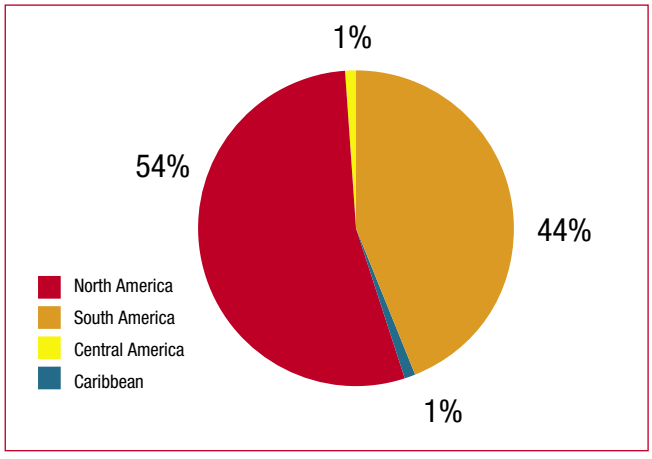
Participating Institutions and Organizations. The Regional Document is the result of the active contribution of many persons, institutions and organizations —public, private, and social— that provided not only relevant documents and information, but also their opinions based on expertise and experience.

3. CHARACTERISTICS of the region

The Americas are characterized by a spectrum of features. Its total emerged land area is over 40 million km^2, which is almost 30% of the world's total land area **(Annex 3, Table A3.1)**. **Figure 3.2** shows the territorial distribution of North, Central and South America, and the Caribbean. Argentina, Brazil, Canada, Mexico, and United States together represent 82% of the total area of the region. The region encompasses 35 countries and 41 economies[11], and its total population estimated in 2004 was almost 872 million inhabitants (50% in North America, 42% in South America, and 4% each in Central America and the Caribbean; see **Figure 3.3**), who speak Spanish, Portuguese, English, French, or one of the more than 400 indigenous languages, and represents nearly 14% of the world population **(Annex 3, Table A3.1)**. All of the main religions of the world as well as many indigenous beliefs are to be found and the Region's ethnic origins are Native American, European, African, Arab, and Asian, with the United States and Brazil being the largest melting pots. Brazil, Mexico, and United States are the most populous countries and together represent 66% of the total population of the region. The annual regional demographic growth rate is currently estimated at 1.22%, similar to that of the world for the same period; population growth averages 2.21% in Central America, 1.33% in South America, 1.05% in North America, and 1.03% in the Caribbean **(Annex 3, Table A3.1)**.

Figure 3.1 The Americas

[11] Some of the economies are not independent countries.



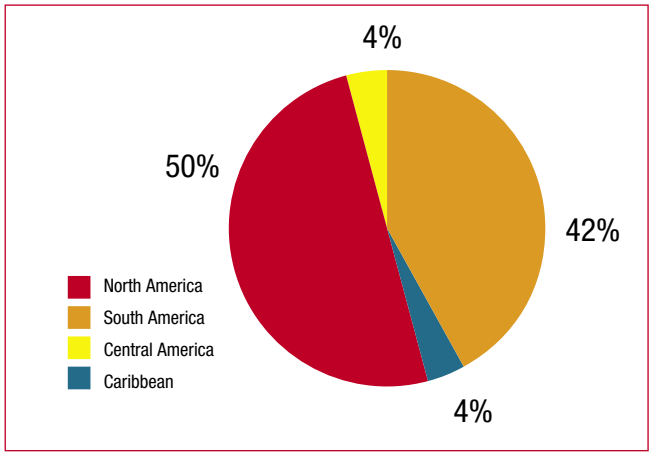


Figure 3.2 Distribution of the America's Territory

Figure 3.3 Distribution of the Population

The population of the Americas is predominantly urban: about 80% of the total, compared to 48% for the whole world; the regional value being strongly influenced by the countries with the highest population (Annex 3, Table A3.1). The average population density in the Americas was estimated in 2004, at 22 inhabitants/km^2, a very low figure compared to the world average of over 43 inhabitants/km^2 (Annex 3, Table A3.1). The highest population densities are in the Antilles, especially in the Lesser Antilles, as well as in El Salvador, with values between 180 and 630 inhabitants/km^2, while the lowest figures refer to Suriname and Guyana with 3 and 4 inhabitants/km^2, respectively. The region generates nearly 36% of the world's Gross Domestic Product (GDP), although approximately 95% of this value is generated by Brazil, Canada, Mexico, and the United States. The latter accounts for about 80% of the region's GDP. Per capita GDP values in the Americas estimated in 2004 range from US$ 411 for Haiti to US$ 39,752 for the United States (Figure 3.4). Per capita GDP values in the Americas estimated in 2004 range from US$ 777 for Nicaragua to US$ 39,752 for the United States. Average GDP for North America is US$31,043, for South America it is US$ 3,256, for Central America it is US$ 2,240, and for the Caribbean it is US$ 1,192 (Annex 3, Table A3.1). In Latin America and the Caribbean, about 128 million of the region's 872 million people live in poverty, with 50 million considered extremely poor (living on less than US $1 a day).

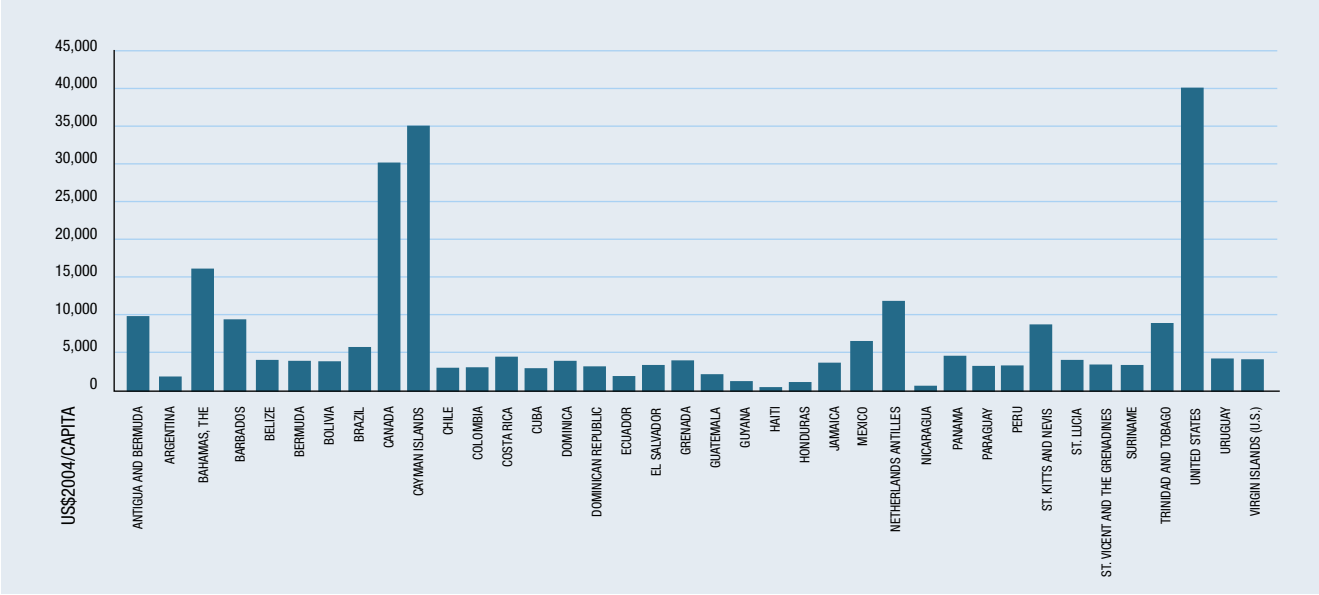


Figure 3.4 GDP Per Capita for 38 of the 41 Economies (2004 US$)

The Americas' economies include some of the richest in the world, as well as some of the poorest. There are also high levels of poverty and income divergence among almost all indigenous populations (Vaughan 2005). According to the World Bank, 9 out of 41 economies are classified as high Income; only 2 are classified as low Income (Haiti and Nicaragua); 14 are classified as low middle income; another 16 are classified as upper middle income **(Annex 3, Table A3.1)**. From the developmental point of view, Haiti is the only country that has been ranked among the countries with a Low Human Development Index, whereas 13 are included among the countries with a High Human Development Index and the rest fall in the Medium Human Development Index category **(Annex 3, Table A3.1)**.

Climate. Extending from the northern to the southern poles, the region encompasses a diversity of natural landscapes, a wealth of natural resources and significant stocks of global biodiversity, with 4 of the world's 10 mega-diverse countries. Brazil has the world's highest levels of animal and plant richness, with between 10% and 20% of all species described. This is due in part to the diverse topography and variable climatic conditions. All climate categories are present in the Continent **(Figure 3.5 and Table 3.1)**. This climatic diversity results in a natural richness characterized by some of the most important landscapes and ecosystems of the world. As a result, the region has ice caps and glaciers, snowy peaks, temperate four season weather in some areas and two-season dry and wet cycles in others. Extensive humid

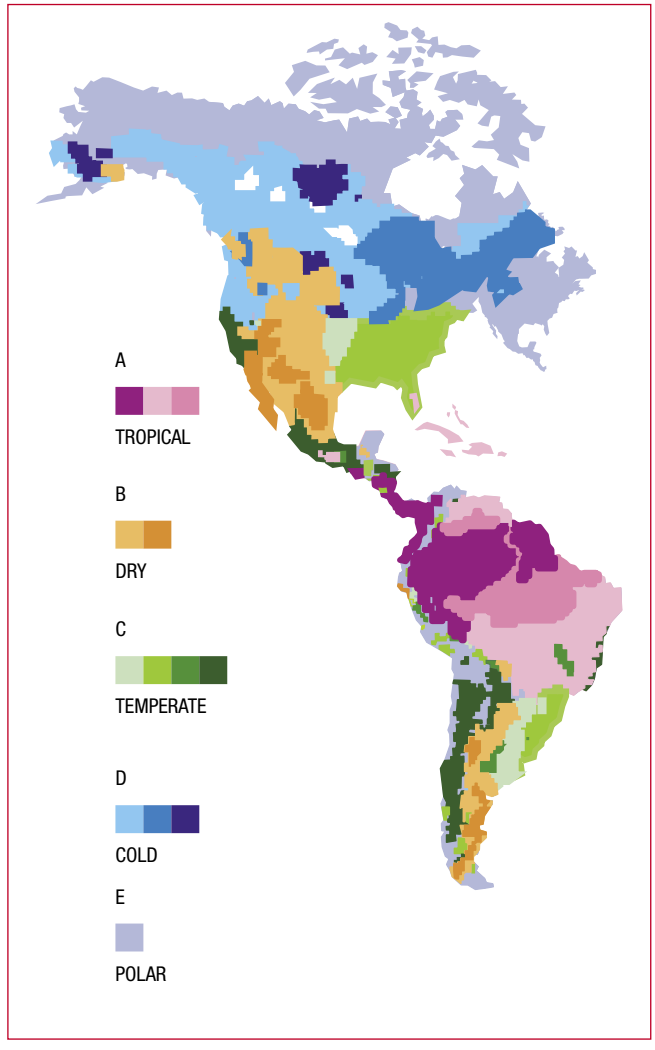


Figure 3.5 Climates of the Americas

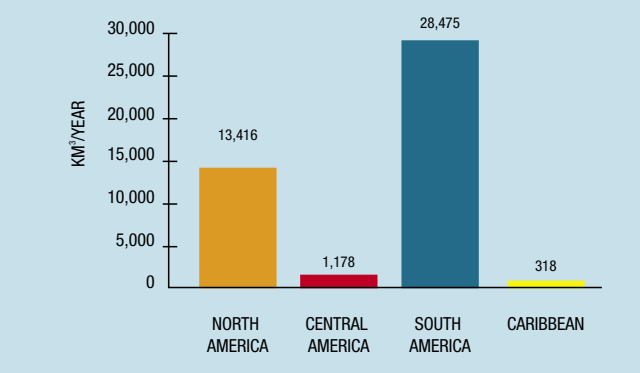


Figure 3.6 Mean Annual Precipitation in the Americas

rainforests and also large tracts of arid and semi-arid areas are also to be found, with annual rainfall ranging from more than 6,000 mm in Central America to virtually no rainfall in the driest place in the world, the Atacama Desert in northern Chile. Figure 3.6 shows the mean annual precipitation for North, Central and South America, and the Caribbean. Due to its geographical position and climatic variability, the Americas are also vulnerable to natural disasters, particularly the Gulf of Mexico, the Caribbean, and Central America.

Water. Climatic diversity leads to an equally diverse set of hydrologic regimes. Overall, The Americas is the water-richest region of the world. With a mean annual precipitation of 1,084 mm, the total renewable water in the region amounts to nearly 24,000 km^3 per annum, which represent more than 55% of the total renewable water of the world (Annex 3, Table A3.2). Figure 3.7 shows the values for North, Central and South America, and the Caribbean. In 2004, the per capita water availability of the whole region was 27,942 m^3/person/year, but country values ranged from less than 100 m^3/person/year in The Bahamas to more than 3,000 m^3/person/year in Jamaica and Cuba in the Caribbean. Values ranged from 3,785 and 4,405 m^3/person/year in El Salvador and Mexico respectively, to 109,886, 275,415 and 312,154 m^3/person/year in Canada, Guyana and Suriname, respectively. (Annex 3, Table A3.2, Figure 3.8 shows values for North, Central and South America, and the Caribbean; Figure 3.9 shows values for some individual countries).

In the Great Lakes area of North America the region has the largest concentration of inland non-saline water bodies in the world. There are several large rivers including St. Lawrence, Mississippi, Rio Grande/Bravo, Usumacinta, Magdalena, Orinoco, São Francisco, Paraná, Paraguay, and the Amazon, whose annual volume discharge of 6,700 km^3 is five times that of the second largest river in the world,

Table 3.1 Climatic Regimes in the Americas

Group	Climate[1]	Latitude Range	Global Position
I. Low-Altitude Climates	Tropical Moist Climates (Af) rainforest	10° S to 25° N	Amazon Basin.
	Wet-Dry Tropical Climates (AW) savanna	15° to 25° N and S	South America.
	Dry Tropical Climates (BW) desert blome	15° – 25° N and S	Southwestern United States and northern Mexico; Argentina
II. Mid-Latitude Climates	Dry Mediatitude Climates (BS) steppe	35° – 55° N	Western North America (Great Basin, Columbia Plateau, Great Plains).
	Mediterranean Climate (Cs) chaparral blome	30° – 50° N and S	Central and southern California; Chilean coast
	Dry Mediatitude Climates (Bs) grassiands blome	30° – 55 N and S	Western North America (Great Basin Columbia Plateau, Great Plains).
	Moist Continental Climate (Cf) Decidous Forest blome	30° – 55° N and S	Eastern parts of the United States and Southern Canada
III. High-Altitude Climates	Boreal forest Climate (Dfc) taiga blome	50° – 70° N and S	Central and Western Alaska; Canada, from the Yukon territory to Labrador.
	Tundra Climate (E) tundra blome	60° – 75° N	Artic zone of North America; Hudson Bay region; Greenland coast.
	Highland Climate (H) Alpine blome	Found all over the world	Rocky Mountain range in North America, the Andean mountain range in South America

[1] Koeppen's Cliamte Classification. FAO_SDN_Agrometeorology Group. 1997.

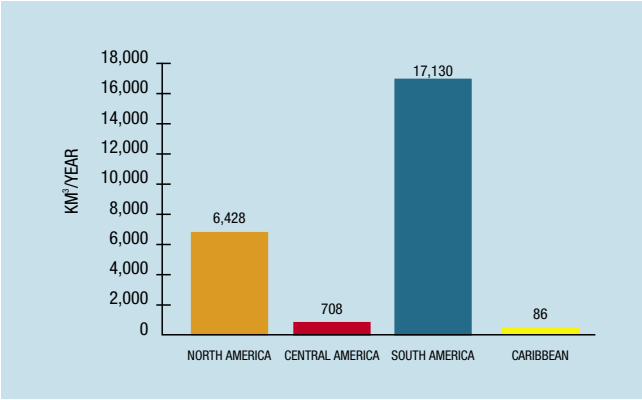


Figure 3.7 Distribution of Renewable Water

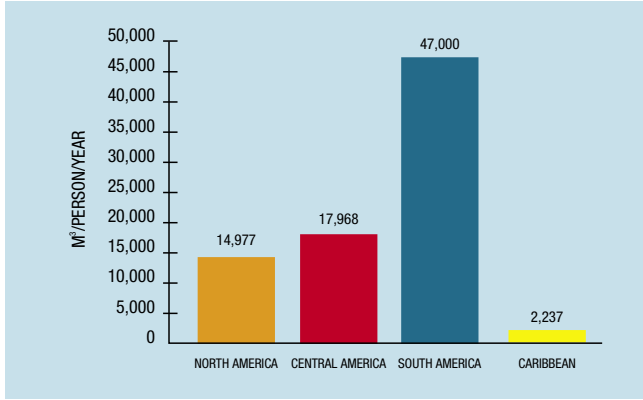


Figure 3.8 Per Capita Water Availability by Sub Region

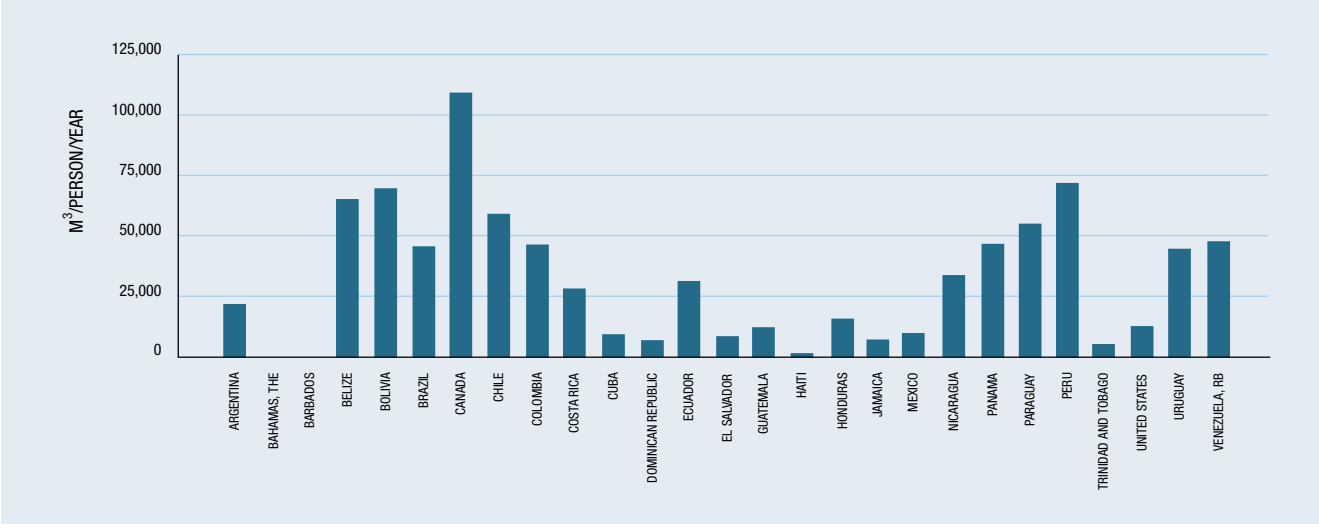
the Congo River.

Although the great majority of the countries in the region are water rich, many of them still face severe water problems in their arid and semi-arid territories; that being the case, for example, in Mexico, western United States, northern Chile, some parts of Bolivia and Peru and north-eastern Brazil.

Extensive aquifers are to be found in North and South America, like the transboundary Guaraní Aquifer in Argentina, Brazil, Paraguay and Uruguay. This is one of the largest groundwater reservoirs in the world, with current water storage of approximately 37,000 km^3 and a natural recharge of 166 km^3 per year. It is anticipated that aquifers such as this one will become increasingly important in the future, as water scarcity and increased climatic changes and variability become major global concerns. In some urban areas of western United States and Mexico, aquifers have already been or are currently being mined beyond their recharge capacity which is severely threatening their sustainability, although some are slowly recovering. In recent years, large urban settlements, extensive agriculture and industry development has increased the demand for water and the necessity to mine groundwater. In some areas of Central America and the Caribbean, groundwater is threatened by saline water intrusion, caused by excessive groundwater abstractions (Miletto 2005).

Environment. Some areas in the Americas, such as the Amazon are well recognized for their biodiversity. The World Resources Institute (WRI) and the Worldwatch Institute (WWI) made a classification of 106 basins and 39 sub-basins which are considered to be the major watersheds of the world and profiled their characteristics (1998). According to this study, the Amazon River Basin has the largest number of fish species, endemic fish species and bird areas in the world. Three basins (Colorado, Yaqui, and Rio Grande in North America)

Figure 3.9 Per Capita Water Availability for Some Individual Countries



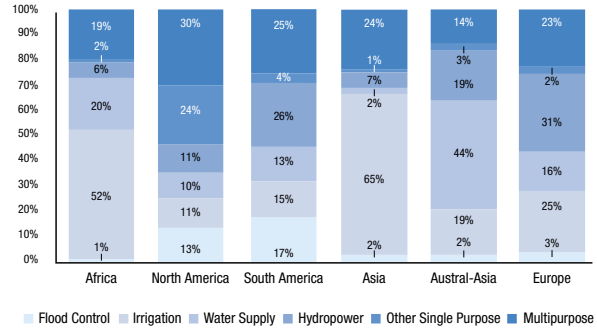
are among the ten most arid watersheds. The first four watersheds from a total of nine ranked according to the number of dams, are also in the region (Parana, Columbia, Colorado, and Mississippi). The Colorado River basin is also among the ten watersheds with the highest percentage of original forest loss. Three watersheds (Orinoco, Usumacinta, and Yaqui) are among the ten with the highest percentage of protected land area. None of the region's watersheds are among the top ten with the highest population density nor among those with the highest percentage of modified land.

Storage Infrastructure. Annual rainfall and surface runoff in the region are generally concentrated in a few months of every year. Consequently, it has been necessary to develop infrastructure to regulate the hydrologic regimes, according to the needs of the population and their economic activities. The last century saw a rapid increase in large dam building. By 1949 about 5,000 large dams had been constructed worldwide, three-quarters of them in industrialized countries. By the end of the 20th Century, there were over 45,000 large dams in over 140 countries (WCD, 2000). Of the 25,400 large dams registered in the International Commission on Large Dams **(Figure 3.10)**, it has been estimated that the region has about 9,000 large dams[12], roughly 20% of the world's total. About 75% are located in the USA. The countries in the region with most dams are the USA, Canada, Brazil, and Mexico, in that order (Gleick 2002).

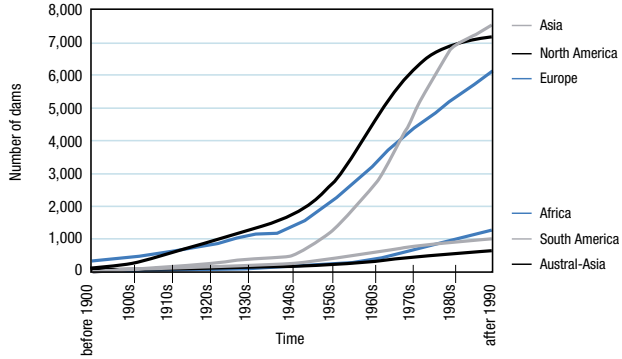
Natural hazards. The region is particularly prone to natural disasters (ECLAC/IDB 2000), the effects of which are often accentuated by inequality and high urban concentrations. The region's vulnerability to natural disasters continues to represent one of the foremost challenges to the Americas. The temporal occurrence of rain and runoff determines the co-existence of droughts and floods, influenced by macro-climatic phenomena such as "El Niño" and "La Niña". Persistent droughts in the arid and semi-arid areas of northeast Brazil and upland areas in Mexico, floods and volcanic eruptions in Central America, and floods and associated land-slides in slums of several metropolitan and peri-urban areas are not uncommon phenomena. The recurrence of extreme hydro-meteorological events (hurricanes and tropical storms) is a pervading threat along most of the Atlantic coast, particularly for those low-lying island states of the Caribbean as well as areas along the Pacific coastline. Frosts also affect important agricultural activities in the region, such as coffee production in South America.

Between 1900 and 1989 the region experienced an average of 8.3 disasters per year. This figure rose to 40.7 disasters per year between 1990 and 1998 (ECLAC/IDB 2000) and is surpassed only by Asia. Of these, 34% were floods, and 5% were droughts[13]. In 2005, for the first time since the present system of naming Atlantic hurricanes and tropical storms was created, forecasters had to introduce the Greek alphabet for names beyond the 21st storm to reach tropical storm strength. The

Figure 3.10 Dams in the Americas



SOURCE: Adapted from ICOLD, 1998 (see Annex V)



SOURCE: ICOLD, 1998 Information excludes the time-trend of dams in China

[12] Dams higher than 15 meters. The resulting figure would be difficult to estimate if smaller dams are included. This number reaches above 80,000 just in the USA alone.

[13] For a detailed discussion of consideration of risk in development planning and project preparation, see "Incorporating Natural Hazard Assessment and Mitigation into Project Preparation – Report to CIDIE members by the OAS," OAS 1987, and *Primer on Natural Hazard Management in Integrated Regional Development Planning, Chapter 1 Incorporating Natural Hazard Management into the Development Planning Process and Chapter 2 Natural Hazard Risk Reduction in Project Formulation and Evaluation.* OAS 1990

previous record of 21 named storms occurred in 1933 (AOL News 2005).

During the 1990s, more than 45,000 people died and another 40 million were affected in some way by natural hazards which cost an estimated US$ 20 billion in Latin America and the Caribbean. Hurricane Katrina is estimated to have cost the United States US$ 34.4 billion in insured property losses alone in 2005. In Colombia, 4 million people were affected by natural disasters during 1993-2000 at an annual cost of US$ 453 million. In Peru, the cost of natural disasters is estimated as 0.51% of GDP. Climate change has the potential to significantly accentuate these impacts and alter existing patterns of natural resource and land use. Some potential impacts include reductions in rainfall; salt-water intrusions that may exacerbate inundation of river deltas, such as those of the Magdalena, Amazon, Orinoco and Paraná rivers; sea level increases threatening coastal areas; and an increased magnitude and frequency of natural disasters such as hurricanes, floods and droughts.

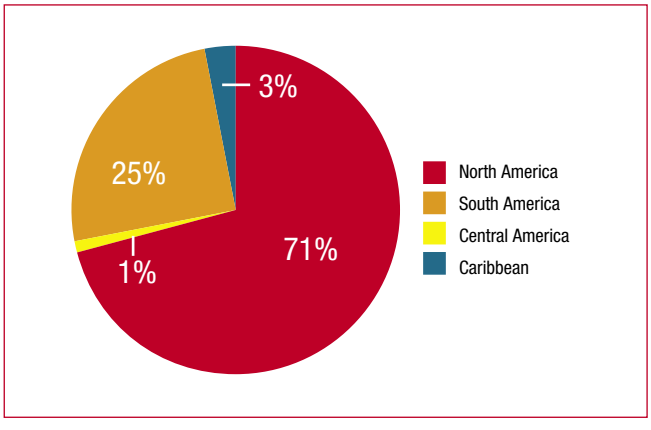


Figure 3.11 Distribution of Irrigated Land in the Americas

Water use. Only a small percentage of the total renewable water of the region is withdrawn to meet the demands of the population and economic activities. Total annual water withdrawals in The Americas (790 km^3) represent 3.2% of total renewable water (24,352 km^3), compared with 8.7% in the whole world, with this percentage ranging from less than 1% in several countries of Central and South America to more than 15% in Mexico, United States and some of the Caribbean countries **(Annex 3, Table A3.3).**

With a few exceptions (Canada, United States, Belize, Panama, Colombia, and Trinidad Tobago), agriculture is the primary water consumer accounting for 50% of all withdrawals. **(Annex 3, Table A3.3)**. In North America, 12% to 77% of total water withdrawals go to agriculture; this percentage ranges from 28% to 83% in Central America, from 46% to 97% in South America, and from 6% to 94% in the Caribbean countries. As a result, there are nearly 42 million hectares of land under irrigation. Of this area, 18.4 million hectares are situated in Latin America and the Caribbean, representing 14% of the total cultivated area (FAO 2000). **Figure 3.11** shows the distribution of irrigated land in North, Central and South America, and the Caribbean.

Levels of irrigation water use are relatively homogeneous across South America and the Greater Antilles, varying between 9,000 m^3/ha/year and 12,000 m^3/

ha/year. Given the socioeconomic characteristics and long history of investments in water development, figures for Mexico are slightly higher, averaging 13,500 m^3/ha/year. These figures are even higher in Central America, due to the development of important, permanent economic crops (banana and sugar cane among others) and the high levels of cultivation in temporary, intensive crops such as rice.

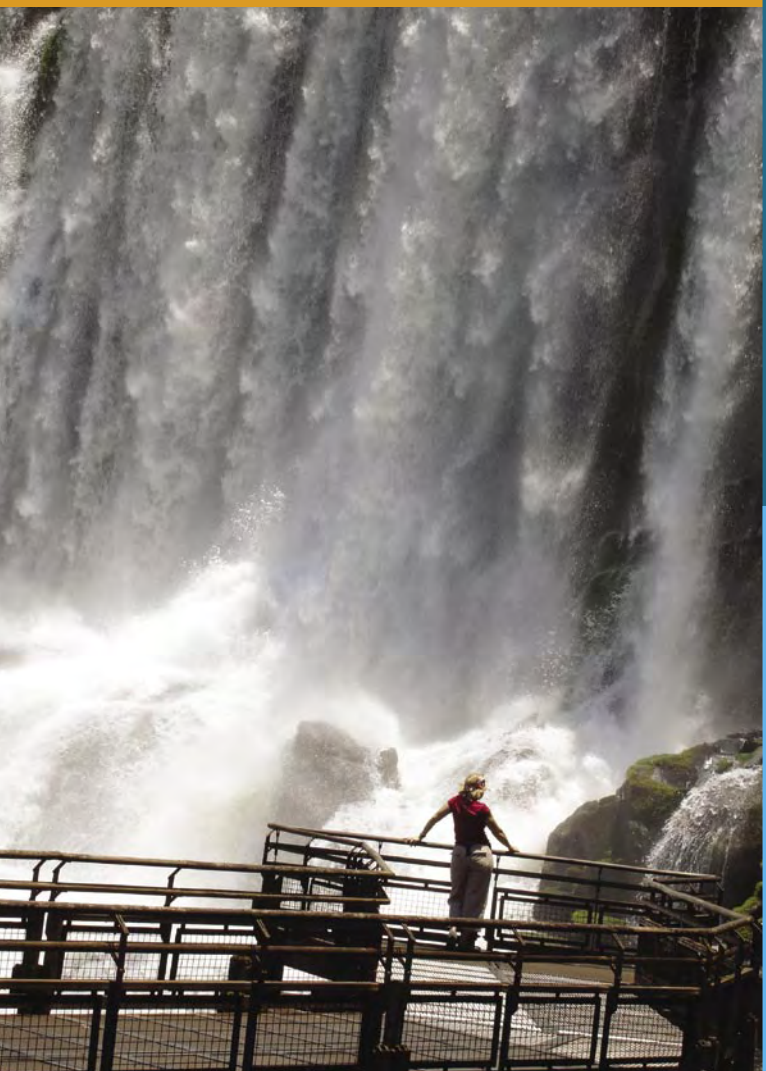
While domestic water use only accounts for 15% of total water withdrawals across the region, it is the largest or second largest water use in all countries, with the exception of the United States, Guatemala, Honduras, Chile, and Peru. Industrial water use accounts for 35% of withdrawals across the Americas but is especially important in Canada, where 69% of withdrawals are for industrial use, far in excess of those for agriculture (12%). Similar situations are observed in the United States, where industrial water use accounts for 46% of withdrawals compared to 41% for agriculture; Trinidad and Tobago, where 6% of withdrawals are for agricultural use compared to 27% for industrial use; and in Belize, where 89% of water is withdrawn for industrial use. Industrial water exceeds domestic use in Canada, United States, Belize, Guatemala, Honduras, Chile and Peru.

Latin American and Caribbean countries have large and varied energy resources including oil (13% of global reserves), natural gas (5.4%), coal (1.6%), biomass and other renewable sources, as well as a large hydroelectric potential (22%). Total energy generation in Latin America and the Caribbean is 1.0 million GWh (55.9% hydroelectric, 40.1 thermoelectric, 3.1% nuclear and 0.9% other sources) (OLADE 2003). In the USA, hydroelectric power generation is around 10% of the total, but in many countries of Central and South America, hydropower represents more than 60% of the total energy production, including Brazil, Paraguay, and Uruguay with more than 90%. By 2000, only about 33% of the economically exploitable hydroelectric potential in Latin America and the Caribbean had been developed (OLADE, 2003).

Access to improved water sources and sanitation. In Canada and United States, access to adequate water supply and sanitation is practically universal. The countries of Latin America and the Caribbean also present relatively high coverage in access to adequate water sources for urban populations: almost all countries register coverage[14] above 90% (data for individual countries is given in **(Annex 3, Table A3.3)**. This is not the case for the rural populations where coverage lies below 70% in some countries **(Annex 3, Table A3.3).** Access to sanitation for urban populations in Latin America and the Caribbean is more variable but is also relatively high, ranging from 52% to 99%. Rural sanitation however remains a challenge, with less than 50% coverage in 10 countries **(Annex 3, Table A3.3)**. The greatest challenge is possibly wastewater treatment. At present, only 63% of domestic wastewater in the region is treated with several countries having no waste water treatment at all **(Annex 3, Table A3.3)**.

[14] When interpreting coverage data, it must be acknolwedged that there is no unequivocal definition. Some data report actual household connections, whereas others report access to the network, without necessarily having an actual household connection. Distinction is not always made between provision of treated or raw water, even if both may be provided to the household.

4. WATER CHALLENGES facing the region



The Americas continue to face many of the generic challenges common to water management around the world. However these are differentiated by unique regional characteristics and country specific context. In an effort to present a representative and balanced overview of these challenges the Operative Committee of the Americas (OCA) and its consultative network (CN/RCA) conducted a survey among members. Twenty-four topics of specific interest were identified (listed alphabetically in **Box 4.1**). The following section presents various examples to outline the various national and regional responses

Box 4.1 Identified Water Management Issues in The Americas*

1. Coastal zone management
2. Dam safety
3. Decentralization; municipal, local and community water management
4. Energy options: hydropower as a clean and renewable resource
5. Financing water infrastructure
6. Floods, droughts, and risk management
7. Governance, institutional quality, and public participation
8. Groundwater management
9. Health implications of sanitation
10. Legal and regulatory framework for IWRM: advances and reforms
11. New frontiers in irrigation approaches
12. Payment for environmental services
13. Privatization: options for financing
14. Public versus private irrigation
15. Reaching the MDGs
16. River basin organizations and institutions-appropriate level
17. Rural sanitation
18. Transboundary river basins
19. Urban water management
20. Water and trade
21. Water as a human right
22. Water as an end versus water as a means
23. Water management of indigenous population
24. Water quality management-adequate water quality standards

*listed alphabetically and not in order of priority

to these challenges. These examples highlight some of the stark contrasts that define the region and illustrate various successes and failures in water management practices from which lessons can be drawn. Challenges are discussed within the context of the five framework themes of the 4th Forum.

1. Water for Growth and Development

Water contributes to often competing, non-complimentary roles. An essential **basic human need**, water also plays an important role in food production, determining the quality of life and in the integrity and sustainability of natural environments, among others. Water is also considered central to social and **economic development**. Water variously contributes to national, regional and local development objectives and is considered a prerequisite for investment, growth and **poverty alleviation**. However, among the Americas there is continued debate over how the role of water should be defined. Much of this debate is centered around Principle 4 of the Dublin Principles **(Box 4.2)**; relating to water as an economic good.

Box 4.2 Dublin Principles

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

This debate is reflected in the history of water management, with early water-projects and management measures based on a strictly service model that viewed water as an isolated resource and an end unto itself. These approaches were focused toward increasing supplies to meet increasing demands or stimulate growth opportunities with the allocation of water not factored into broader local, national or regional objectives. While this gave way to more demand driven planning approaches, water was still largely perceived as a resource and developed in isolation. The underlying assumption has been that such resource planning would increase supply or manage demand in the promotion of social and economic development.

Increasingly these **water management models** have given way to more integrated concepts (Solanes et al 2004). Costa Rica, Guatemala, and Bolivia are among a number of countries throughout the region that have begun to develop IWRM strategies[15] focusing on water as a means for achieving specifically defined national objectives within predetermined strategic areas. Such an approach integrates water management within broader development objectives and maximizes contributions from the countries available water. Such an approach was developed in Chile during the 1980s when the Government decided to support policies in those sectors and activities where it had an international competitive advantage to foster economic growth. The water sector was subsequently developed in line with these policies to achieve national development goals, with a gradual and successive incorporation of social and environmental goals (Peña 2005). Similarly, water in Mexico is viewed as a matter of national security and the legal framework for water management is clearly linked to national development planning. Water management policies also support the country's objectives of democratization, decentralization and social participation (CNA 2005). Costa Rica has placed greater emphasis on the environment and tourism sectors, developing their national economy, defining development objectives and developing water management strategies around these.

While some across the region maintain that **water is a commodity**, others maintain that **water is a human right** and therefore not subject to market forces. Given such disparate views, experience has shown that it is important to define national development objectives with due consideration of economic, social and environmental priorities, the countries economic model and cultural characteristics along with the preferences of its society and political context. The principle of water as a human right has been emphasized (see CN/RCA 2005) and was re-iterated by Organizations of Civil Society during preparatory meetings for the 4th World Water Forum which articulated six statements **(Box 4.3)** in respect of water management. Interestingly, Uruguay became the first country in the Americas to enshrine the right to

[15] Financed by the IDB-Netherlands Water Partnership Program (INWAP) Fund.

drinking water and sewage services in its Constitution. Moderate voices from across the Americas advocate that both concepts are compatible and not mutually exclusive, recognizing that the economic value of water creates conditions that make it possible to ensure the human right to safe drinking water[16] (Mora 2004).

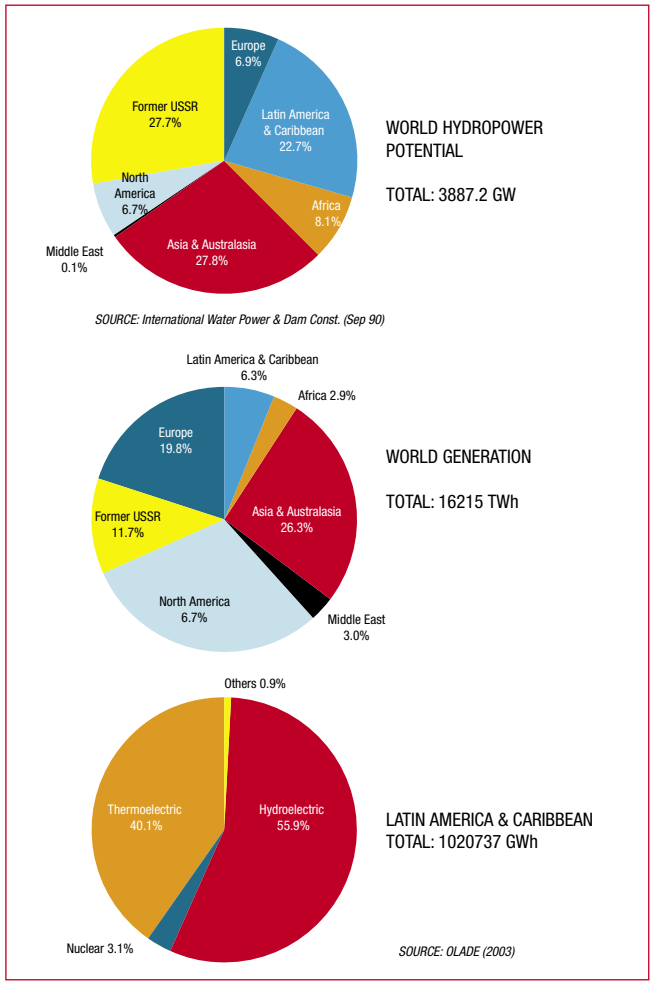
Box 4.3 Statements of Civil Society Organizations during the preparatory meetings

- That water be a fundamental human right and natural and cultural patrimony of nations, guarantee its access in quality, quantity, and continuity to all persons and societies, especially to poor communities and to the most vulnerable sectors;
- That water be a priority within public policies;
- That civil society participates in a binding manner in decision making through adequate means and at adequate levels in the planning, management, and regulation of water and its services;
- That management, use, and distribution of water be made according to rules of justice, equity, and sustainability;
- That rural communities have secure water supply sources with legal provisions to guarantee all uses made by such communities;
- That the water-related function of forests, prairies, moors, wetlands and all natural vegetation land cover be conserved; and that an integrated management and conservation of watersheds, including transboundary river basins, be developed.

SOURCE: CN/RCA (2005)

Water makes significant contributions to both social and economic development across the region. Examples such as the Tennessee Valley Authority (TVA) in the United States provide an example of water management institutions having supported social and economic development. Hydropower has also made significant contributions across the region. Globally, hydropower potential within the Americas represents 29.4% (North America 6.7% and Latin America and the Caribbean 22.7%) of the world's total 3,887.2 GW. The developed potential generates 36.3% of global electricity (North America 30.0% and Latin America and the Caribbean 6.3%), estimated at 16,215 TWh (OLADE 2003: Annex 3, Table A3.3). While hydropower has played a major role in the development of many countries across the region, only 33% of the economically exploitable hydroelectric potential in Latin America has been developed. This is comparable to the 20% developed in Asia and in excess of the 7% of potential developed in Africa. In contrast, Canada, the United States and Europe have developed over 60% of hydropower potential. One third of the world's countries currently rely on hydropower for more than 50% of their energy requirements; however developed hydropower potential represents only around 10% of the total energy production in Canada and the United States, but around 60% of energy production in Latin America.

Figure 4.1 Hydropower Potential and Electricity Generation



[16] FANCA is working on a (2004 – 2006) project to develop: (a) a theoretical conceptualization arising from the local and national organizations about water as a human right made compatible with the fourth Dublin Principle; and (b) a proposal of economic valuation instruments for water, compatible with the legal nature of water as a public good.

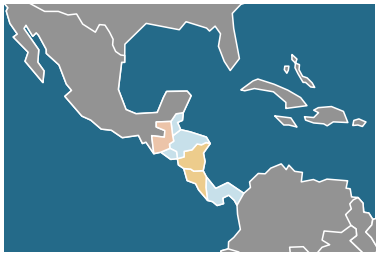
Although having made a significant contribution to the economic growth of the region there has been increasing recognition of the environmental and social cost of large dam developments. Other controversial issues among the Americas include legislation that exists in some countries affording administrative rights to hydropower operators for areas upstream of impoundments (CN/RCA 2005). However, with energy demands predicted to double or triple by 2050 and oil prices continuing to rise, ensuring sufficient water and energy is becoming a decisive factor in supporting economic growth and poverty alleviation (Braga 2005). Hydropower also minimizes the use of hard currency reserves which remains one of the primary goals set forth by many countries in the region. Hydropower projects previously not deemed viable are being re-assessed, typically representing the cleanest source of cost-effective, renewable energy (Braga 2005).

International **funding** available for large hydropower projects has reduced over the past decade and financial restrictions in many countries of Latin America and the Caribbean have led to increased private sector involvement in hydropower development via concessions and/or privatization. The private sector has typically favored small hydropower or thermal generation projects that provide better returns with the size closely related to the level of competitiveness. This is situation is likely to change with continued increases in oil prices and evidence to suggest that countries relying on fossil fuels show greater deficits in the balance of payments.

2. Implementing Integrated Water Resources Management

The region has shown increasing interest in the concept and application of **Integrated Water Resources Management** (IWRM). Since the World Summit on Sustainable Development (Johannesburg, 2002) resolution to approve IWRM and efficiency plans by 2005, the principles of IWRM have been adopted by most national, regional and international organizations responsible for water management in the Americas. The Canadian Water Resources Policy and Mexican National Water Law include IWRM[17] and by 2004, 22 countries from Centre-South (108 worldwide) had made progress toward improving IWRM and efficiency plans (GWP 2004: **Table 4.1**). In Center-South America and the Caribbean, 3 countries showed good progress (14 worldwide), 14 had taken some steps (51 worldwide), and 5 were in the initial stages (43 worldwide). Development of IWRM has been facilitated through projects such as those in Brazil's São Francisco River and the La Plata River Basin in South America supported by international organizations like the Global Environmental Facility / UN Environment Program / Organization of American Sates (GEF/UNEP/OAS) **(Box 4.4)**.

Table 4.1 Status of National Efforts to Elaborate IWRM and Efficiency Plans in Center-South America and the Caribbean

Location	Good Progress	Some Steps	Initial Stages
 *Countries that have made good progress towards more integrated approaches.* *Countries that have taken some steps towards more integrated approaches but need to increase their efforts.* *Countries that remain at the initial stages of the process leading to more integrated approaches.*	• Costa Rica • Nicaragua	• Belize • Honduras • Panama • Guatemala	• El Salvador (originally considered to have taken some steps) • Dominican Republic
 *Countries that have made good progress towards more integrated approaches.* *Countries that have taken some steps towards more integrated approaches but need to increase their efforts.* *Countries that remain at the initial stages of the process leading to more integrated approaches.*	• Brazil	• Argentina • Chile • Ecuador • Paraguay • Peru • Bolivia	• Colombia • Uruguay • Venezuela

[17] Chile decided not to include IWRM in its water law (Peña 2005).

Location	Good Progress	Some Steps	Initial Stages
		• Guyana • Jamaica • Nevis • St. Lucia • St. Vicent & Grenadines • Trinidad & Tobago	

SOURCE: Updated after Informal Stakeholder Baseline Survey. Current Status of National Efforts to Move Towards Sustainable Water management Using an IWRM Approach. Global Water Partnership, Version 1. Project Funded by the Norwegian Ministry of Environment, April 2004.

Box 4.4 GEF/UNEP/OAS IWRM Planning Projects

- Amazon River Basin: Integrated and Sustainable Management of Transboundary Water Resources in the Amazon River Basin.
- Bermejo River Basin: Implementation of the Strategic Action Program for the Binational Basin of the Bermejo River.
- Deltamerica: Development and Implementation of Mechanisms to Disseminate Experiences and Lessons Learned in Integrated Transboundary Water Resources Management in Latin America and the Caribbean.
- La Plata River Basin: A Framework for the Sustainable Management of its Water Resources with Respect to the Hydrological Effects of Climatic Variability and Change.
- Pantanal and the Upper Paraguay River Basin: Implementation of Integrated Watershed Management Practices for the pantanal and the Upper Paraguay River Basin.
- Procuenca-San Juan: An Eco-Management Vision for the Integrated Management of Water Resources and the Sustainable Development of the San Juan River Basin and its Coastal Zone.
- São Francisco River Basin: Integrated Management of Land Based Activities in the São Francisco River Basin.

SOURCE: Office for Sustainable Development and Environment of the General Secretariat of the Organization of American States.

A recent workshop held in Brazil examined various applications of IWRM and highlighted a number of successful applications. These included the São Francisco River Basin in Brazil along with a number of others. **(Box 4.5).**[18]

Box 4.5 Examples of Successful Application of IWRM in Latin America

- Sao Francisco River Basin, Brazil – empowerment of the River Basin Committee has facilitated the implementation of pollution control infrastructure.
- Paraiba do Sul River Basin, Brazil – all the instruments of water resources policy were implemented. The water permit system, the water charges, the Basin Committee, the Basin Agency, and the Basin Plan are operational.
- COIRCO (Colorado river) and AIC (Limay – Neuquen rivers), Argentina. River Basin Committees are operational since 20-30 years.
- Lerma-Chapala River Basin, Mexico - River Basin Council and interstate agreement for use of the waters have been implemented. The River Basin Council was the first established in Mexico.
- Cornare, Colombia – Pollution reduction with implementation of water pollution charges.

[18] Workshop on Integrated Water Resources Management for the Americas, Rio de Janeiro, Brazil, 9-11 January 2006. IADB, INWAP, ANA, IPO.

A ranking of Local Actions submitted for the 4th World Water Forum by the Evaluation Committee of the Committee of the Americas prioritized a number of IWRM examples **(Box 4.6)**.

Box 4.6 Selected Local Action IWRM Cases Submitted to the 4th Forum Secretariat

- Reforestation for conservation of water sources in Chilpancingo, Mexico; Oaxaca, Mexico; Perfume and Santiago rivers, Chiantla Alta, Oaxaca, Mexico; Ayuquila-Armería rivers, Jalisco and Colima States, Mexico.
- Binational arrangements for watershed management, Canada-USA International Joint Commission; Lake Champlain, States of Vermont . and New York, USA and Province of Quebec, Canada.
- Educational program for IWRM in Chile.
- Management of invading plant species for local artisans, Sanguaré, Colombia.
- Waste water bio-treatment, Ensenada Bay, Mexico.
- Agreement of water distribution for Lerma-Chapala River Basin, Mexico.
- National Water Plan, Mexico.

Common denominator: involvement of many actors (local, municipal, state, Federal)

Implementation of IWRM has proved challenging across the region. Despite the efforts of various international and regional bodies to promote the application of IWRM the concept represents many things to many people and accepts many definitions. The concept has been applied solely to water as a resource, facilitating allocation among competing uses to maximize benefits for the system as opposed to maximizing benefits for any given use or user. It has also been applied to integration of the water resource with other resources, incorporating technical, institutional, social, environmental, and political aspects (Garcia et al 2005; Peña 2003).

In several countries across the Americas the concept of IWRM has been expanded to incorporate the idea of **Payment for Environmental Services** (PES)[19]. PES is based on the underlying principle that the environment provides services to humans and that users should pay for activities that ensure sustainability of those services. Services relating to water typically include: (i) provision of water for consumptive uses (drinking, domestic, agricultural and some industrial uses); (ii) non-consumptive uses (hydropower generation, cooling water, and navigation); (iii) flow regulation and filtration; (iv) cultural services (recreation, tourism, existence values); and (v) insurance against uncertain effects of a change in natural flow and disturbance regimes (Tognetti et al 2003). The promotion of PES has been based largely based on three modalities: (i) a surcharge in the tariff of end users of water services, such as water supply or hydroelectric power generation; (ii) as a canon for water withdrawals from water sources; and (iii) as an incentive for landowners to provide valued services in addition or as an alternative to agricultural products.

PES systems are proving effective in the protection of watersheds, with innovative examples from the region including partnerships with Coca-Cola in the protection of upper watersheds in Guatemala, the reduction of sedimentation and water degradation from protected areas adjacent to sources for potable water-use in Bogotá, Colombia, and arrangements around the Panama Canal (Vaughan 2005b). New York residents have agreed to pay for improved dry season flows through increased upstream forests (3rd World Water Forum) while domestic water users in Brazil are willing to pay more for water when revenues are invested within the basin where the funds are generated and when afforded the opportunity to participate revenue spending decisions (Tognetti et al. 2003, after Porto et al. 1999)[20]. However, the majority of PES systems are aimed at the local level and, with the exception of Costa Rica[21], have proved difficult to scale-up.

[19] Although the term "Payment for Environmental Services" has been widely used, some organizations feel that the term "Compensation for Environmental Services" is more adequate, since there is an opportunity environmental cost that should be compensated every time that land, forests or water are used to produce a service to humans. Alternatively, the term "Payment for Ecological Services" is also used.

[20] In the past decade, progress has continued in the field of environmental valuation. Based on cost-benefit analysis (CBA) tools, different valuation methodologies have evolved to capture the value of direct, indirect and non-market values of different environmental services, including water services. In addition to Willingness-to-Pay (WTP) approaches —which are based on responses from individuals to questionnaires regarding how value they attach to different ecological services— approaches include hedonic pricing methods (which use real estate prices as a proxy for different market values), and the travel cost method (to estimate how much individuals will spend to travel to a lake, river or protected area) (Vaughan 2005b).

[21] Costa Rica has created a fund (FONAFIFO) for this purpose.

The success of local PES systems depends on stakeholder confidence in access to benefits and their willingness to pay (WTP), which is typically a function of proposed protection mechanisms and whether these are considered fair and effective (Tognetti et al. 2003, after O'Connor 2000). Many argue that the principle should be inherent in the ethos of "do no harm" or that PES undermine existing mechanisms such as those of polluter pays (Tognetti et al 2003, after FAO 2002). The validity of PES is also undermined by a lack of clearly defined scientifically verified linkages between many of the services and activities for which stakeholders are paid **(Box 4.7)**, particularly in relation to forest-water relationships (Bruinjzeel 2001, Aylward 2002, Tognetti et al 2004, Noordwijk and Agus 2004, Hayward et al 2005). However, PES does not attempt to value all ecosystem functions, but instead to identify and support financial transfer of those ecosystem functions that enhance human well-being (Vaughan 2005b) and is intended to improve environmental protection through providing incentives to landowners for alternative activities that provide valued services in addition to agricultural products (Tognetti et al 2003).

The challenge facing the future development and sustainability of PES is in defining payment mechanisms, whether these are based on direct and/or indirect values of water-related services or an alternate proxy (much like a tax or subsidy), and developing scientific legitimacy. There has been little research into the transactional costs associated with establishing PES systems (see **Box 4.8**) and there is little empirical evidence to suggest that such systems are more cost-effective than other measures (Tognetti et al. 2003). Other such measures, such as improving institutional capacity, may have broader social benefits that are more closely aligned with national objectives, particularly when such measures are designed to overcome barriers to participation of the poor (Tognetti et al. 2003, after Landell-Mills and Porras 2002).

Box 4.7 PES and the Myth of Simple Solutions

"It is a tall order to expect any single policy or market-based instrument to control floods, maintain or increase dry season flow, reduce sedimentation and landslides, provide a source of funding for conservation, and alleviate poverty. However, the notion that paying people to maintain forests will accomplish all of these things if we can just get the science right so that we can get the prices right remains implicit in many initiatives to establish payments for watershed services (PWS).

The mystery is why such myths persist, in spite of over 20 years of scientific research that states the obvious, at least to hydrologists, that trees are also consumers of water and that this is a complex topic that does not lend itself to any one simple solution. Perhaps such myths persist because they provide a basis for simple and standardized solutions, or "magic bullets", which are the stuff of bureaucracy. They have also provided the basis for approaches to watershed management in which many interests have become invested, such as relocating people to make way for forestry plantations, and construction of check dams to capture water and soil for consumption in upstream areas."

Flows-News on Payments for Watershed Services (2005). Supported by the International Institute for Environment and Development, and The World Bank-Netherlands Watershed Partnership Program.

Box 4.8 Establishing an Enabling Environment for PES

- Existence of land tenure security.
- Existence of appropriate supporting institutions, which refer to relationships established among buyers, sellers, and intermediary organizations that serve to insure enforcement and reduce transaction costs.
- Formation of organizations such as farmer or landowners associations, watershed councils, and land trusts, who are able to develop priorities and plans of action on which stakeholders can agree to collaborate.
- Establishment of policy objectives.
- Research and assessment to:
  - Define and quantify services
  - Identify effective management actions,
  - Identify distribution of costs and benefits,
  - Raise awareness and WTP of stakeholders.
- Reduce barriers to participation.
- Monitoring and enforcement.

SOURCE: Tognetti et al 2003.

While PES provides an economic instrument to integrate water management issues within a watershed, **coastal zone management** presents a series of unique challenges. The regional coastline is some 617,105 km in length (North America 398,835 km, Central America and the Caribbean 73,703 km, and South America 144,567 km) encompassing 26 million km^2 of sea (North America - 11 million km^2; Central America and the Caribbean - 6 million km^2; and South America - 9 million km^2) (WRI 2002). For many countries, such as the island nations of the Caribbean, Panama and Costa Rica, this coastal zone represents more than half the area under national jurisdiction (IDB 1998). Given the importance of this zone many countries have enacted legislation which sets aside an inland strip under public jurisdiction. Some countries have adopted a broad definition of coastal zones, including any inland areas with a direct and significant impact on coastal waters, while others have specified specific limits, such as Ecuador where the coastal zone is defined as 8m and Uruguay where it is defined as 250m.

The coastal zone has great economic, social, and environmental importance for the region. In one of the world's most urbanized regions, 100% of the population lives within 100 km of the coastline in most of the Caribbean countries along with seven others in the region. In twelve other countries, this figure is 50% or more, and only in six is it less than 50% (WRI 2002). Sixty of the 77 largest cities in Latin America and the Caribbean are situated in the coastal zone which plays an important role in tourism, a major source of income for most Caribbean countries and many others in Latin America, such as Costa Rica, Belize, Panama, Uruguay, Argentina, and Mexico. These coastal areas include 12,741 km^2 of protected mangrove (1,195 km^2 in North America, 2,149 km^2 in Central America and the Caribbean, and 9,397 km^2 in South America) (WRI 2002). These and other important coastal habitats support important activities, such as small-scale inshore fisheries. In 1993 the total regional catch was estimated at around 20 million tons, dominated by catches from Peru and Chile, contributing approximately 20% to the world's total catch.

Coastal regions throughout the Americas face a number of challenges. These relate to environmental, social, and economic issues, including, among others, land use and resource allocation conflicts; degradation of ecosystems; depletion of commercial fisheries stocks; increasing erosion; flooding; shoreline instability; property, economic infrastructure and human losses from meteorological phenomena and climate change; impoverishing of coastal communities; and declining coastal water quality from land-based sources (IDB 1998).

The coastal areas receive about 80% of the sediments transported by rivers within the region, including major rivers such as the Magdalena, Parana, Amazonas and Mississippi (Escobar 2002). Annual BOD_5 of waters reaching coastal areas in Latin America and the Caribbean alone have been estimated at more than 500,000 tons, with municipal and industrial wastewaters contributing 90% to 95% of this pollution. Serious cases have been reported in numerous countries, including Chile, México, Costa Rica, Perú, Brazil, El Salvador, Ecuador, Panama, Venezuela, and Colombia. Pollution from agriculture is the regarded as the second most significant problem in Central America after municipal pollution[22] and the most significant in terms of toxic substances. Important cases of the latter have been reported in Costa Rica, Colombia, Ecuador, Mexico, Chile, Peru, and the Gulf Coast of the USA. Mining sources also make significant contributions to coastal pollution across Peru, Chile, Panama, Nicaragua, Honduras, and Guatemala, while Chile, Colombia and Mexico report problems arising from industrial pollution.

Several instruments for controlling the impacts of land-generated pollution in coastal areas are employed throughout the region. These include policy instruments (in use in Colombia, Brazil, Chile, and Mexico), planning instruments (such as in Mexico, Chile, Colombia, and Peru), management instruments (in use in Chile and Brazil), regulatory and control mechanisms (for example in Colombia and Mexico), and economic instruments, whose use has been increasing over the last years. Coordination mechanisms for management of coastal zone pollution are few, but there is high potential for existing institutions to act in that respect. Examples can be found in Mexico, Chile, Colombia, Nicaragua, Venezuela, and Cuba and organizations have been established to deal specifically with problems of coastal zone pollution in Brazil, Chile and Colombia (Escobar 2002). However, despite the fact that most countries in the Americas have signed the UNEP's Global Action Plan (GAP) to reduce pollution and degradation of coastal zones due to land sources and activities, few have developed National Action Plans (CN/RCA 2005).

[22] Some authors use the term "domestic pollution", but the use of "municipal pollution" is also widely used referring to pollution originated in urban areas, irrespectively of the public or private nature of the service operators and providers.

Within the context of IWRM, the challenges facing integration and management of the coastal zone are relatively simple when contrasted to those facing **groundwater**. A valuable resource across the Americas, groundwater is increasingly playing a strategic role in supporting national development. Increasing surface water pollution across the region means many urban centers have to rely on groundwater sources, with unreliable public water supply systems giving rise to increased participation by the private sector. However, agriculture remains the major use of groundwater, accounting for nearly 50% of groundwater abstractions in United States and supporting one third of the irrigated areas in Mexico. Ensuring a comprehensive management framework that integrates groundwater with surface water and ensures that they are managed within sustainable limits remains one of the biggest challenges throughout the region.

The existence of several different, often inconsistent, policies relating to groundwater management have led to numerous conflicts. The reallocation of groundwater rights and restriction of water abstraction to economically efficient and sustainable limits have been the driving forces behind legal and institutional reforms. In the USA, for example, the states of Arizona, California, Nebraska, and Texas have adopted various approaches to reduce water rights conflicts and ensure environmental protection (Flay & Narasimhan 2005). All these approaches differ significantly in the degree of centralization, integration of surface and ground waters, and the organization of localized groundwater management districts. The State of Arizona has created Active Management Areas (AMA) and Irrigation Non-expansion Areas as legal subdivisions of the state, and all sources of water, surface and underground, are included in management plans. The AMA Boards of Directors have numerous tools to achieve water consumption goals, including legal right provisions, underground storage, conservation and education programs. Similarly, specific legislation has been enacted in Texas establishing guidelines for comprehensive groundwater district management plans, including conformance with regional water plans.

The problems of groundwater over-exploitation include land subsidence, such as experienced in many areas across Mexico, along with salinization, the result of a diverse array of processes that threaten high-quality groundwater sources. This is a specific concern in many rural areas, such as in Mendoza, Argentina. Lack of proper sanitation in many urban areas has also increased the vulnerability of aquifers. This is the example in some Central American countries where groundwater supplies also provide the main water sources for the population. In contrast, groundwater levels in the Buenos Aires area are rising due to the increase in potable water imported from the La Plata River and accompanying decreases in groundwater use. However, this is causing numerous health problems due to the collapse of septic tanks and significant economic losses due to urban, industrial and commercial basement flooding (Llop 2005).

Adding to the complexity, many aquifers in the Americas are **transboundary**, being shared between neighboring countries or federal states. According to the Inventory of Transboundary Aquifers of the Americas, carried out by the ISARM regional programme[23], there are at least 67 transboundary aquifers in the American hemisphere: 27 located in South America, 19 in North America (Canada, Mexico, USA), 12 in Central America and 4 in the Caribbean (the Dominican Republic – Haiti[24]). About one third of these transboundary aquifers are in arid and semi-arid zones. From a first estimate of high risk-features based on anthropogenic activities (IGRAC 2005), 20 of these transboundary aquifers are already considered intensively mined, while 16 located in areas of intensive agriculture or industry show higher rates of salinity.

One of the priorities emerging from the ISARM regional programme is ensuring the sustainable management of transboundary aquifers in water-scarce regions, such as the arid and semi-arid areas of the Americas. The challenges are exemplified in the case of the Gran Chaco Americano, the largest semi-arid plain in South America. Nearly 80% of the rural population lacks access to potable water and issues of water scarcity are compounded

[23] The UNESCO/OAS ISARM-Americas Programme is the regional initiative for the American hemisphere of the worldwide ISARM "Internationally Shared Aquifer Resources Management" Programme and is jointly coordinated by the UNESCO International Hydrological Programme (IHP) and the Office for Sustainable Development and Environment of the Organization of the American States (OSDE/OAS). Its implementation has provided a platform to promote interest for the development of transboundary aquifer projects.

[24] A GEF/UNEP/OAS/UNESCO project is being implemented on the Artibonite and Masacre, two transboundary aquifers located in the inter-mountainous and coastal regions of Haiti and Dominican Republic in the Island of Hispaniola.

by recent population increases, intensification of agricultural and industrial land use, salinization and pollution. The Yrenda-Toba-Tarijeno transboundary aquifer system (SAYTT) covers 40% of the plains of the Gran Chaco Americano across Bolivia, Argentina and Paraguay. It represents a potentially valuable source of water[25] and the SAYTT pilot-project aims to provide a comprehensive understanding of the aquifer system, its function in supporting human needs and needs to ensure environmental sustainability. The project will also provide guidance for management in other La Plata Basin aquifers to ensure more sustainable management mechanisms **(Box 4.9)**.

In view of the complexities involved in sustainable groundwater use, the World Bank-Netherlands Water Partnership Program launched the Groundwater Management Advisory Team (GWMATE) in support of a multinational groundwater program providing technical assistance for specific cases. In Latin America, efforts include the GEF funded Guaraní Aquifer Project for groundwater sustainability and environmental protection. The project was launched with the active participation of the Mercosur nations of Argentina, Brazil, Paraguay, and Uruguay. GWMATE continues to provide services with special reference to (i) the evaluation of regional aquifer development and management issues; (ii) the promotion of practical groundwater protection measures at the local level through four pilot projects for aquifer management; and (iii) the definition of an appropriate legal and institutional framework for efficient transboundary groundwater management. Other GWMATE projects in the region include: (i) analysis of actual and potential regulatory issues relating to groundwater use in the Patiño aquifer of Gran Asunción, Paraguay; (ii) mitigation of groundwater drainage problems in the Buenos Aires conurbation; (iii) potential construction of sub-surface dams to augment groundwater storage for human subsistence in the state of Pernambuco, Brazil; and (iv) design of the institutional and legal frameworks for the administration of the surface and groundwater resources associated with the Quibor aquifer in Venezuela.

Experiences and lessons learned thus far from across the region have shown that the existence of a stable and legally-grounded system of water rights is an important building block of plans, programs, and actions towards restoring the sustainability of aquifers. These experiences have also highlighted the need for comprehensive regulatory, participatory, and economic water management instruments. Groundwater management is appreciably more complex than the management of surface waters. There is often no concordance between basin units and aquifers and as such management systems must be more comprehensive and robust, while having the flexibility to adapt to changing demands.

The challenges of addressing and implementing IWRM in the region stem largely from problems arising from a lack of consensus around the definition of IWRM, its role in ensuring effective water management and the process of translating this into effective implementation. Sustainable financial mechanisms in support of decentralized IWRM processes are needed along with

Box 4.9 The Role of Groundwater in the Pantanal Ecosystem

La Plata Basin encompasses also the Pantanal, the largest wetland in the world and a globally significant biodiversity hot spot. Given the global relevance and uniqueness of this ecosystem, recent efforts have been made to ensure its sustainability. In all previous efforts; little attention has been paid to the role of groundwater in the functioning of the Pantanal Ecosystem. Thanks to the ISARM Americas Programme, the key role played by groundwater in the functioning of the Pantanal Wetland has been appreciated. During the Corumba Workshop (March 30, 2005), the countries of Bolivia, Brazil and Paraguay have actually agreed on a joint action on groundwater based on the common vision "of developing a coordinated sustainable management framework for the Pantanal transboundary aquifer, based on a sound understanding of the hydraulic interrelationships with surface waters, and on the recognition of the Pantanal as a groundwater dependent ecosystem - GDE. The ultimate goal is to ensure the integrity of the ecosystem and sustain its ecological values and functions, taking into account and adapting to the effects of climate change and variability".

SOURCE: Miletto 2005.

[25] The ISARM case-study on Yrenda-Toba-Tarijeno - SAYTT is addressed within the wider context of the Project "Framework for the Management of the Water Resources of the La Plata River Basin", being carried out by the countries that share the basin in close coordination with the Plata Basin Intergovernmental Commission and supported by UNEP and OAS, with financial assistance from the GEF and the Italian Ministry of Environment and Territory.

greater efforts to ensure harmonization of local and national initiatives and programs. While PES provides interesting models for financing within watersheds these systems need to be strengthen and supported through scientifically verifiable linkages. Many of the issues inherent in this lack of consensus relate to externalities that are not directly linked to water but part of broader national and regional dialogues. These relate to the contrasting perceptions of water as an economic good or a human right, as discussed previously. In the absence of scarcity and conflict the imperative for addressing sustainable solutions and thus developing IWRM is often lacking. Legal frameworks throughout the region need to be harmonized and further developed to incorporate lessons learnt from experiences across the region.

3. Water and Sanitation for All

In all of the Latin America and Caribbean countries **water supply and sanitation** utilities are almost exclusively for the domestic and commercial users. Irrigated agriculture, mining and most industry, with the exception of some smaller, urban industries, have their own supply. Consequently, the most important impacts associated with coverage deficits relate to human health (Jouravlev 2004). Unsafe water supplies and poor sanitation-hygiene rank 10th among the 20 leading causes of mortality. In the developing world they rank 6th overall and 4th among those developing countries with the highest levels of mortality, after high blood pressure, malnutrition and unsafe sex

(WHO 2002). Although the overall average percentage coverage for water supply and sanitation in the Americas exceed those for Africa or Asia these figures hide the challenge over ensuring supply to the regions population. Although approximately 87% of Latin America's 337 million urban inhabitants have adequate sanitation, more than 100 million urban dwellers still remain without service and an estimate 120 million additional people require access to safe water supplies. These are concentrated in countries with large cities, such as Brazil (57 million without service), Mexico (10 million), Argentina (8 million), Venezuela (7 million), and Peru (7 million). It is only in Chile, Colombia, Guatemala, and Mexico that the urban population connected to sewage systems exceeds 70%. In Paraguay, Suriname and several of the Caribbean islands coverage is less than 20%.

While service levels in Canada and the United States are considered universal, persistent disparities exist across Latin America and the Caribbean between urban and rural areas. Only 49% of the rural population across Latin America and the Caribbean are connected to conventional sewage systems, with 31% relying on in situ sanitation systems. With the exception of Colombia, Ecuador, Guatemala, Jamaica, Mexico, Peru, and Venezuela rural sewage systems are practically nonexistent in most Latin American and Caribbean countries. Existing systems in situ may provide short-term alternatives in rural areas, where 41% of the population depend upon them, but do not provide an adequate solution for urban areas, although 27% of the population relies on such systems.

Poor sanitation facilities and sewage disposal are contributing to existing problems of surface and groundwater pollution in many cities, like Buenos Aires, San Salvador and San José (Jouravlev 2004 after PAHO 2001). Few countries In Latin America and the Caribbean have adequate wastewater treatment, with only 24% of countries treating more than 50% of their domestic wastewater, 15% treat between 20% and 50%, 27% treat from 10% to 20%, and one third treat less than 10% (Jouravlev 2004 after PAHO 2001). Given this context there is concern that not enough emphasis has been given to instilling simple but effective practices, such as hand-washing, that can result in significant health improvements (Thurnhofer 2005).

Problems associated with **water pollution** are having significant impacts on the health of the regional population. For the first 90 years of the 20th century the region was free of epidemic cholera. However, in 1991 a major epidemic broke out in Peru causing almost 323,000 deaths. This outbreak later spread to other countries including Bolivia, Brazil, Canada, Chile, Colombia, Ecuador, El Salvador, USA, Guatemala, French Guyana, Honduras, Mexico, Nicaragua, Panama, and Venezuela, totaling 70% of the cases registered worldwide (Jouravlev 2004 after Brandling-Bennett et al 1994). This example also highlights the fact that issues associated with water management are often impacted by broader external issues, such access to better health conditions in rural areas as well as including access to safe drinking water and sanitation.

Governments in the region have traditionally confronted problems in assisting **rural areas** and in many cases, especially in Central America and the Caribbean, are the NGOs who have reached them with innovative solutions. For example, national and regional water supply and sanitation networks in Central America, and the Sectorial Concertation Committees of the Andean region are contributing to the water supply and sanitation sub-sector by providing coordination, capacity building, exchange of experiences and promoting synergies and contributions to national sub-sectorial policies (Thurnhofer 2005).

Existing issues are being compounded by **population growth and urban migration**. The region includes some of the largest and fastest rapidly growing cities in the world, with Mexico City, New York, São Paulo, and Los Angeles having a joint population of over 80 million inhabitants[26]. These characteristics, along with monopolist service and potential economies of scale, originally (1940s and early 1950s) supported arguments for an increasing government role in the provision of water supply and sanitation services (Lee 1990). However, facing these challenges and increasing deficits in coverage, along with administrative inefficiency of some public providers and limited payment capacity among low-income communities, has forced governments to allocate increasing subsidies for operation and maintenance of systems[27]. However, advances toward financial sustainability of service delivery have not kept the same pace and subsidies are still necessary, perhaps beyond

[26] http://www.citypopulation.de/World.html

[27] In some countries, these subsidies were given directly to the public service providers and in other countries, such as Chile, the subsidies were given directly to the low-income users. It is interesting to note that in Chile, these subsidies to users were given irrespectively of the public or private nature of the service provider.

what is considered a desirable level. Solutions to the problems in large urban centers not only require additional **financial resources** but the development systems to handle increasingly complex problems. Such challenges include the reuse of treated wastewater in Los Angeles and the extensive infrastructure needed to supply water and treat the wastewater in Mexico City[28]. In general, the rapid urbanization and concentrated population in the cities have resulted in hydrologic imbalances in the watersheds and aquifers over which many cities are located. These imbalances sometimes require the transfer of water from one river basin to another with some inter-basin transfers in Central American crossing the continental divide from the Pacific to the Atlantic. Other urban water management problems include poor water quality, urban flooding, and inadequate urban drainage and distribution problems. The increasing water demands of the large urban centers often conflict with the water needs of many rural areas, both in terms of volumes as well as in the quality of water bodies receiving return flows.

In response to these challenges the region has made important advances in the modernization of the water supply and sanitation **institutional framework**. For example, the Central American and Dominican Republic Water Supply and Sanitation Forum (FOCARD-APS) integrates national water supply and sanitation entities and is linked to the Central American integration process, providing important leadership in the sub-sector (Thurnhofer 2005). Large amounts of money have been invested in this regard and high coverage rates have been reached in some urban areas. Innovative mechanisms are being applied, including institutional reform to separate the provision and regulation functions. Private sector participation has been promoted, as well as decentralization and community participation to share decision-making and operation and maintenance responsibilities. Despite inroads into reducing coverage deficits in the last 15 years, especially in urban areas, many deficiencies in access to safe water supply and sanitation still prevail, affecting mainly the poorest populations and rural areas (Jouravlev 2004).

Experiences suggest that efficient public service providers are required for sustainable solutions which when combined with community control can help ensure equitable access for the poorest of the poor (UN Habitat 2005a). For example, in Guatemala City over 200 independent operators are responsible for service provision to over half of the city's population, while Bolivia operates some of its water utilities as co-operative models. The Saguapac cooperative in Santa Cruz is reputed to be one of the best-run urban water utilities in Latin America. After a long struggle in Buenos Aires several low-income groups have successfully negotiated the provision of services from private operators despite their lack of land title and legal status.

Although still far from fully meeting the existing challenges the region has enjoyed some important successes. The Ibero-American and Caribbean Forum on Best Practices is a regional network of public and private sector partners[29] formed in 1997 to identify, analyze, document and disseminate regional best practices that have contributed to improving the quality of life in the region's cities (UN Habitat 2005a). This network has collected over 500 best practice examples since its inception (approximately 200 in 2004).

At the core of the problem, however, lies the **financial challenge** in closing existing gaps and meet increasing needs. One reason the provision of water and sanitation is inadequate for much of the urban population of Latin America and the Caribbean is that large-scale investments in water and sanitation were made in cities without adequate plans or programs for improving the conditions of lower-income groups. As many countries pursued privatization of service utilities, it proved difficult to reconcile the interests and priorities of private companies with the often complex and capital intensive investments needed to ensure adequate provision for low-income groups. Public-private partnerships and small-scale providers combined with community participation and regulation now form part of a pragmatic response to addressing these inadequacies.

When discussing the different **modes of financing** water-related projects and activities, several seeds of controversy flourish, as this has become a highly sensitive issue in the region. Discussions around different modes of financing for water-related projects and activities have become a highly sensitive and controversial issue in the

[28] For more information see http://www.ladwp.com/ladwp/areaHomeIndex.jsp?contentId=LADWP_WATER_SCID and CNA 2002.

[29] The main partners include the Government of Spain, Habitat Colombia Foundation, Instituto Brasileiro de Administracao Municipal of Brazil, El Agora of Argentina, Centro de Estudios de Vivienda y Urbanos and UN-HABITAT.

Table 4.2 Contribution to investment for all water related activities in developing countries

I. Source of financing	Contribution
II. Domestic government/ public sector	62%
Domestic non government	15%
International aid flows	14%
International private companies	9%

SOURCE: Sunman 2002 from GWP Framework for Action 2000

region. There are four main sources of finance for capital investment in water **(Table 4.2)** and the various models of financing continue to be a source of debate, which is often overshadowed by polemics (Vaughan 2005b). Latin American and Caribbean countries typically follow this pattern, although the share of international private capital may be higher (Sunman 2002).

The challenge of meeting increasing **demands for service provision** have been compounded over the last 30 years by lack of adequate financial resources in many countries. As a result both infrastructure and service quality have deteriorated, exacerbating perceptions that governments were incapable of ensuring adequate service provision. Emerging from this experience it was acknowledged that new approaches were needed and these have subsequently included increased private sector and community participation in the operation and maintenance of water supply and sanitation services.

However, **private involvement** is not akin to regulatory retreat or deregulation. On the contrary, the record shows that with the introduction of private concessions, more (not less) regulatory oversight is needed to ensure that the terms of reference of concessions are met (Vaughan 2005). The privatization process undertaken in Argentina has resulted in the creation of multiple regulatory bodies, with almost one for each privatized service provider. This has resulted in the creation of a Federal Association of Regulatory Entities (AFERAS) that includes 14 regulatory bodies and has facilitated useful exchanges of information and experiences, benchmarking of service providers in

Argentina and the development of indicators to compare with other regions of the world (Llop 2005).

Practically all countries in the region have adopted policy guidelines to increase private **sector participation** in the provision of water supply and sanitation services with some countries adopting overly ambitious plans in the early 1990s (ECLA 1998). Despite this the Latin American countries have been very successful in attracting international private sector investment for water and sanitation projects[30]. However, the risks involved in lending to certain groups, such as municipalities or farmers' associations, are often considered too high for the private sector. The cost of borrowing for the private sector is also higher than for governments and this additional cost needs to be offset through expected efficiency gains (Sunman 2002). Despite these constraints Argentina and Chile have succeeded in transferring most of their urban water supply and sanitation services to the private sector and it is estimated that private sector participation provides coverage to between 8% and 15% of the total population in Latin America and Caribbean (WHO/UNICEF 2000).

The following provides some examples of private sector participation throughout the region: (i) some cities in Bolivia (La Paz, El Alto, Cochabamba[31]), Brazil (Jundiaí, Limeira, and Manaus, among others), Colombia (Barranquilla and Cartagena), Ecuador (Guayaquil), Honduras (San Pedro Sula), Mexico (Aguascalientes, Cancun, Mexico City, Saltillo, among others); (ii) tourist areas in Cuba, Mexico and Uruguay; (iii) BOT contracts in wastewater treatment (Mexico, Brazil, Colombia), water supply and desalinization operations (some Caribbean islands); and small water supply systems ("aguateros" in Paraguay and other cities) (Jouravlev 2004). In Cordoba, Argentina, private providers account for 10 to 15% of water services, covering about 38,200 households.

Increasing private sector involvement in the water supply and sanitation sector has highlighted the need to ensure adequate regulatory frameworks to oversee the costs and quality of the services. The existence of an efficient, effective and transparent institutional and legal framework provides legal security to investors and at the same time, guarantees service agreements between providers and users. Experience shows that such regulatory actions should be applied not only to private but also public service providers. This promotes investment, innovation, efficiency and ensures that the price paid by the users is the lowest possible, without jeopardizing the financial health of the provider or quality of service to the user.

Private sector investments in water supply and sanitation in countries like Argentina, Brazil, Chile, Cuba, Ecuador, and Mexico are often attributed to regulatory frameworks that favor the private sector (Jouravlev 2004). Such investments have helped reduce chronic financing deficits and the deterioration of water supply and sanitation services, improving the efficiency, coverage and quality of service provision. Others argue that private sector investments are typically focused toward low risk areas, ignoring and often accentuating problems of exclusion faced by the poorest sector of the population (Corrales 2003), although many governments, such as in Brazil, have expressed different opinions (Vaughan 2005).

While several authors agree about the success of the Chilean process of privatization (Solanes 2005, Celedón and Alegría 2005, CN/RCA 2005), the Argentinean experience, especially that of Buenos Aires, is more controversial (Solanes 2005, Lentini 2004, CN/RCA 2005). An analysis of private sector service providers in Argentina (Llop 2005b) distinguishes three distinct phases: (i) a first phase in which, with some important exceptions, contractual obligations were met, important investments were made, coverage and services were improved and important reductions in personnel were made; (ii) a second phase in which important non-fulfillment of contractual obligations from the service providers appeared as well as increasing weaknesses on the part of regulators were made evident; and (iii) a third phase, starting with the crisis of 2001, with increasing tensions between service providers and the national government, where the regulatory entities experienced increasing stress. Presently, there is uncertainty regarding the future of the institutional arrangements for the provision of water and sanitation services (Llop 2005b). The Buenos Aires experience provides a number of lessons that may prove useful for

[30] By 1997 the total investments in projects with private sector participation reached US$8.2 billion (about a third of total international private investment in developing countries), and this pattern seems to have continued with a further US$8 billion worth of contracts (concessions and BOT) announced in the following 5 years (Sunman 2002).

[31] The cases of Bolivia also merit a more detailed analysis in order not to repeat some of the conflicts that resulted from the process (Solanes 2005).

other countries in the region (**Box 4.10**: Castro 2004, Lentini 2004, Solanes 2005).

As a result of such experiences, public opinion in several countries are beginning to reflect an increasing "uneasiness" about the effectiveness of regulatory frameworks and the legitimacy of private sector management of water supply and sanitation services. Many argue that their assumed higher efficiency should be reflected in a progressive lowering of tariffs (Stranger and Chechilnitzky 2003). It is interesting to note that some of the largest international corporations are leaving the water supply and sanitation sector in the Latin American and Caribbean region. In a number of schemes these voids are being filled through the participation of local investors.

The main economic argument for privatization is that water markets are more efficient than public agencies. The gauge of economic efficiency is of course, related to price. In this regard, some sectors doubt that privatization has

Box 4.10 Some Lessons Learned from The Buenos Aires Case

- Taking as a whole the problems and lessons learned in the regulatory practice, the following aspects are relevant: (i) the contractual design and the bidding process; (ii) the legal and institutional regulatory framework; and (iii) the degree of development of the regulation and control instruments.
- Countries, financing institutions and service providers should carefully analyze socio-economic context, the quality of macroeconomic policies, national priorities and the sustainability of economic growth before embarking into water services development programs, either private or public. Services are costly and non-growing economies may not be able to afford them.
- Governments striving for expanded and enhanced water services, including control of environmental externalities, will not be successful unless high policy priority is given to the sector, processes are adequately resourced, and subsidies for the poor are provided.
- Rushed decisions should be resisted. Adequate physical, economic, and social data are crucial to good decision making and to the sustainability of services, state-owned or privatized.
- Public utility services are not neutral to the socioeconomic mores of the environment where they perform. Their sustainability is affected by overall economic performance. Private sector participation is a formal procedure that does not, by itself, ensure sustainability, since its success depends on the quality of overall economic policies, public priorities, and economic growth.
- Future regulatory designs should set up the basic regulatory instruments, necessary for good regulation, as resulting from relevant experiences, enacted through regulatory law, and separated from the contract.
- They include, inter alia, reasonable returns, linking rates and tariffs to growth and performance of national economies, controlling transfer prices, requiring that expenses be reasonable, controlling companies debt, setting regulatory accounting, having independent regulators, connecting returns to actual investment, providing subsidies and protection to the poor, requiring efficient companies that transfer efficiencies to customers, providing regulators with broad information powers, and penalizing improvidence and non-compliance.
- Governments and lending organizations should carefully consider the impact of special guarantees, such as rates of exchange, on the efficiency of service providers, macroeconomic national balances, contingent national liabilities, and equitable apportionment of national resources;
- Bidding mechanisms and other designs such as price cap systems are no substitute for adequate regulation. There is a need to refine competition mechanisms for awarding monopolies, with the aim of avoiding bid offers with predatory tariffs (to win now and negotiate later) and provide for a capital contribution from the successful bidder that represents a level of risk appropriate to the venture undertaken.
- Initiating a private sector participation process with faulty data, and inadequate public information, is a prescription for conflict.

SOURCE: Solanes (2005); Lentini (2005)

led to lower prices for water users while maintaining or increasing water delivery services. There are also concerns that governments do not generally have the capacity to favorably negotiate concessions with water companies, and that in some instances there has not been sufficient transparency in governmental institutions (Solanes 2005, Lentini 2004, CN/RCA 2005, Vaughan 2005b). As a consequence, there has been a renewed demand from some in the region to ensure greater public sector involvement in the water and sanitation sub-sector. Some maintain the view that all forms of water should remain a public good, supported exclusively by public presence, protecting water from private companies and their profit motive (CN/RCA 2005, Vaughan 2005b).

The primary issue relates to the role of governments in service provision and regulatory oversight for water markets when they have become open to private concessions. However, it should be re-iterated that examples from the telecommunications and financial sectors show that privatization does not mean regulatory retreat. In fact, the opposite is true. Experience from Europe and the US in the telecommunications sector clearly shows that with deregulation, more —not less— regulatory oversight is needed to ensure fair competition (Vaughan 2005b).

All of these contributions are aimed at improving the **service delivery** with respect to water supply and sanitation and progress made in modernizing the water supply and sanitation sector across the region has advanced regional progress toward meeting **Target 10** of the **MDGs** in halving the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015. While the region still faces significant challenges and lags behind on achieving the MDG poverty goal, it is leading other regions in access to safe water, child mortality, and gender equity in education MDGs.

Despite progress toward achieving the water supply target of the MDGs, the region still requires provision of water to 120 million people and extending sanitation services to another 131 million people in urban areas and 32 million people in rural areas by 2015 (WHO/UNICEF, 2000)[32]. Although daunting, such targets are achievable present rates of service provision are maintained (**Figure 4.2**: IDB 2005).

[32] The total number given in IDB (2005) is 138 million people.

Figure 4.2 Access to Water Supply

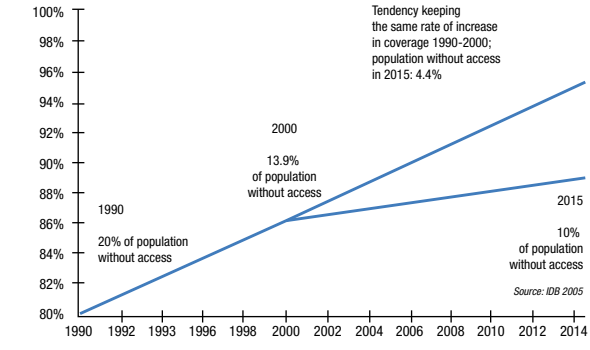
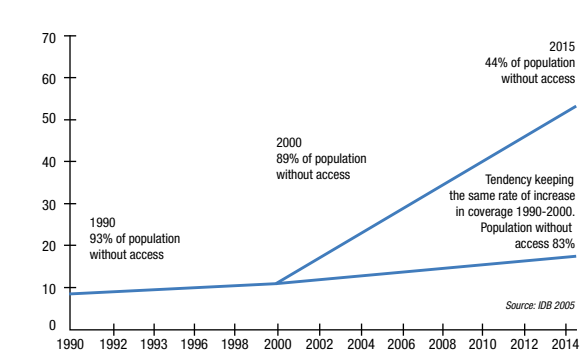


Figure 4.3 Access to Wastewater Treatment



Although access to wastewater treatment is not considered one of the MDG targets, it is an integral component of the integrated approach to water management and of increasing importance with increased supply provision and sanitation. Existing levels of wastewater treatment are low throughout the region, compounding water pollutions problems, and without appropriate interventions is likely to continue to present a major challenge throughout the region (**Figure 4.3**: IDB 2005).

Annual investments needed in Latin America and the Caribbean to achieve these targets have been estimated in the order of US$ 800 million for water supply and US$ 1,500 million for sanitation, at 2001 prices (Rodríguez 2005). Lower estimates have been determined using different models to project water project costs (Hutton and Haller 2004, Vaughan 2005). However, institutional reforms and capacity building are also required to meeting these goals. The costs and benefits of increasing access to improved water and sanitation vary considerably depending on the type of technology selected. From a health point of view, achieving MDG Target 10 by using simple technologies, would on average lead to a

10% reduction in diarrhea worldwide. More advanced technologies, such as provision of regulated water piped in-house, would lead to more substantial health gains it would also require more substantial financial commitments. Interventions should be directed toward those most likely to yield an accelerated, affordable and sustainable health gain among target groups, such as those under 5 where the incidence of water borne diseases are highest (Hutton and Haller 2004).

Many of the existing approaches to sanitation in the region are not considered long-term sustainable options as they can accentuate problems of water pollution and scarcity, loss of soil fertility and food insecurity. As a result, both high-tech conventional systems and low-tech traditional pit latrines are not considered sustainable solutions to the problems of sanitation and non-conventional approaches are being promoted within the region to help stakeholders and decision-makers develop appropriate, environmentally sound, technically feasible, and economically viable systems for basic sanitation services and municipal wastewater management (UNEP 2003). Governments and communities are currently faced with the option of expanding existing sanitation approaches, with all the limitations and weaknesses, or seeking new solutions (examples of which are described in **Box 4.11** and **Box 4.12**; UNEP 2003).

According to PAHO-CEPIS (2005), the Ecosan approach is an interesting alternative that can be adopted in rural areas where water is scarce (PAHO-CEPIS 2005). Used throughout Asia, as well as within the region (Guatemala, El Salvador and Mexico), it is essentially a dehydration of solids and liquids separation which includes a fiberglass structure and cost US$ 270 in Mexico, at 2003 prices, and US$ 125 (without the structure) in El Salvador, at 1997 prices.

4. Water Management for Food and the Environment

Agriculture accounts for around 60% of all **withdrawals**, representing the single largest water user in the region (Annex 3 Table A3.3). Of the estimated 392 million ha of arable land and permanent crops in the Americas 10.7% is under irrigation. Although there are over 41 million Ha of irrigated lands, the regional potential for irrigated agriculture is estimated at 77.8 million ha. Sixty-six per cent of this potential is concentrated in four countries: Argentina, Brazil, Mexico and Peru (FAO AQUASTAT 2005). Small scale subsistence agriculture is important in many areas, providing food and economic security. However, surface irrigation is by far the most widespread technique employed in the region **(Table 4.3)**, although water scarcity and land characteristics have played a major role in determining the importance of localized irrigation in areas like the Lesser Antilles.

Box 4.11 Action steps for selecting new, and improving inefficient, sanitation/wastewater management systems in the region

1. Encourage widespread pollution prevention
2. Discourage the use of water for moving or discarding excreta
3. Favor dry ecosan systems:
   (a) On-site treatment and reuse/recycling (especially for rural and peri-urban households)
   (b) On-site pre-treatment with collection and off-site final treatment and recycling (especially for peri-urban and urban households)
4. Develop wet sanitation systems:
   (a) On-site treatment and disposal (especially for rural and peri-urban households)
   (b) On-site retention with collection and off-site final treatment (especially for peri-urban and urban households without sewer systems)
   (c) If sanitary sewer systems are required, promote low-cost alternatives and separate greywater —and urine if possible—from wastewaters
   (d) Favor end-of-pipe land-intensive natural treatment systems over energy- intensive conventional treatment plants
5. Maximize the reuse/recycling of adequately treated wastewaters

SOURCE: UNEP 2003.

Table 4.3 Irrigation techniques by sub-region[a]

Sub-region	Irrigation techniques					
	Surface		Sprinkler		Localized	
	ha	%	ha	%	ha	%
Mexico	5 802 182	92.7	310 800	5.0	143 050	2.3
Central America	418 638	93.0	17 171	3.8	14 272	3.2
Greater Antilles	746 894	63.6	407 075	34.6	21 256	1.8
Lesser Antilles	2 890	53.8	761	14.2	1 725	32.1
Guyana Sub-region	201 314	100	0	0.0	0	0.0
Andean Sub-region	3 379 637	95.6	122 364	3.5	34 536	1.0
Brazil	1 688 485	58.8	1 005 606	35.0	176 113	6.1
South Sub-region	3 445 068	95.6	95 730	2.7	62 153	1.7
Latin America & Caribbean	15 672 050	86.7	1 960 365	10.8	453 105	2.5

a. The information on irrigation techniques refers to 98.3 percent of total area under irrigation.

SOURCE: FAO AQUASTAT 2005.

Box 4.12 Key points of ecosan

1. Conventional sanitation systems are generally unsustainable and a significant drain on unrenewable natural resources. Wastewater-induced pollution limits our access to the existing water resources, is a threat to public health, reduces biodiversity, and compromises the stability of the region's ecosystems.
2. Alternative sustainable sanitation approaches exist and should be much more widely encouraged and adopted. An innovative, ecological sanitation paradigm seeks to prevent pollution at the source; conserve and use water efficiently; recycle nutrients; and apply appropriate low-cost, low-energy technologies for wastewater treatment.
3. A shift to the new sustainable sanitation paradigm requires a major commitment in terms of policy development, institutional reform, applied research and funding.

SOURCE: UNEP 2003.

The relative importance of agriculture in the region and the percentage of GNP derived from agriculture vary from country to country. Irrigation has played a major role in development of many countries throughout the Americas, notably Mexico, Peru, Chile, and Brazil. In countries such as Nicaragua, Haiti, Paraguay, Guatemala, Honduras and Bolivia agriculture typically contributes 20% to GNP whereas in the larger countries like Argentina, Brazil, Mexico, and USA, this figure is around 6 to 9%.

There are numerous issues relating to the development of irrigated agriculture, notable the scale of such developments, the role of government and the private sector in irrigation investments and subsidies, the influence of broader regional trade agreements and market forces, technological developments and application of the "virtual water" concept. Rapid increases in large-scale production provided incentives for the development of irrigation infrastructure across North America, while in Central America, the Caribbean and the Andean countries, medium and small scale irrigation was promoted in association with rural development programs. Ex-post evaluations of both approaches have been inconclusive, showing both positive and negative results. The introduction of new technologies to Chile and the transfer of public irrigated districts to farmer associations in Mexico are both positive examples of interventions that have had significant impacts in improving agricultural production.

5. Risk Management

The incidence of **extreme events** has caused significant impacts throughout the region as evidenced by the recurring incidence of hurricanes, floods, landslides. These typically disproportionately affect the poor and are often aggravated by human and development factors. Given the high level of urbanization and proximity of the regional population to the coast the region faces important challenges in finding ways to cope with associated uncertainties and risks. The process by which a country learns to minimize the impact of natural hazards develops incrementally, although can be accelerated by capitalizing on lessons learnt and best practices adapted to local conditions (Bender 2005).

By the end of the last decade, International Financing Institutions (IFIs) in the region had made significant public statements linking disaster losses and existing vulnerability to development practices, highlighting the need for risk management. Risk management and mitigation needs to be seen within the context development processes and not as an adjunct, externality applied once development decisions are made[33]. Earlier consideration of natural hazard risk[34] mitigation options in the development process will reduce the level of risk and mitigation must be considered before preparing and responding to unexpected losses from an emergency situation. The challenge in developing such an approach is to move beyond sector strategies for providing financial assistance in case of catastrophic loss and addressing the root causes of the vulnerability. These include, among others, land use planning, conservation of natural vegetation, urban planning and zoning, community based early warning systems and contingency planning. Within the context of the Americas, each development action should be seen as an opportunity to mitigate possible losses to natural hazard events.

Despite the staggering economic effects of hurricanes, most countries and donor agencies tend to focus almost exclusively on emergency response and reconstruction after events occur. However, emphasis

[33] For a complete discussion of the topic, see OAS 1987 op. cit.

[34] For a detailed discussion of consideration of risk in development planning and project preparation, see "Incorporating Natural Hazard Assessment and Mitigation into Project Preparation – Report to CIDIE members by the OAS," OAS 1987, and *Primer on Natural Hazard Management in Integrated Regional Development Planning, Chapter 1 Incorporating Natural Hazard Management into the Development Planning Process and Chapter 2 Natural Hazard Risk Reduction in Project Formulation and Evaluation. OAS 1990*

needs be placed on the preparation of risk management measures and emergency response management and mitigation plans before such phenomena occur. There are compelling economic and development arguments supporting investments in disaster mitigation as opposed to responding to post-disaster reconstruction and rehabilitation. Investments that bolster the resilience of buildings, infrastructure and other critical areas are more cost-effect —by a two-to-one ratio— than expenditures in post-disaster relief and recovery (Bender 2005).

Specific challenges in relation to **flood events** are further complicated by the lack of predictability and that their causes across the region are as varied as the region itself. Coastal areas are vulnerable to floods arising from frontal storms, tropical storms, hurricanes along with tsunamis, while the other climatic origins across the region include the spring thawing of accumulated snow, the El Niño Southern Oscillation (ENSO) phenomenon and severe weather conditions due to the Inter-Tropical Convergence Zone (ITCZ). These events have caused enormous social and economic impacts across the region **(Box 4.13)**. Much of the decline in Peru's GDP in the early 1980s, with negative growth rates of 0.6% and 11% in 1982 and 1983, has been attributed to El Niño. Similarly, a 0.6% decline in GDP in 1997 - 1998 was attributed to an intense El Niño event (Vosti et al 2003). The effects of Hurricane Mitch in Central America clearly illustrate the impact of natural disasters in the region. Economic projections prior to Hurricane Mitch suggested the 4.3% annual growth rate experienced between 1992 and 1998 would increase to 4.8% in the period 1999 - 2003. This would have allowed the region to return, by 2004, to per capita GNP values equivalent to those of 1978 before the recession in Latin American known as the "lost decade" (1980s). However, according to estimates, this economic recovery was postponed by 3 years as a result of the effects of Hurricane Mitch. Damages in Central America were estimated at US$ 6 billion in 1998, equivalent to 16% of the GNP for that year, 66% of the value of its exports, 96.5% of the value of its gross capital formation, and 37.2% of the total external debt.

In September 2004 in Grenada, Hurricane Ivan destroyed practically 90% of the housing stock (OECS 2004). Prior to this the economy was projected to grow by 4.7% in 2004 and at an average rate of 5.0% between 2005 and 2007. The fiscal operations of the Central Government were estimated to result in a current account surplus of US$ 17 million or 1.3% of GDP. With the passage of Hurricane Ivan, economic activity was projected to decline in 2004 with an overall impact of six percentage points of GDP growth, reflecting a contraction in tourism and the halt in production of traditional crops. In the following year, the economy is projected to remain stagnant as the tourism and agricultural industries continue to be weak.

The USA experienced 62 weather-related disasters between 1980 and 2004, with overall damages exceeding US$ 1 billion (NOAA 2005). Fifty-three of these events occurred after 1988 with seven in 1998 alone. The total normalized losses in 2002 from these 62 events are estimated at over US$ 390 billion (NOAA 2005). The American Geophysical Union (AGU) states that on average, natural hazards result in annual losses in the USA (crop and property) exceeding US$ 7.6 billion (adjusted to 2004 dollars)[35], and that weather-related events produce more dollar damages than any other hazards. The AGU also shows that losses from natural hazards in the USA have been increasing exponentially since 1960 and that

Box 4.13 Socioeconomic effects of some natural disasters in the Americas

- Mitch in Central America (1998): 9,214 deceased; US$ 6 billion in damages
- El Niño in Bolivia, Colombia, Ecuador, and Peru (1982-1983 and 1997-1998): 600 deceased; US$ 7.7 billion in damages
- Venezuela landslides (1999): 25,000 deceased; US$ 3.3 billion in damages
- Georges in the Dominican Republic (1998): 235 deceased; US$ 2.2 billion in damages
- Ivan in Grenada, Jamaica, Grand Cayman, Cuba, and 11 states in the USA (2004): 124 deceased; US$16 billion
- Katrina in the USA (2005): almost 1,000 deceased; US$ 200 billion in damages
- Stan in Central America and Mexico (2005): more than 1,500 deceased

SOURCE: ECLAC/IDB 2000, OECS/ECLAC 2004, press releases 2005

[35] Conservative estimate not including insured loss payments to individuals and business, or local governments, or indirect losses such as lost wages, business downtime, or environmental damage (EOS 2005).

the decadal annual mean loss has also been increasing, peaking at US$ 14.4 billion (adjusted to 2004 dollars) in the 1990s. With only four years of data for the present decade (data from 2004 and 2005 still in process), it appears that estimates will surpass the 1990s annual loss, which has been not only the most costly, but also the most deadly with more than 5,200 fatalities (EOS 2005).

The economic and social effects of natural disasters such as hurricanes Mitch and Ivan persist for decades (ECLAC/IDB 2000, OECS 2004). Among the long-term impacts are the destruction of economic and social infrastructure, environmental change, external imbalances, extraordinary fiscal imbalances, inflationary processes, and negative income redistribution. While several countries have organized civil protection systems, they face challenges of financial sustainability and appropriate capacity in the face of unpredictable and often devastating disasters. Given the unpredictability of natural disasters it has proved difficult to ensure and maintain appropriate trained personnel and equipment and sustained financial resources.

In many cases international aid after a major disaster provides financing for the installation of state-of-the-art forecasting and early warning systems without appropriate consideration of long-term sustainability, particularly given the financial constraints of many local governments. Sometimes in the region, even if the forecasts are good and timely, the response capacity is not always at par. Response measures for such disasters are typically very weak and lack sufficient human and financial resources. There is still much room for improvement regarding the capacity to translate the early warnings and forecasts to effective preventive measures and to ensure effective responses and protection to the population once a disaster has occurred.

The preventive and protective measures tried in the region after the major disasters that occurred in the 1990s have been varied. They have spanned from the traditional structural and non-structural measures, to mechanisms of risk transfer by insurance and the creation of Emergency Funds. Technical plans that anticipate and lower the risks of hurricanes, flooding and other events have been in-place for sometime. These range from increasing hazard mapping and aligning the results of forecasting with better land management and zoning practices; adopting flood management plans that are part and parcel with overall river basin and watershed catchments management plans; adopting relevant building standards and construction codes covering both public buildings such as hospitals, schools, government building, universities, ports and transmissions lines, as well as private housing standards. These need to be accompanied by appropriate governance mechanisms and practices that have proved a key aspect to integrating and effectively enforcing risk mitigation policies (Bender 2005).

In stark contrast to the problems associated with hydroclimatic flood events, large parts of the Americas experience unpredictable and variable patterns of precipitation that undermine water and food security, increasing vulnerability of the poor and impeding growth and development opportunities. **Droughts** occur throughout North America with at least one region in any given year experiencing drought conditions. Of the 62 major weather related events that occurred in the USA between 1980 and 2004, at least nine were droughts (**Box 4.14**: NOAA 2005). The major drought of the 20th century in North America is considered to be the 1930s the Dust Bowl drought. Lasting seven years it affected areas of the Great Plains of the USA, resulting in the migration of

Box 4.14 Major Drought Events in the USA 1980-2004

- 1980, Central and Eastern USA drought/heat wave: 10,000 deceased, US$ 48.4 damage/costs
- 1986, Southeastern USA drought/heat wave: 100 deceased, US$1.8-2.6 billion damage/costs
- 1988, Central and Eastern USA drought/heat wave: 5,000-10,000 deceased, US$ 61.6 billion damage/ costs
- 1989, Northern plains USA drought: no deceased, US$ 1.5 billion damage/costs
- 1994, Southeastern USA drought/heat wave: 16 deceased, US$ 1.3 billion damage/costs
- 1996 Southern Plains USA severe drought: no deceased, US$ 6.0 billion damage/costs
- 1998 Southern USA drought/heat wave: 200 deceased, US$ 6.6-9.9 billion damage/costs
- 2000 South Central and Southeastern USA drought/ heat wave: 140 deceased, US$ 4.2 billion damage/ costs
- 2002 over 30 states widespread drought: no deceased, US$ 10.0 billion damage/costs

SOURCE: NOAA (2005)

millions of people to the western USA in search of better living conditions (NOAA 2003). In Latin America much of the climatic variation can be linked to the El Niño, with associated drought conditions having resulted in reduced agricultural yields, crop failures, and the adoption of fallow instead of crops. During the 1982, 1986 and 1987 El Niño years, 97%, 86% and 73% of the rain-fed agriculture in the semi-arid north and central regions of Mexico were ruined.

Another intense drought in Central America resulted from the El Niño event during the second half of 1997 and the first half of 1998. Water-related sectors were seriously affected with significant impacts upon hydropower generation (electricity rationing), agriculture (loss of crops), forestry (record number of forest fires), fisheries (decrease in the catches), water supply (reduced availability for some population groups), and health (spread of some diseases, epidemics). Central America again experienced a widespread drought in 2001, and according to ECLAC estimates, GNP growth in the region, expected to be 2.5%, reached less than 1%. With the exception of Costa Rica, most countries in the region have limited capacity to produce climate outlook information relating to the value of a sector affected by climate variability (WMO/IDB 2004). Improved El Niño forecasting could save substantial losses. Expected benefits were estimated for Mexico, Peru, Jamaica and Honduras (Vosti, 2003) and Mexico, Peru, Jamaica, and Honduras (NOAA/WMO/IDB 2003), where the present value of benefits ranged from about US$ 480 million to US$ 2,495 million under perfect forecast scenarios.

The **effectiveness and efficiency** of existing measures is difficult to evaluate, due to the variability and randomness of the natural phenomena. It is also recognized that in a given period of time, the cumulative effect in transport infrastructure, agriculture, and the economy in general of periodic annual phenomena, can add to substantial amounts. These phenomena, unlike the major events, will not make the headlines because of their periodicity. However, their impacts could be easier to control and the local communities could participate in their prevention and amelioration, as many programs financed by the World Bank, IDB and several NGOs are trying to promote. The challenge in response to such unpredictable and variable conditions is to develop appropriate economic instruments to transfer risk and ensure protection of investments, infrastructure, social and environmental considerations.

5. STRATEGIES FOLLOWED
to solve major water related problems

The 24 water challenges identified by the members of OCA and the Civil Society organizations represented in the ACN mentioned at the beginning of the previous section were ranked by both organizations **(Table 5.1)**. It is of interest to note that the ranking by OCA includes three priorities also shared by the civil society. These 3 topics are: (i) decentralization, municipal role and local community water management; (ii) legal and regulatory frameworks for IWRM: advances and reforms; and (iii) river basin organizations and the appropriate institutional levels for management. As expected, the other five topics chosen by OCA deal more with strategic national issues, while the other five topics chosen by civil society reflect more local concerns. Eight priority topics were then chosen from these 24 by combining the rankings of the OCA and ACN. These eight topics are discussed in this section.

Table 5.1 Rankings

Selected water challenges in the Americas	Rank by Civil Society	Rank by OCA	Combined Rank
Coastal zone management	14	21	35
Dam safety	23	20	43
Decentralization, municipal role, and community water management	1**	4**	5***
Energy options: hydropower as a clean and renewable resource	21	10	31
Financing water infrastructure	19	5*	24a ***
Floods, droughts, and risk management	10	9	19***
Governance, institutional quality, and public participation	2*	12	14***
Groundwater management	11	8*	19
Health implications of sanitation	4*	18	22
Legal and regulatory framework for IWRM: advances and reforms	6**	1*	7***
New frontiers in irrigation approaches	20	15	35
Payment for environmental services	8*	11	19
Privatization: options for financing	5*	14	19
Public versus private irrigation	18	23	41
Reaching the MDGs	13	17	30
River basin organizations and institutions-appropriate level	7**	7*	14***
Rural sanitation	9	16	25
Transboundary river basins	12	3*	15***
Urban water management	16	6*	22
Water and trade	17	2*	19***
Water as a human right	3*	22	25
Water as an end versus water as a means	22	19	41
Water management of indigenous population	Not ranked	Not ranked	Not ranked
Water quality management-adequate water quality standards	15	13	28

** = Selected by both groups

* = Selected by one group

***FINAL SELECTION (groundwater management, payment for environmental services and privatization: options for financing also ranked with 19 points. Floods, droughts and risk management was selected because of the large damanges being caused in the region by natural hazards)

a. This was preferred over others of lower value because these are being given attention in other sessions of the Forum

a. Institutions, Governance and Public Participation

As would be expected, water institutions have changed with time in the region (ECLAC 1999, Garcia 2003, Jouravlev 2001, Dourojeanni and Jouravlev 2002, Ballestero et al 2005). As happened in North America, water resources development in Latin America peaked in the 1930s-1940s. For some time, water management was vested with the key institutions responsible for the most economically important sector. In other words, ministries or secretariats of agriculture, public works, housing or energy were thus responsible for water management depending on the country's economic scenario.

After Rio in 1992, environment ministries or secretariats were created in most countries and the responsibility for water management was transferred to them in many cases. However, these institutions are largely weak, and face the dilemma of needing to be a driving force without adequate financial resources; and/or of being executing agencies of large development projects while simultaneously needing to be the judge and advocate, representing a conflict of interest.

Mexico, Colombia, Venezuela, and other countries, following the TVA experience in the USA, created regional development corporations for the primary purpose of operating and managing hydraulic infrastructure, mainly for irrigation and energy generation. The roles of the public sector were planning, compilation of basic hydrometeorologic information, and design and construction of hydraulic works. The Itaipú, Yacyretá, Caroni in South America and El Cajón in Central America hydropower projects, the irrigation and hydropower infrastructure in Mexico and the flood control works in Argentina, are some examples of this trend.

However, since the 1990s, a new trend has surfaced in Latin America and the Caribbean, with the realization of more representative forms of government that in the past were only characteristic of North America. Civil society organizations gained empowerment and new spaces for participation[36]. The private sector also began to claim a more active role in water related issues. The prioritization of national and/or regional goals over those of the local communities began to be questioned and the preferred scale of projects in general shifted from large-scale, to smaller local projects. This was aided also by the environmentalist movement. Internationally-financed modernization projects also favored a shift in the role of governmental organizations from service providers to regulators. Countries whose institutional frameworks had been traditionally hierarchical and pyramidal, have approved reforms towards a more participatory decision-making process[37]. Conflicts over water are not a mere consequence of the struggle for such a scarce resource, but that this scarcity is socially linked to legal and political circumstances, as well as to the cultural forms underlying the different means of water appropriation. Nowadays, the concept of governance, though not yet well understood and facing resistance from some sectors is spreading in the region. It is now generally accepted that for a project to be conceived, planned, designed, constructed, and operated successfully, a participatory process should be followed. This has introduced some additional complexities in the approval process of water-related projects, but proponents of this approach firmly believe that it is the only way to guarantee their success and sustainability.

b. Decentralization, Municipal Role and Local Community Water Management

The decentralization trend initiated in the region is primarily related to administrative activities rather than a genuine transfer of full responsibilities accompanied by resource flows. Generally core responsibilities remain in the central government or, in the case of federal countries, in the state government with some participation of the federal government. In Argentina, where each province owns its water, a consensus was reached regarding a set of Water Resources Policy Guidelines and a Federal Water Resources Council was formed. Supporting the provincial water administrations is one of the priorities of the federal water policy. In Mendoza a "Water Government" was created by the Provincial Constitution in parallel to the Provincial Government, to avoid political influences in matters regarding water administration. From the very beginning, water management was decentralized within the Province, a culture of payment for the use of water for irrigation was adopted and water management by democratically elected authorities by the water user associations was institutionalized (Llop 2005a).

Orozco (2001) points out that natural resources legislation does not allow such a transfer to municipalities in most cases. In accordance with the constitution of many countries, the responsibility for basic services provision, such as water supply and

[36] Some organizations claim public participation as a Human Right (CN/CRA 2005).

[37] For example, the 2004 reforms to the Mexican National Waters Law.

sanitation is transferred, but not the management of water resource base itself. The main reason being that water is considered as a strategic resource with important economic, social, and environmental functions which need to be directed and managed from a national vision and with overall public interest. The incompatibility between hydrologic and geopolitical boundaries, the emphasis on local problems in their own jurisdiction, the limited budgetary resources, and the increased risk of capture and politicization of water authorities at municipal level are other reasons given against the transfer of authority. The case of the USA, where the responsibility for regulation of public utilities was transferred from the local to state public utilities commissions is given as an example (Jouravlev 2003).

In some cases, although the water authority remains a central government entity, this entity is decentralized through regional offices. Typical functions that have been transferred or delegated to the regional offices include monitoring and data collection and issuance of water and discharge permits. The Regional Offices of the General Water Directorate (DGA) in Chile, the Water Agencies of the National Water Resources Council (CNRH) in Ecuador, the Regional Management Offices of the National Water Commission (CNA) in Mexico, and the regional offices of the National Hydrographic Directorate (DNH) of the Ministry of public works and Transportation (MTOP) in Uruguay are examples of this institutional arrangement (Jouravlev 2003).

In the countries that lack a well-defined central water authority, the responsibility for water management tends to be fragmented among many organizations. Some countries have created river basin organizations (see section 5.2.b) as coordination and conciliatory agencies, at the watershed or basin level, to create a space for local participation in some of the decision-making. Municipalities participate in some of these basin organizations, as a means of providing a direct link between the national water authority, the users, and the local governments. Examples of these can be found in Brazil, Mexico, and Peru.

Another decentralization tendency observed in the region is the creation of specific watershed or river basin organizations to solve specific water management problems, such as protection of municipal water supply sources, pollution control, and sometimes flood control (Jouravlev 2003). These are more problem-solving oriented and operate closer to the local level, thus attracting the interest and participation of local civil society organizations, water users, and local governments.

Although municipalities have not played a central role in these river basin organizations, there are noteworthy municipal advances towards a more participative role in water management. For example, there are interesting cases of local government associations, especially in Brazil, which have been formed to solve problems related to water supply, sanitation, environmental protection, and watershed management in the river basin where they are located, when the individual action of each municipality is not effective.

An example can be found in the Piracicaba, Capivari, and Jundiai rivers, where fish mortality prompted the municipalities to cooperate to solve pollution problems, and later led to one of the biggest social movements for the protection of water in the state of Sao Paulo. Other examples in the region **(Box 5.1)** can be found in Honduras, Nicaragua, Peru, the Dominican Republic, and Guatemala. Municipalities in the region have also played an important role in managing watersheds that are important water supply sources in their jurisdiction. Examples are cited from Colombia since the 1920s and from the 1930s in Bolivia, Ecuador, Peru, Costa Rica, El Salvador, Honduras, Mexico, and others.

The provision of water supply and sanitation services has been one of the traditional roles of municipalities in several countries of the region. This has been reinforced in the last two decades of sub-sector reform and the ensuing trend to decentralize these services to the lowest possible administrative level. Now, municipalities participate in these services as direct providers, as responsible for ensuring that these are provided, and as supervisors of the utilities. This has been the case in North America and now it is seen in countries such as Bolivia, Colombia, Ecuador, Guatemala, Mexico, Peru, Venezuela, Brazil, Costa Rica, El Salvador, Honduras[38], Nicaragua, and Panama (Jouravlev 2003). On the downside, decentralization has led to a fragmentation in institutions, which can undermine government's ability to deliver effective public services, whether using public or private funds (Sunman 2002). Two important aspects that should not be overlooked in local water management are the role of women and the water culture of indigenous populations.

[38] The municipalities of San Pedro Sula and Puerto Cortes are successful cases that merit attention.

Box 5.1 Some examples of associations of municipalities

Honduras. Municipalities of Puerto Cortes, Choloma and Omoa, for the protection of the Rio Tulian watershed; association of eleven municipalities for the protection of the Rio Higuito watershed; association of three municipalities for the protection of Rio Copan; association of two municipalities for the protection of the Nubosa recharge area of Rio Guayambre; association of eighteen municipalities (AMUPROLAGO) for the protection of Lake Yojoa and El Cajon watershed.

Nicaragua. There are associations of municipalities for the Rio San Juan (AMURS), for the Lake Nicaragua watershed (AMUGRAN), and for the Rio Esteli watershed (AMCRE).

Peru. There is the association of municipalities of the Rio Lurin watershed (AAM).

Dominican Republic. There is the association of municipalities for development of the Rio Macasias watershed (AROMA).

Guatemala. There is the association of municipalities for the Lake Peten-Itza watershed (AMPI-MANMUNI).

Besides the conservation of water resources and the environment, all of these associations strive for institutional strengthening of the municipalities themselves, as well as for the socioeconomic development of their communities.

Quebec-Canada. The Quebec Federation of Municipalities (QFM) represents 900 local municipalities and 85 regional county municipalities. They are Quebec's leading water managers.

SOURCES: Jouravlev (2003) and IDB 2005.

International Network of Basin Organizations. The Network Newsletter, No. 13. December 2004-January 2005.

Gender. Women, as traditional guardians of the family are directly impacted by the lack of water and sanitation services. There is a tendency now in Latin America and the Caribbean, to promote equity for women as beneficiaries of local water-related productive projects, such as irrigation, since many women are also the heads of families and must provide income in addition to doing the traditional homemaker roles (Thaxton et al 2005, Siles et al 2005).

The indigenous populations of the Americas maintain ancient links to nature, the earth, marine and freshwater components and have a comprehensive understanding of natural laws **(Box 5.2)**. Therefore, their beliefs and the conservation objectives of water-related projects rarely conflict (Beltran, editor 2001). Conflicts usually arise when their rights are not respected and infringed. The indigenous peoples declaration distributed in the Day of the Americas at the 3rd World Water Forum by several Latin American indigenous associations called for the right to govern, use, manage, regulate, recover, conserve, enhance, and renew their water resources without interference. It also called for governments to recognize their interests in water and associated customary uses and their right to participate in decision-making at all levels through consultations based on mutual respect, free of fraud, manipulation and duress. It supported the recommendations of the World Commission on Dams (WCD) on water and energy development, and called for the international financing institutions to stop the imposition of water privatization or full cost recovery as a condition for new loans and renewal of loans in developing countries. The declaration also called for the implementation of international and domestic restoration and compensation systems to regenerate the integrity of water and ecosystems. The declaration also encourages the broader society to support and learn about the indigenous peoples' water conservation practices.

Indigenous populations in the USA and Canada have received by law, operational priorities regarding water. These are respected and enforced by the legal systems of these countries. In Latin America, similar priorities are not clearly established within the existing legal frameworks. Traditional indigenous uses of water have been jeopardized by activities such as mining and urban development. The issue of property rights and title is also a policy challenge, as well as a prerequisite for market-based approaches to water management (Vaughan 2005). The Agreement on Tribal Indigenous Populations, Number 169 approved by the International Work Organization in 1989 (Gentes 2001a) is the backbone for the inclusion of the issues

Box 5.2 Rigoberta Menchu, Peace Nobel Prize, recently stated:

"Water is life and the source of life. Its preservation is synonymous with the balance that must exist in the world. For centuries, we Indian Nations have been the keepers of the world's natural resources: land, forests and water. We have done so because we are aware of the necessity of preserving harmony between the elements that form the chain of life, and allowing those who will succeed us to enjoy the goodness of the planet."

"Today, we Indian Nations are suffering the plundering of water by governments and multinationals, who are placing not only the survival of the Indian Nations at risk, but of Humanity as a whole... It is urgent that our Indian Nations' rights be respected for us to decide on the use of our natural resources. But if there is a group that is not being taken into consideration in the decision-making process regarding the subject of natural resources, it is the Indian Nations. Rivers are being diverted without our consent, water is being extracted from natural springs while ignoring the will of the inhabitants of the region where they are located. If these practices persist, the dispute for water will become a conflict of enormous proportions, one where there will be neither winners nor losers."

SOURCE: 4th Forum, Bulletin No. 7, August 2005

specific to indigenous populations into national regulatory systems. Some of the countries that have enacted legislation in this respect are Brazil, Chile, Colombia, and Mexico (Gentes 2001b).

c. Legal and regulatory frameworks for IWRM

In Central and South America, there has been an extraordinary interest to modernize water legislation. In the last 15 years, new water laws were approved in Brazil, Mexico and Venezuela, while some important reforms were enacted in Chile[39], and most of the other countries are discussing options for new water laws. In the cases of Costa Rica, Guatemala, Honduras, and Nicaragua, several local organizations have been involved in this process with varied results, but making important contributions from the technical, environmental, social, and political standpoints. Similar efforts can be seen in Bolivia, Colombia, Paraguay, and Peru. Some of the experiences of these local and national organizations are being synthesized by FANCA (Mora 2004).

The limited results derived from these efforts —in spite of the greater involvement of social organizations and the apparent political support— can be analyzed and perhaps explained from different perspectives, as described below.

Pre-existing water rights. In Mexico, the Constitution recognizes the original rights of indigenous groups, and the National Water Law provides necessary protection of such rights for human consumption and irrigation. In some other countries, however, the legal situation of water rights is unclear and some sectors have expressed concerns about the conflicts that may arise when trying to introduce new water laws vis a vis pre-existing water rights, such as those of indigenous populations. Additional considerations in this respect have been made by CN/RCA (2005).

Endogenous or exogenous forces. The cases of Brazil, Chile, and Mexico, and to a lesser extent Venezuela, support the notion of a water law resulting from the internal evolution of policies and institutions in the face of a changing social, economic and political environment. An existing "critical mass" allowed these countries to maintain the necessary institutional memory, therefore providing their own basis to identify the changes needed to the existing legal and institutional frameworks with a long-term view. This has not been the case in the rest of the countries, where the notion of a water sector was and still is nebulous. The absence of similar internal forces in other countries has opened the door to external influences which are not always relevant or viable. Many of the external experiences are drawn from arid or semiarid conditions, and other situations of severe water scarcity, which would not be applicable to situations of water abundance, and where sufficient infrastructure to regulate water flows is still lacking. The closer relationship between water management and the environment also calls for different approaches to water legislation in the region.

[39] Water laws can be consulted through the Internet: Brazil http://www.ana.gov.br/Institucional/default.asp; Mexico http://www.cna.gob.mx/eCNA/Espaniol/MarcoNormativo/Leyes/Ley%20de%20Aguas%20Nacionales.pdf; Venezuela http://www.badellgrau.com/NUEVO%20PROYECTO%20DE%20%20LEY%20DE%20AGUAS.htm; Chile http://www.dga.cl/

Prevailing sectoral views. Along with the notion of integrated water management came the push for a unique water authority charged with managing the water resource, differentiated from the administration and regulation of the associated water services (water supply, irrigation and power generation). Integrated water management has also propagated the consideration of both water quantity and water quality in conjunction managed by one authority. The translation of these concepts into a water law has faced the resistance of strong sectoral institutions who have traditionally been responsible for water management in discrete sectors. Some environmental and public health institutions also disagree with combined management of the quality and quantity aspects; in the first case under the argument of the need to integrate the management of all natural resources and in the second case associating pollution control to public health policies. Resistance from these institutions and related interest groups has rendered unsurpassable a new law for integrated water management in some countries.

Missing the long-term perspective. Most, if not all of the unsuccessful attempts to modernize the water legislation were launched without the support of a long-term view of the water sector, as defined by a national water policy. The problem is not so much which of these should come first, but resides in the lack of coordination and feedback between these two realms. A parallel track approach (Garduño, 2003) suggests that with proper coordinating mechanisms, both efforts could be deployed simultaneously and successfully.

Incorporating management instruments. Generally, the lessons learned from international experiences prove that a legal framework that combines command and control mechanisms with regulatory, participatory, and economic instruments is the most effective. The present experience of water management throughout the world, may allow the conclusions presented in **Box 5.3** (Porto and Lobato 2004).

Moreover, the use of economic instruments has been severely questioned in some countries when introduced in the new water law proposals, to the point of making them politically unfeasible. Another problem seems to be associated to the fact that participation by civil society is not accompanied by a systematic flow of information. In general, such participation processes are launched during

Box 5.3 Conclusions regarding the use of different types of water management instruments

- Due to the complexity of water related problems, water management must rely upon several different but complementary management mechanisms; command and control, consensuses building, economic instruments and mechanisms of voluntary adherence are available for water management but each requires a different institutional arrangement to be applied;
- Such mechanisms are not excluding; they are to be applied in different situations and, although their implementation in an integrated manner is quite difficult, the best results will come from the use of several of them together, through the selection of those best suited to solve the problem;
- It is essential to recognize that command and control mechanisms have to be used at all times, no matter what other instruments are also implemented; the water management system always requires discipline and enforcement; it must be applied by the government;
- Nevertheless, if the command and control methods aim for very difficult or ambitious targets, they tend to lessen the power and the efficiency of the other mechanism, mainly of the economic instruments;
- Both the "consensuses building" and the "economic instruments" require a flexible and decentralized decision process; if centralized decision processes are used with these two instruments, they tend to reproduce the command and control process and its efficiency is greatly reduced; there is a potential use for the mechanisms of voluntary adherence;
- Although much of what has been said is fully accepted by the water resources community, there are very few examples of good practice related to the integrated use of the water management instruments, even in developed countries.

SOURCE: Porto and Lobato 2005.

or after the drafting of the law, when they should be implemented earlier.

d. Financing water infrastructure

The financing needs for water infrastructure are generally very substantial and projects are often indivisible and capital intensive. The 1990s saw a decline in international financing for water infrastructure. For example, lending by the World Bank to the LAC region for water supply and sanitation, averaged $ 306 million between 1992-1999, but declined to $ 147 million in 2000. In the case of the IDB, lending to the water sector declined from $ 3,962 million (average 1980-1988) to $ 1,252 million (1988-2001), reflecting a very dramatic fall in lending for hydropower (Sunman 2002). Although it had 12 ongoing dam projects, by 2000 the World Bank's dam portfolio in Latin America and the Caribbean was one of the lowest, with only 10.5% of the total[40] (De Azevedo and Baltar 2000). The major problems regarding financing for water-related infrastructure were discussed at the 3rd World Water Forum (see **Box 5.4**). It is expected that lending for infrastructure from international financing institutions such as the World Bank and IDB will increase in the near future[41]. In Mesoamerica, the construction of 47 proposed new dams[42] (IRN 2004) is a hope for some and the fear of others.

Dams are singularly the item most representative of water resources development and at the same time, the most controversial item. According to advocates, some of the benefits of dam construction are typical of any large public infrastructure project, but some are inherent to the dams themselves. They are a technological option for development and, reflecting the needs of society, play an important role in satisfying its needs. Regional development, job generation, and the promotion of an industrial base with export potential are usually mentioned as additional justifications for building dams. Other benefits include national income from exporting electricity, or agricultural products, or processed products from electricity-intensive industries like aluminum refining. Dam advocates also point out that the building of large dams for hydropower generation provides not only energy, but also regulated flows of water for multiple uses, released according to specific demands of the water-using sectors. Large dams, critics say, have fragmented and transformed the rivers of the world; their construction has displaced between 40 and 80 million people; they cause negative environmental and public health impacts; and they are unsafe. The region has no doubt seen a fair share of dam failures but the key element in keeping dams safe post-construction is proper and regular maintenance. The World Commission on Dams report (2000) notes an increase in dam safety assessments between the 1950s and the 1970s, but tapering thereafter even though the need for repairs tends to increase significantly 25 to 35 years after construction. The American Society of Civil Engineers (ASCE) has consistently given a poor grade (grade "D") to the status of rated dams in the USA in the Report Card for America's Infrastructure (WCD 2000, ASCE 2003). There were 21 dam failures reported in the 2001-2003 period and the number of dams categorized as "unsafe" rose by 23% to nearly 2,600. The number of dams categorized as "high-hazard potential dams[43]" increased from 9,921 in 2001 to 10,049 in 2003. It was estimated that US$ 10 billion would be needed to repair the most critical dams over a period of 12 years (ASCE 2003). In 2000, the World Bank portfolio included nearly US$ 2 billion for dam safety or rehabilitation projects for five dams in Latin America[44] and the Caribbean (World Bank 2000).

In the last decade, emphasis has shifted to smaller infrastructure projects to target specific regional and local water-related goals. Large infrastructure, especially the building of dams, became an anathema, mainly because of population displacement and the impacts on the environment. In North America, especially in the USA, many old dams that have outlived their usefulness have

[40] East Asia and Pacific 25.4%, Africa 21.1%, Europe and Central Asia 20.2%, South Asia 16.7%, and Middle East and North Africa 6.1%.

[41] In 2003 the World Bank launched an Infrastructure Action Plan. A recent progress report indicates that lending for infrastructure has increased by approximately US$ 1 billion per year since 2003, reaching US$7.4 (33% of total lending) by 2005. It is expected for this trend to continue in the near future, reaching about US$ 10 million (40% of Bank's lending) in the next 2-3 years (Bosshard 2005, after World Bank 2005)

[42] Four in Mexico, five between Mexico and Guatemala, seven in Guatemala, one in Belize, one in El Salvador, two between El Salvador and Honduras, four in Honduras, thirteen in Nicaragua, two in Costa Rica, and eight in Panama.

[43] Those whose failure would cause loss of life.

[44] In Mexico, Ecuador, and Peru.

been decommissioned and river restoration is a major activity for state and federal water resources agencies. Many countries have also implemented specific legislation including specific social and environmental mitigation measures and the multilateral organizations like the World Bank, are discussing minimum requisites for the approval of new dam projects, based on mitigation of the environmental impact on ecosystems and on the promotion of economic alternatives for the affected local population. The construction of dams will very likely continue to be controversial in the region, but all parties involved do agree that past mistakes need not be repeated.

e. Policy

Water policies must be in congruence with the economic, institutional, social, and political positions. The experience of the region has been that there is a two-way relationship between water and the social and macroeconomic environment of the countries (Solanes et al 2004). Besides water policies, economic and social policies, and even the international scene influence the water sector. The Canadian Water Policy, for example, explicitly recognizes that Canada's water is an interdependent part of a finite global water system (Environment Canada 2005). Commerce and investment

Box 5.4 Background, rationale, and problem statement for the International Water Resources Association (IWRA) session "Meeting Future Water Needs: a Reality Check" at the 3rd World Water Forum

"For 2nd World Water Forum, global, regional and sectoral water visions for year 2025 were developed, in an unprecedented effort, based on projected desired scenarios. The roles of governments, communities and users, the private sector, international agencies and NGOs were outlined. However, the estimated level of capital investments required to meet the objectives are staggering: Present total annual investments of around US$ 70 – 80 billion per year would have to be increased to US$ 180 billion per year in new infrastructure only, exclusive of rehabilitation, deferred maintenance and O&M costs. In Latin America, for example, it has been estimated that some US$ 150 billion would be needed as new investments to meet the goals for 2015. Considering that some of the more developed countries of that region are presently investing about one third of what they need now; that private sector investments are about 5% of the total investment needs; and that the countries face similar requirements in their health, education, housing and other basic service needs; this is an exercise in futility.

Lately, there has been much discussion and hope placed on innovative financial instruments and on increasing the role of private sector investments. The reality is that there are only three ultimate sources of finance: (i) customer payments (a large percentage of which in many developing countries are poor); (ii) government subsidies from general taxation (which in many developing countries is limited for diverse reasons); and (iii) grants and aids from donor agencies and NGOs (which are scarcer by the day). Under these conditions, lobbying for this size of investments for water in the Third World would be, instead of a recipe to move from vision to action, an assurance to go from vision to inaction or from vision to dismissal.

An effort must be made to distinguish between what is desirable from what is reachable and to obtain data on what is reachable. Data on past behavior should be analyzed to improve future behavior and introduce realistic improvements, based on the multitude of constraints facing the developing countries, without pretending quantum leaps. Financing, investment and private sector involvement are very important. However, just by themselves they cannot guarantee the long-term successful implementation of projects. At the same time, solutions employed now by the industrialized world are unsustainable if the same standards are to be applied to the developing world.

Working with the water-using population by providing education, information, simple yet innovative technology and management skills in harvesting, storing, using and reusing water (i.e. stretching what little water may be available), would allow Third World counties to achieve reachable goals under conditions of limited financial resources. That is the reality. Wonderful projects are useless if they are built but do not meet goals and objectives, or if they do not become reality. The best project or the best action is not the "best" conceptually, but the one that is executed and achieves its goals; the one that takes into account the realities of each country."

SOURCE: IWRA 2003

treaties may also affect the internal water regime and its planning and management.

Lately, treaties like the NAFTA and CAFTA have raised concerns in some countries. In the specific case of CAFTA, the Central American Water Forum raised the following concerns: (i) the priority that investors would have in this type of treaty versus the water rights of the countries and their inhabitants; (ii) whether these treaties would imply changes in the World Trade Organization rules; (iii) whether water is explicitly excluded from the chapter related to services; (iv) whether there is a compromise for liberalization of public services; if the liberalization of water services is symmetrical; and (v) which are the exclusions that are included (GWP et al 2004). The Forum called for mechanisms and clauses to preserve national roles regarding the management and protection of water and the sustainability and equity of service provision.

De Ford (2005) points out that on a global level, water is classified within entry 22.01 of the **Harmonized System of Designation and Codification of Merchandise**, and it has been recognized as a commercial good in the Central American sub-region since some time ago. CAFTA does not affect the capacity of individual countries of assigning concessions, permits or allocations for a private entity to use the water resource. Similarly, it does not affect their capacity to establish environmental standards or protective measures that each country wants to have. The real risk lies in the countries' lack of adequate water legislation and in the ineffective application of the existing laws in the country regarding water and environment.

Vaughan (2003) points out that the General Agreement on Trade and Services (GATS) allows considerable flexibility in terms of which sectors can be opened, or remain entirely or partially closed. There is nothing in the GATS that compels any country to open their markets to competition, and countries can also privatize without liberalization. However, once markets are open to foreign competition, domestic public service providers cannot shield themselves under exceptions provided in the exercise of government authority in GATS Article 1 (3) (b). As there is little experience in most of the countries regarding these issues, further analysis and attention is needed.

Moreover, Vaughn (2005b) states that NAFTA Chapter Eleven and investor-state rights do not represent a major challenge to public policies or country regulatory capacities. One example is the Methanex Case, summarized in **Box 5.5**, which has clarified the expropriations issue.

Box 5.5 The Methanex Case

The Methanex case is an investment dispute between Canadian-based Methanex Corporation and the United States, arising from the provisions in the North American Free Trade Agreement's (NAFTA) Chapter 11 on investment.

Methanex is a major producer of methanol, a key component of MTBE (methyl tertiary butyl ether), which is used to increase oxygen content and act as an octane enhancer in unleaded gasoline. Methanex launched its international arbitration against the United States in response to the March 1999 order by the State of California to ban the use of MTBE by the end of 2002.

California argued that banning MTBE was necessary because the additive is contaminating drinking water supplies, and is therefore posing a significant risk to human health and safety, and the environment. Methanex argued in its original submission that the ineffective regulation and non-enforcement of domestic environmental laws, including the U.S. Clean Water Act, is responsible for the presence of MTBE in California water supplies. The company argued that the ban is tantamount to an expropriation of the company's investment and thus a violation of NAFTA's Article 1110; was enacted in breach of the national treatment obligation in Article 1102 of NAFTA; and was also in breach of the minimum international standards of treatment obligations in Article 1105 of NAFTA. It was seeking almost $1 billion in compensation from the United States.

The Tribunal undertook an extensive review of the process by which California enacted its MTBE ban. In brief, it found that the legislative process had been transparent, science-based, subject to due process and to legitimate peer review, and done in a manner that was consistent with California practice in this area. Methanex's allegations of corruption on the part of California Governor Gray Davis as a key factor in the decision-making, were determined to be unfounded, and thus were not accepted as a basis to interfere with the overall assessment of the legislative process as summarized above.

SOURCE: Mann (2005)

This was one of the biggest worries about investor rules creating a major risk to environmental policies[45] (Vaughan 2005b, Mann 2005, CN/RCA 2005).

Nevertheless, the reference to NAFTA (or other trade-related investment clauses in other trade accords, including CAFTA) may not be the most important issue regarding trade and water (Vaughan 2005b). Regarding the just-completed World Trade Organization (WTO) negotiations, the biggest issue from a water policy perspective is in direct relation to farm subsidies in OECD countries, and the implications of significant decreases in farm protection for developing countries and their water-use intensity.

In addition to overall subsidies, the specific issue of irrigation subsidies has significant effects on overall farm output: there are various estimates on the increase in irrigation intensity in Latin America and the Caribbean, including those from the Millennium Ecosystem Assessment. On the critical issue of agricultural subsidies in general, the ministers have agreed to a new deadline of April 2006, to finalize "full modalities" to move forward on agricultural liberalization, including subsidies and tariffs and non-tariff barriers. The ministerial meeting also agreed to eliminate agricultural export subsidies by 2013.

According to Vaughan (2005b) and others (CN/RCA 2005), the main issue of trade and water has to do with the link between the shift in agricultural production to more export-intensive and higher value-added crops, and the higher propensity of producers to rely on higher off-farm production inputs like irrigation and agro-chemicals (rich in nutrients), which in turn are changing water tables and creating new sources and higher levels of pollution. Also in some cases, this has resulted in a shift to more water intensive crops, such as soybeans.

f. River Basin Management

Lately, participative management of water resources through river basin organizations (RBO) is a theme that has received much attention in the region and many projects have received financing from national and/or international sources. However, the region confronts the same problem faced in other regions: that of sustainability. It is not uncommon that when external financing for a project or program finishes, the activities also cease and eventually disappear due to lack of resources. To correct this, in some countries, especially in Central America, mechanisms for financial sustainability are being tried[46]. One of these mechanisms has been to promote and/or reinforce local organizations in order to: (i) execute activities on their own; (ii) provide technical assistance to beneficiaries and jointly develop Annual Operative Plans (AOPs); (iii) provide targeted, transparent, and temporary subsidies as bridges until projects get fully underway; and (iv) have the beneficiaries return the funds or part of them to their organization to manage as a revolving fund. On a broader scale, recent legal reforms in Mexico provide a basis to delegate the management of the Nation's waters to river basin organizations **(Box 5.6)**, with the participation of water users and other interested parties, both public and social.

Legal reforms in Brazil have led to the progressive creation of river basin organizations as mechanisms to induce greater governmental coordination in the management of water as well as the necessary participation of water users and civil society. The operational objectives of river basin organizations in Brazil are associated not only to water allocation but also to water quality control, integrated, decentralized and participatory water management and the financing of wastewater treatment.

Earlier river basin experiences in the Americas date back to 1933 with the passing of the Act that gave birth to the Tennessee Valley Authority, TVA, in response to the Great Depression in the United States. The TVA was envisioned as a corporation clothed with the power of government but possessing the flexibility and initiative of a private enterprise[47]. Mexico followed the same concept with the creation of Executive River Commissions during the late forties and early fifties. Colombia also used that model and created the Regional Autonomous Corporations (CAR), who are in charge of sustainable management and development of the natural resources and environment within their jurisdictions. The CAR are public corporative entities formed by the departments, districts, municipalities and indigenous territories which

[45] One may think that if a company was able to sue the US Government, what would happen in other cases in Latin America and the Caribbean, given the litigation experiences derived from NAFTA: Ethyl Corp vs. Government of Canada; Metalclad vs. Government of Mexico; S.D. Myers vs. Government of Canada; Sun Belt Water Inc. vs. Government of Canada; Pope & Talbot vs. Government of Canada; Desona vs. Government of Mexico; USA Waster vs. Government of Mexico; Karpa vs. Government of Mexico (more details can be found in CN/RCA 2005).

[46] IDB financed projects in El Salvador, Honduras, Costa Rica, Panama, and Guatemala.

[47] http://www.tva.gov/abouttva/history.htm

geographically belong to the same ecosystem or integrate the same geopolitical, biogeographical or hydrographical entity (Jouravlev 2003). Nowadays, some other countries in Latin America are again exploring this type of river basin organization as a viable alternative, specially those regions that are less developed and where there is a great potential for water infrastructure development.

Besides the problem of sustainability, some difficulties have arisen from the notion of a "universal model" that is to be applied on a national basis, rather than establishing the legal mechanisms for the creation of river basin organizations where and when they are needed, and for the specific purposes demanded by the problems of the given river basins (See **Box 5.7**). Water allocation may be the driving force in some arid regions or in over developed river basins. Pollution control may be the relevant problem in other cases; conservation of natural resources could be a third objective. In each case, the institutional arrangement fits the problem and not the opposite. That is, envisioning the creation of river basin organizations as a

Box 5.6 Examples of river basin organizations

Argentina: The experience of Argentina includes the following cases: Interjurisdictional Committee of the Colorado River (COIRCO); Interjurisdictional Authority of the Limay, Neuquén and Negro Rivers (AIC); Regional Commission of Bermejo River (COREBE); Technical Interjurisdictional Commission of the Sali-Dulce River Basin; Rio Azul River Basin Authority (ACRA);Interjurisdictional Commission of the Laguna La Picasa; and Province Organizations such as Buenos Aires, Mendoza, and Santa Fe.

Brazil: The River Basin Committees perform a water related parliamentary role in river basins. They are the decision forum in each basin and are created by decision of the President of the Republic and include representatives from the Federal Government, the states, the municipalities, the water users, and the water related civil society organizations form them. Government representatives cannot be more than one half of the total members. The main functions of the River Basin Committees include: (i) debating water management issues and coordinating the joint action of governmental agencies, (ii) arbitrating water conflicts, (iii) approving the river basin water plan, (iv) determining and collecting water levies, and (v). allocating investment costs of multi-purpose projects. Among the River Basin Committees that have been created are those of rivers Doce; Muriaé y Pomba; Paranaíba; Paraíba do Sul; Piracicaba, Capivari y Jundiaí; and São Francisco. Some states, such as São Paulo, have created or are creating their own River Basin Committees; their compositin varies but they always include the participation of water users.

Mexico. The River Basin Councils have coordination and conciliatory functions between the CNA, federal, state, and municipal entities, and the water users of the river basin. They are created by CNA with the concurrence of its Technical Council. They coordinate the formulation and execution of programs and actions to improve water resources administration, development of hydraulic infrastructure, delivery of water services, and the preservation of the resources in the river basin. They have auxiliary entities such as watershed commissions and committees and Groundwater Technical Committees (COTAS). Municipalities participate as water users but not as local governments, although they may do so by invitation.

Peru. The Autonomous River Basin Authorities are created in those river basins with regulated irrigation or with an intensive or multisectoral use of water. They are the highest authority regarding use and conservation of soil and water resources in their jurisdiction. They are chaired by the Technical Administrator of the Irrigation District in representation of the Ministry of Agriculture and have representatives from the users of irrigation districts, the producers, the mining and energy sector, the housing and construction sector, the Executive Director of the most important irrigation district in the river basin, and a representative from the local governments.

Quebec–Canada. On adoption of the Quebec Water Policy in 2002, River Basin Agencies were established in 33 watersheds deemed high priority.

SOURCE: Jouravlev (2003) from Jouravlev (2001), Dourojeanni, Jouravlev and Chavez (2002), Chavez and Martinez (2000). International Network of Basin Organizations. The Network Newsletter, No. 13. December 2004-January 2005 www.inbo-news.org Pochat (2005).

Box 5.7 Examples of local problem-solving river basin organizations

Costa Rica. Rio Tarcoles Coordination Commission and Rio Reventazon upper watershed management commission (COMCURE)

Guatemala. Authorities for sustainable management of Lake Amatitla, Lake Izabal and Rio Dulce, Lake Atitlan and surroundings, and Lake Peten-Itza. Honduras. Executive Commission of the Sula Valley (CEVS).

Mexico. 69 Thechnical Ground Water Committees (COTAS) and 27 watershed commissions and committees.

SOURCE: Jouravlev (2003), CNA 2005

means to improving water management and not as an end in itself. The key question here is how these organizations interact with standing federal and other jurisdictional responsibilities. In no case do they supersede them and in many cases they must include representatives from the existing institutional framework.

Institutional arrangements for groundwater management have followed a similar path. To tackle the consequences of over-exploitation or the conflicts arising for intensive exploitation, in Mexico and in western United States important efforts have been taken to promote and create specific organizations for aquifer management. Results in United States are notorious, whereas in Mexico, the results are promising but the benefits are yet to be realized.

Transboundary river basins. The river basin or watershed approach has a solid logic in terms of environmental or other public goods management, especially for conflict resolution. Most of the experiences in Latin America and the Caribbean relate to relatively small watershed or river basins, as the interest diminishes when these increase in size. On of the reasons is the increased complexity and difficulty to reach agreements among increasing numbers of persons at the local, municipal, provincial, national or multinational level, as the basins increase in size. This is also the case in transboundary river basins. If these basins are sources of conflicts, the river basin or watershed approach is arguably the best approach for cooperation and integration (Garcia and Quiroga 2003).

More than 60 river basins in Latin America and the Caribbean (of which the Rio Grande/Bravo, Usumacinta, San Juan, Amazon, Paraná, Orinoco are some examples) are shared by two or more countries, and about 71% of the surface water is produced in transboundary basins (Dourojeanni and Jouravlev 2002). The use of water in many interior areas of several countries depends on the use of the common resource among two and even three bordering countries.

In the region, the legal regulation of transboundary water systems and bodies is mostly reached through bilateral agreements. Practically all countries of the region, from Canada to Chile, have one or more transboundary river basin. About 55% of the Latin American and Caribbean territory belongs to transboundary river basins. In one country, Guatemala, it reaches 75%. The use of shared resources depends in each case on the particular binational or trinational arrangements

between neighboring countries and the region offers some interesting examples where international water commissions have been created- between Canada and USA; USA and Mexico; Mexico and Guatemala; and Guatemala and El Salvador. Environment Canada (2005) reports that by 1987 the governments of Canada and the USA had referred more than 100 issues to the Commission. In all but a few cases, the decisions of the Commission had been unanimous and, for the most part, the governments have accepted its recommendations.

There is also a bi-national commission for the Rio Sixaola between Costa Rica and Panama, and a Trifinio Tri-national Commission between Guatemala, Honduras, and El Salvador in the upper Rio Lempa river basin. In the Rio de la Plata river basin in South America, there are nine bi-national commissions, one tri-national commission (Argentina, Bolivia and Paraguay) for the Pilcomayo River, and two pentad-national commissions (Argentina, Bolivia, Brazil, Paraguay, and Uruguay), one for the Parana waterway and another for the Plata river basin as a whole.

Querol (2003) reports that this practice aside, the use of transboundary water systems and bodies in the region reflects the customary legal norms: (i) the prohibition to cause appreciable damage, reflected in the large number of bi-national environmental and sustainable development projects; (ii) the equitable and reasonable use of water, reflected in the agreements for hydroelectric projects such as Itaipu and Corpus Christi, as well as in the willingness to negotiate the use of irrigation water in the Rio Grande (Rio Bravo); and (iii) the requirement of previous consultation, reflected in the reserve of right made by Argentina in Itaipu and the information exchange in the case of the Rio Grande (Rio Bravo). In just a few cases, there have been conflicts between the application of a conventional norm and the application of the principle of just and equitable use. In some cases, countries have also reached agreements on navigation and on bi-national regional development programs, such as between Peru and Ecuador regarding the Amazon River basin.

Although disagreement has been expressed (CN/RCA 2005) by citing the case of the La Plata River Basin Framework Project, which originated by initiative of the participating countries, Querol (2003) attributes the success of projects in these transboundary river basins to the role of international financing. The projects in the Amazon basin between Peru and Ecuador, in Lake Titicaca between Peru and Bolivia and in Rio San Juan between Nicaragua and Costa Rica, are given as examples. One important governance lesson has been, however, that care must be taken to include the participation of the local communities to avoid bias. There are also important governance and institutional lessons and models that are emerging from some GEF International Water Projects, such as in the Amazon, Pantanal and Upper Paraguay and La Plata River basins, as well as the Guaraní aquifer (Vaughan 2005, CN/RCS 2005). Lundqvist and Falkenmark (1999) promote the "Hydrosolidarity" principle as a mechanism to achieve equity among the populations living in the upper and lower river basins. On the other hand, economics suggest the application of market-based mechanisms as the most efficient way for resource allocation and to give the correct signals for the use of natural resources in a river basin. However, this approach faces considerable difficulties in transboundary situations. Several NGOs and universities in Central America have suggested the need to change the political, economic, and social terms of the debate on transboundary river basin management, by working with the communities living within these territories, and transcending the imperatives of national sovereignty (Lopez, editor 2002).

Lately, more participative decision-making, taking into consideration the opinions of local populations, has been the approach to planning and designing bi-national projects in the region. The cases of Corpus Christi in the Misiones province of Argentina and the Rio San Juan in Nicaragua and Costa Rica are given as examples of this approach (successful or not), as well as the upper Rio Lempa basin, between Guatemala, Honduras, and El Salvador (Querol 2003, Garcia and Quiroga 2003).

g. Management of Risks including Floods and Droughts

Although floods and droughts are not the only water-related hazards (other examples include accidental pollution and contaminant discharges, dam breaks and landslides), these two disasters are related to natural causes, in some cases aggravated by human and development factors; cover wider areas; are relatively more frequent and cause higher damages. Over the past three decades, while the number of extreme natural events encountered by developed and developing countries has roughly been the same, three-quarters of the disasters and 99% of the human casualties have been in developing countries. The process by which a country learns to minimize the impact of natural hazard events is developed incrementally over time. Like other learning processes,

the rate of improvement can be accelerated by taking advantage of the know-how and best practice techniques developed elsewhere and by adapting the methods used in other countries (Bender 2005).

By the end of the last decade, International Financing Institutions (IFIs) in the region had made significant public statements linking disaster losses and existing vulnerability to development practices, and to the need for risk management. The earlier in the development process that natural hazard risk mitigation options are considered, the more likely an acceptable level of risk will be achieved[48]. Natural hazard risk mitigation must be seen in the context of the process of development, not as an adjunct action to be applied once development decisions are made.[49] Mitigation must be considered before preparing for and responding to expected or unexpected losses and the resulting emergency. It should go beyond sector strategies for providing financial assistance in case of catastrophic loss and address the root causes of the vulnerability, such as land use planning, conservation of natural vegetation, zoning, community based early warning systems and contingency planning, etc.

Despite the staggering economic effects of hurricanes, most countries and donor agencies tend to focus almost exclusively on emergency response and reconstruction after events occur. However, emphasis should be placed both on preparing emergency response management plans with mitigation and other forms of risk management, before hurricanes and other phenomena occur. Indeed, there is a compelling economic and development argument that investing in disaster mitigation makes more economic sense than concentrating solely in post-disaster reconstruction. Investments that bolster the resilience of buildings, infrastructure and other critical areas are more cost-effect —by a two-to-one ratio— than expenditures in post-disaster relief and recovery (Bender 2005).

The key conclusion of the IDB, IFM, OAS and The World Bank report, "The Economics of Disaster Mitigation in the Caribbean," is that hazard risk management must be integrated into the economic development process. Mitigation options need to increase programs and projects that reduce the vulnerability of priority groups, particularly the poor. Both of these points are reflected in national, regional and hemispheric development goals. Addressing the issue of improving the resilience of critical local infrastructure including water infrastructure, and production systems essential to national development plans are critical in the context of strengthening democracy, transparency and good governance. Overall, the report makes a compelling economic and developmental argument that investments intended to mitigate the impacts of hurricanes, flooding and other disasters before they occur through resilience-related technical activities are more cost effective than relying solely on post-disaster relief efforts (Bender 2005).

Several countries have organized civil protection systems, like FEMA in the USA and those in Mexico, Argentina, and Central America. However, according to studies by the World Bank, WMO, and IDB, few countries in Latin America and the Caribbean have the necessary capacity in terms of trained personnel and equipment to make reliable short to medium term forecasts, due to financial constraints. In some cases, international aid after a major disaster, has financed the installation of state-of-the-art forecasting and early warning systems, but the financial constraints of local governments to provide for operation and maintenance of such systems, have made them unsustainable. Response measures for such disasters are also very weak and lack human and financial support. Sometimes in the region, even if the forecasts are good and timely, the response capacity is not always on par. There is still much room for improvement regarding the capacity to translate the early warnings and forecasts to effective preventive measures and to give protection and assistance to the civil population once a disaster has occurred.

The preventive and protective measures tried in the region after the major disasters that occurred in the 1990s have been varied. They have spanned from the traditional structural and non-structural measures, to mechanisms of risk transfer by insurance and the creation of Emergency Funds. Technical plans that anticipate and lower the risks of hurricanes, flooding and other events have been in-place for sometime. These range from increasing hazard mapping and aligning the results of forecasting with better land management and zoning

[48] For a detailed discussion of consideration of risk in development planning and project preparation, see "Incorporating Natural Hazard Assessment and Mitigation into Project Preparation – Report to CIDIE members by the OAS," OAS 1987, and Primer on Natural Hazard Management in Integrated Regional Development Planning, Chapter 1 Incorporating Natural Hazard Management into the Development Planning Process and Chapter 2 Natural Hazard Risk Reduction in Project Formulation and Evaluation. OAS 1990

[49] For a complete discussion of the topic, see OAS 1987 op. cit.

practices; adopting flood management plans that are part and parcel with overall river basin and watershed catchments management plans; adopting relevant building standards and construction codes covering both public buildings such as hospitals, schools, government building, universities, ports and transmissions lines, as well as private housing standards, and crucially, ensuring that those codes are effectively enforced through a range of good governance practices. Indeed, good governance is a key aspect to integrating risk mitigation policies (Bender 2005).

Except in Costa Rica, in most other countries there is a limited capacity to produce climate outlook information of value for sectors affected by climate variability (WMO/IDB 2004). Improved El Niño forecasting could save substantial losses. Expected benefits for Mexico, Peru, Jamaica and Honduras were estimated by Vosti (2003) and NOAA (NOAA/WMO/IDB 2003) where the present value of benefits ranged from about US$ 480 million, to US$ 2,495 million in a perfect forecast scenario. As a result, new risk management instruments are being adopted and comprehensive water resources management in river basins and watersheds is gaining coverage. In this regard, watershed management projects in Guatemala, Honduras, and El Salvador show good results.

Although the concept of agricultural insurance is not new in the region[50], the application of risk transfer mechanisms that take into account climatic variability is being explored. Mechanisms to indemnify irrigators based on the annual inflows into reservoirs, i.e. some specific prototype insurance contracts that would pay when inflows are below normal, are being proposed in Mexico. It is hoped that such indemnity payments during water scarce periods would provide additional liquidity to the system that would not only mitigate the losses to the irrigation district as a whole, but also would lead to an efficient use of the resource (Skees and Leiva 2005). Auto-financed crop insurance models to provide protection against decreases in farmers' incomes due to low crop productivity, caused by critical drought events have also been proposed in Brazil (Pilar et al 2001).

The effectiveness and efficiency of these measures is difficult to evaluate, due to the variability and randomness of the natural phenomena. It is also recognized that in a given period of time, the cumulative effect in transport infrastructure, agriculture, and the economy in general of periodic annual phenomena, can add to substantial amounts. These phenomena, unlike the major events, will not make the headlines because of their periodicity. However, their impacts could be easier to control and the local communities could participate in their prevention and amelioration, as many programs financed by the World Bank, IDB and several NGOs are trying to promote.

[50] Several modalities have been established in Argentina (1919), USA (1939 and 1955), Mexico (1965), and Brazil (1966, 1970, and 1974). These are generally based in the Large Numbers Theory, which distributes the expected cost of a given event among the insured mass and involves the concept of a weighed average spatially distributed (Pilar et al 2001).

6. SUCCESSFUL LOCAL ACTIONS in the region

The overarching theme of the 4th World Water Forum "Local Actions for a Global Challenge" was selected with the objective of encouraging debate and fostering new initiatives to deal with the great challenges faced by local actors. In this context, one of the main components of the Forum is the presentation of local experiences and actions which have been carried out throughout the world. These experiences and local actions will be shared between the different countries around the world in order to help them create better well being conditions for their inhabitants. The Forum Secretariat defined a local action as follows:

"An activity or group of activities focused on solving an identified problem faced by a local stakeholder group in the management of their water resources or services. It is not necessarily a "project", but can encompass a variety of interconnected activities aimed at addressing a particular issue. The scale of a local action depends on the scale of the problem focused on and is the scale at which an effective solution can be implemented."

The Forum Secretariat established the following procedure for the submission and selection of the local actions to be presented at the Forum: (i) register the proposed local action through the Forum website, November 15th being the deadline for registration; (ii) evaluate registered local actions by the Regional Committees according to criteria decided by their members; (iii) integrate a data base with all actions that received a certain qualification level defined by each Regional Committee; and (iv) select the local actions to be presented at each session by each session convener.

The Regional Committee of the Americas was the only one that established an Evaluation Committee. The criteria for selecting the members of this Committee included the following: (i) geographic distribution (North, Central, and South America, and the Caribbean); (ii) gender representation (at least 40% presented by women); (iii) civil society representation (at least one member per theme representing the civil society); (iv) knowledge and experience on the theme according to each thematic topic; and (v) acceptance of the nomination and commitment to accomplish the task. The mandate of the Evaluation Committee was to recommend a short-list of "local actors" that would be invited to participate directly in the actual Forum meeting, by making presentations of their experiences at the project and policy level. It is believed that in this manner, the results in selecting outstanding local actions, as well as the process by which public participation and transparency are directly supported, was an important contribution to the Forum.

The structure of the Evaluation Committee of the Americas was discussed at the COA meeting in June 2005 in Tabasco, Mexico, and it was agreed to have groups of 3 persons for each thematic area, with one of them coming from the civil society sector. The committee was comprised of 5 sub-working groups, to reflect the five thematic areas of the Forum itself. The composition of the Committees is shown in **Table 6.1**. As of December 22nd, 26 countries had registered local actions, distributed as shown in **Figure 6.1**.

Table 6.1 Composition of Evaluation Committe of the Americas

THEME	NAME	POSITION	EMAIL
	Karin Krchnak	Director of International Water Policy Nature Conservancy http://www.nature.org/initiatives/freshwater/contact/krchnak.html www.tnc.org	krchnak@tnc.org
Water for Growth and Development	Rocio Cordoba	Coordinadora Area de Humedales, Aguas y Zonas Costeras Mesoamerica - Costa Rica - IUCN Coordinator Wetlands Water and Coastal Zones Program for Mesoamerica IUNC http://www.iucn.org/themes/wani/people.html	rocio.cordoba@iunc.org
	Marta Franco	CLAEH - Argentina	martafranco@uolsinectis.com.ar
	Elisa Colom	GWP Guatemala / SEGEPLAN	ecolom@segeplan.gob.gt
Implementing Integrated Water Resources Managment	Jose Nilson Bezerra Campos	ABRH - Associaçao Brasileira de Recursos Hidricos Director Asociacion Brasileña de Recursos Hidricos Director Brazilian Water Resources Association	nilson@funceme.br
	Alejandro Brown	Presidente Proyungas / Argentina ww.proyungas.org	abrown@proyungas.com.ar
	Dora Irene Ordoñez Bustos	Directora Equidad de Género en el Desarrollo Sustentable - Instituto Nacional de las Mujeres México	dordonez@inmujeres.gob.mx
Water Supply and Sanitation for All	Luis E. Marín	Chair - Water Network - Mexican Academy of Sciences / Instituto de Geofísica Universidad Autónoma de México, Cd. Universitaria http://geoinf.igeolcu.unam.mx/rda/ing/index.html	lmarin@mail.com
	Ron Sawyer	Director - Sarar Transformación SC - México http://www.sarar-t.org/equiposarar.htm	rsawyer@laneta.apc.org
	María Angélica Alegría Calvo	Ingeniera de Recursos Hídricos - Dirección General de Aguas de Chile / Experta en Gestión Comunitaria del agua, humedales, agua potable rural y urbana, Regulaciones http://www.genderandwater.org/page/209	maria.alegria@moott.gov.cl
Water Managment for Food and the Enviroment	Alan Gonzalez	Director - Proyección Externa y Servicios Técnicos Regionales - CATIE http://webbeta.catie.ac.cr/bancoconocimiento/S/STRQuienesSomosAGonzalez/STRQuienesSomosAGonzalez.asp?CodSeccion=325 www.catie.ac.cr	alang@catie.ac.cr
	Laura Acquaviva	Staff Member of the Water Authority in Mendoza Argentina	lauaqua@hotmail.com
	Valma Jessamy	Executive Director JECO Caribbean, Grenada http://www.uea.ac.uk/env/cserge/people/valma_jessamy.htm	vjessamy@caribsurf.com
Risk Management	Gerald E. Galloway	Profesor of Engineering Dept. Civil and Environmental Engineering University of Maryland http://www.civil.umd.edu/people/page74.htm	gegallo@umd.edu river57@comcast.net
	Vincent Sweeney	Director Caribbean Enviromental Health Institute CEHI - www.cehi.org.lc/ed.html	vsweeney@cehi.org.lc

Figure 6.1 Local Actions by Region (December 22, 2005)

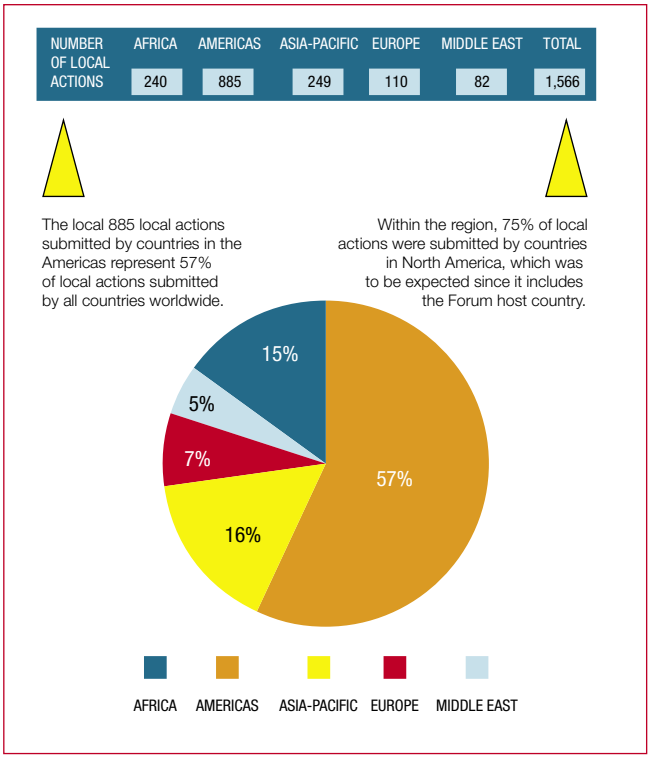


Figure 6.3 Local Actions in Americas (December 22, 2005)

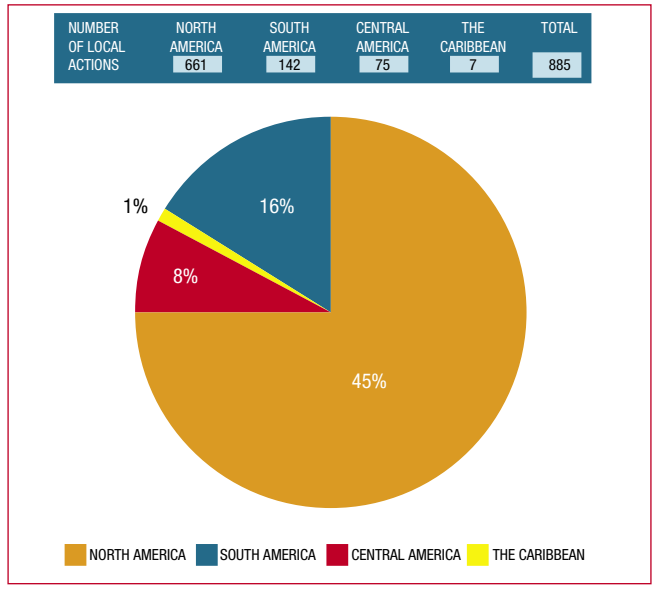
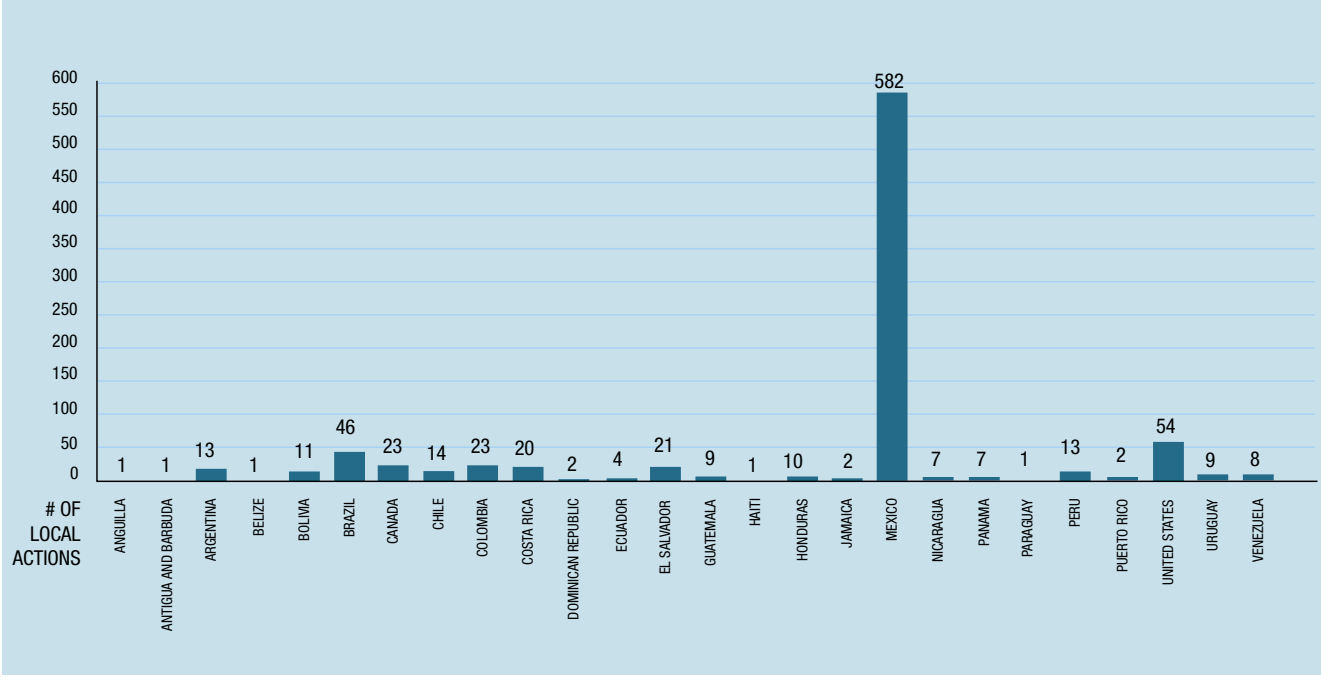


Figure 6.2 Distribution of Local Actions submitted by Country in Americas (December 22, 2005)



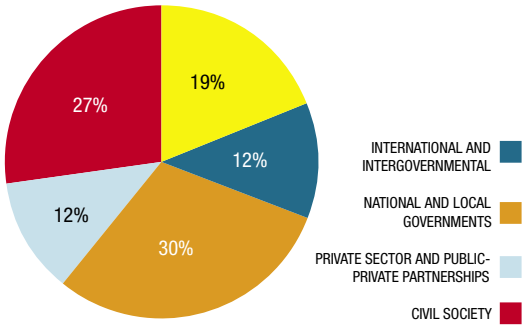
Registered local actions were evaluated according to the following criteria: (i) the results achieved improved the social welfare; (ii) the results achieved promoted the economic development; (iii) the results achieved protected the environment; (iv) stakeholder participation was successfully achieved in the process; and (v) the experience or actions could be duplicated or upgraded in other places of the world. The distribution of the local actions submitted is presented in **Figure 6.2**.

The geographical setting for the local actions submitted by the Americas was predominantly by basin (45%), followed by those by country (25%). It is interesting to note, however, that the smaller geographical settings dominated, as both basin and cities, taken together, represent 63% of the total, against 37% corresponding to the larger geographical settings of district and country.

Since actions submitted by organizations of the civil society were 27% of the total, only surpassed by those submitted by national and local governments (30%), it can be said that the bottom-up approach is well represented, since that 30% also includes an undisclosed number of actions submitted by local governments.

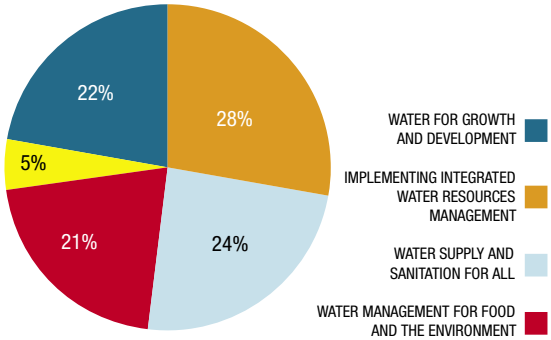
Figure 6.4 Local Actions by type of Organization (December 22, 2005)

	NUMBER OF LOCAL ACTIONS
INTERNATIONAL AND INTERGOVERNMENTAL	159
NATIONAL AND LOCAL GOVERNMENTS	427
PRIVATE SECTOR AND PUBLIC-PRIVATE PARTNERSHIPS	160
CIVIL SOCIETY	361
PROFESIONAL ASSOCIATIONS KWNOLEDGE AND EDUCTION INSTITUTIONS	253
TOTAL	1,360

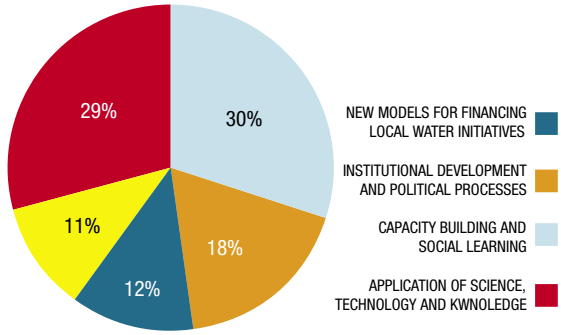


Figures 6.5 and 6.6 Distribution of Local Actions by Thematic and Cross-Cutting Topics

	NUMBER OF LOCAL ACTIONS
WATER FOR GROWTH AND DEVELOPMENT	199
IMPLEMENTING INTEGRATED WATER RESOURCES MANAGEMENT	251
WATER SUPPLY AND SANITATION FOR ALL	206
WATER MANAGEMENT FOR FOOD AND THE ENVIRONMENT	183
RISK MANAGEMENT	44
TOTAL	885



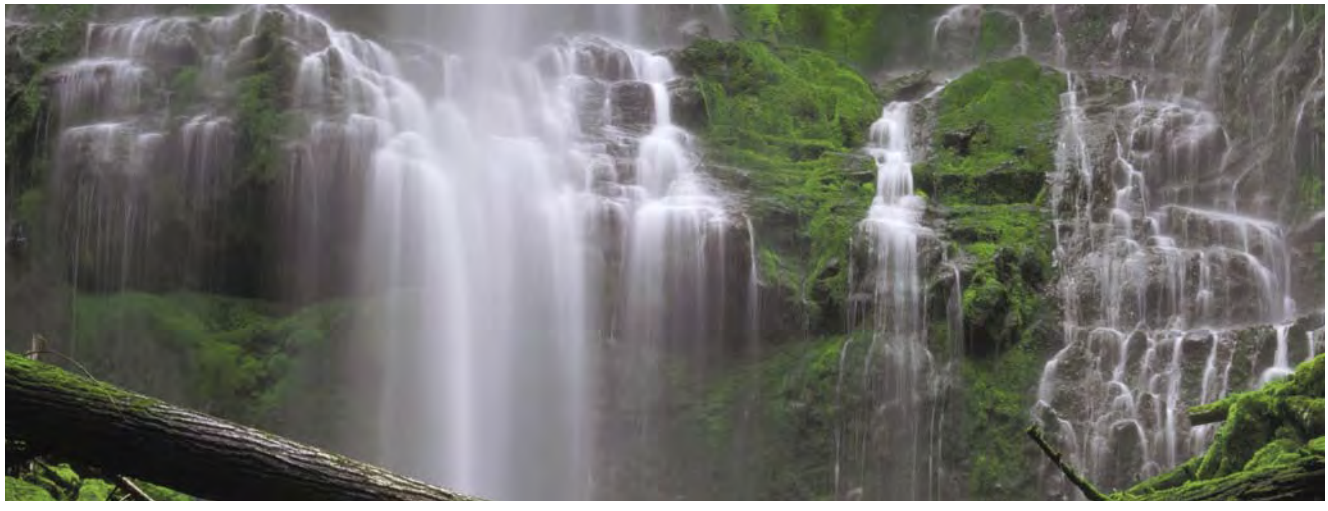
	NUMBER OF LOCAL ACTIONS
NEW MODELS FOR FINANCING LOCAL WATER INITIATIVES	191
INSTITUTIONAL DEVELOPMENT AND POLITICAL PROCESSES	280
CAPACITY BUILDING AND SOCIAL LEARNING	466
APPLICATION OF SCIENCE, TECHNOLOGY AND KWNOLEDGE	458
TARGETING, MONITORING AND IMPLEMENTATION ASSESSMENT	170
TOTAL	1,565



Figures 6.5 and 6.6 shows the distribution of the local actions submitted by the Americas, by thematic topics as well as by cross-cutting perspectives. It is seen that those issues related to implementation of Integrated Water Resources Management concern the most to local actors, followed by those related to water supply and sanitation, water for growth and development, water for food and the environment, and finally, risk management.

Regarding the cross-cutting perspectives, the greatest emphasis of the submitted local actions was placed on capacity building and local learning, followed closely by application of science and technology and knowledge. Institutional and political processes was third, followed somewhat distantly by new models for financing the local water initiatives and those related to targeting, and last, by monitoring and assessment of implementation.

These two results taken together may seem to suggest a strong demand for learning about the forefront themes of interest. It could also be posed that either the financing needs for actual water-related projects is perceived as fairly well satisfied by the conventional financing models; or that the emphasis of the local actions presented may have an inclination more towards the conceptual design and planning phases, than towards the implementation of actual projects. Summarized descriptions of the ten best-rated local actions in each thematic topic by the Committee of the Americas' Selection Committee are included in Annex 4.



7. CONCLUSIONS, **lessons learned and future perspectives**

The situation in the Americas regarding water has made some advances in the three years since the 3rd World Water Forum was held in Kyoto, Japan, in 2003. A good description of the key issues, actions and lessons learned, and recommendations presented at the Day of The Americas in Kyoto can be found in the Proceedings of that session and are summarized in **Boxes 7.1 and 7.2**. A commitment was made in that occasion to construct the foundation of a new Water Agenda for the Americas, which will always be a work in progress. The basis for this New Water Agenda included efforts to devote expertise, logistics, and financial resources to find negotiated solutions for the most important water issues in the region (see **Box 1.1**). **Since the 3rd World Water Forum**, some advances have been made in policy development, including the definition of rules for efficient and equitable water allocation. However, addressing the financial needs for water management continues to be a struggle. While international trade agreements have advanced between countries from the North and South of the region, their effect on national water public interest is still not well understood. Efforts towards capacity building have continued, but still there is much to be done regarding capacity building for effective decentralization, water governance, and management and regulation of services. Significant

Box 7.1 Day of the Americas, 3rd World Water Forum Kyoto, Japan, March 2003 KEY ISSUES

"Several continental Latin American and Caribbean (LAC) countries and cities face moderate water stress and quality problems from increasing population growth and urbanization trends. Natural hazards and climate change events, including hurricanes combined with floods and droughts, cause deaths and have destructive impacts in urban areas, agriculture, water supply, hydropower, and transportation. Flash flooding and mud slides plague steep slope Pacific catchments with scant vegetation. Water management issues affect two principal sources of income in the Caribbean —tourism and agriculture.

Macro and global economic determinants condition water resources and country development scenarios. Increasing poverty levels and widening of income distribution prevail, despite large investments in water-related projects and macroeconomic reforms that, disregarding social policy, generally failed to promote sustainable economic growth."

SOURCE: 3rd World Water Forum, Day of the Americas Declaration, 2003.

advances have been made regarding local participation for an efficient risk management, but the region continues to be devastated by natural hazards. Some countries in Latin America and the Caribbean made an unsuccessful effort to negotiate the elimination of agricultural subsidies in First World countries. Although this point of contention between countries in the North and countries in the South still remains, its solution was greatly advanced in the Hong Kong meeting of the WTO.

Issues relating to water management do not vary significantly throughout the region, although priorities typically differ, particularly between North America and the countries of Latin America and the Caribbean. The goals of Canada's Federal Water Policy are related to the protection and enhancement of the quality of the water resource and to promote the wise and efficient management and use of water. In the USA, a Water Infrastructure Financing Act was introduced to the Senate in July 2005, with provisions to finance more than US$ 20 billion over five years for a variety of loans, grants, and studies. Most of the money would be directed to the Clean Water State Revolving Fund, the state administered programs that provide low interest loans to wastewater and water utilities (Civil Engineering 2005).A recent Water Policy Dialogue sponsored by the American Water Resources Association (AWRA) identified four key water challenges and two crosscutting issues. The four challenges were: promoting more integrated approaches, reconciling the current Ad-Hoc National Water Policy, Developing collaborative partnerships, and providing information for sound decision making. Crosscutting issues included: financing water improvements and educating the public and public officials about water challenges (AWRA 2005). Conclusions from the fifth Ibero-American Forum of Environment Ministers held in Colon, Panama in September 2005 included 14 items related to water. These underline four prerequisites for IWRM: a strategy for IWRM including groundwater, an adequate environmental valuation of water, the existence of adequate basic infrastructure for water supply and sanitation, and the existence of an adequate policy and institutional framework.

Box 7.2 Day of the Americas, 3rd World Water Forum Kyoto, Japan, March 2003 LESSONS LEARNED

"A balanced set of policies and institutional reforms harnessing the efficiency of market forces and strengthening government capacities has been initiated in LAC. The region has outstanding, although controversial, examples of market-based approaches to water management and water services privatization. It is also a showcase for bottom-up decision-making river basin organizations, decentralization and municipalization processes, and conceptualization of participatory water planning processes.

Sub regions like Central America have developed strong regional institutional frameworks. Strong environmental movements have also appeared in LAC. Mechanisms for political dialogue within and between countries sharing transboundary river basins and marine resources exist in North, Central and South America and the Caribbean region.

Beneficial impacts such as increased efficiency in water use, increased civil society participation and use of conflict resolution mechanisms have occurred over time. Despite important gains, however, there is much to be accomplished in LAC. Problems still persist and the region has learned valuable lessons: water resources management and institutional settings cannot be independent from external and national overall political, economic and administrative organizational structures at a given moment in time."

SOURCE: 3rd World Water Forum, Day of the Americas Declaration, 2003.

1. Water for Growth and Development

Water as an end and water as a means. Growth and development objectives continue to dominate national agendas with economic growth and poverty alleviation of primary importance among Latin American and Caribbean nations. While advances have been made toward understanding the relationships between water and its role in the economy, society and environment not all countries within the region have clearly defined the role of water in achieving national goals. The effects of increasing globalization and trade liberalization on national water resources are only beginning to be realized, with the subject of **water and trade** a recurring theme in water fora in Latin America and the Caribbean, and continue to raise concerns in several countries. Water management paradigms continue to be vigorously debated across the region and there many hurdles to be had before it can be said that any one dominates in the region.

The intuitive relationship between water management and socioeconomic development is often confounded by a lack of suitable indicators. The absence of such indicators complicates the identification of cause and effect that would enable the role of water in growth and development to be isolated from other economic, social, and environmental effects. Although emphasis has shifted toward demand management, rather than supply augmentation, a debate on how to reach an equitable and sustainable balance between the two persists. While governments have traditionally established priorities with respect to water, this is changing with the introduction of market-based approaches. Introduced to improve incremental benefits for the scarce available resources growth and poverty alleviation such objectives have not always been clearly demonstrated and despite noble intentions society often pursues alternate objectives. Competing demands among various sectors of society and the economy continue to stimulate debate on the most appropriate mechanisms to manage water.

Brazil (2005) has proposed a common water resources management strategy for the Latin American and Caribbean countries, towards the adoption of common measures for poverty alleviation and for reducing the restrictions to development imposed by an inadequate access to water in the hemisphere. The core of the strategy rests on common long-term actions for solving the major water management problems in national and transboundary waters. The convergence of national water policies for the sustainable use of water as well as South-South cooperation processes for the creation of a Common Water Resources Development Fund, among others, are posed as specific objectives of the strategy.

As a result of meetings held by Organizations of the Civil Society during the preparatory process for the 4th World Water Forum, the six basic statements listed in **Box 7.3** were put forward.

While the region has accepted the premise of sustainable development it continues to debate the emphasis that should be afforded to economic, social, and environmental goals within the national context. Proposals for the maximization of economic growth subject to social and environmental restrictions have been met with counterproposals to maximize equity or environment, subject to restrictions imposed by the other two vertices of the sustainable development triangle. Previously irreconcilable struggles between those that regard **water as an economic good** and those regarding **water as a human right** are beginning to give way to proposals[51] aiming to show both views are compatible and mutually beneficial. The remaining challenge is to develop appropriate mechanisms for maximizing the contribution of water to clearly define and strategically pursue social or environmental objectives at national and regional levels.

[51] Such as one presented by FAN-CA.

Box 7.3 Statements of Civil Society Organizations during the preparatory meetings

- That water be a fundamental human right and natural and cultural patrimony of nations, guarantee its access in quality, quantity, and continuity to all persons and societies, especially to poor communities and to the most vulnerable sectors;
- That water be a priority within public policies;
- That civil society participates in a binding manner in decision making through adequate means and at adequate levels in the planning, management, and regulation of water and its services;
- That management, use, and distribution of water be made according to rules of justice, equity, and sustainability;
- That rural communities have secure water supply sources with legal provisions to guarantee all uses made by such communities;
- That the water-related function of forests, prairies, moors, wetlands and all natural vegetation land cover be conserved; and that an integrated management and conservation of watersheds, including transboundary river basins, be developed.

SOURCE: CN/RCA (2005)

Institutional and legal framework. The institutional framework for water management is continually evolving throughout the region and there is no one model that could be qualified as regional. The region is extremely heterogeneous and each country has either maintained traditional institutional frameworks from the 1940-1980 era, introduced models based on successful European examples or adapted new models to national characteristics. The challenge facing the region is in determining the value of investing in new approaches that address changes in the national, regional and global context as opposed to retaining historical institutional frameworks and, if these are retained, what conditions are required to ensure these are appropriate for accommodating new legislative measures. **Decentralization** has had mixed success. The degree of delegation of some functions related to this responsibility varies from country to country in the region and whether the country has a central or a federal structure. Most countries, however, consider water as a strategic resource and thus, central governments retain the responsibility for its administration and conservation. What has been delegated almost universally to local governments or **municipalities** is the responsibility for providing basic services such as water supply and sanitation. Some countries have delegated these responsibilities since the 1940s and others have just recently done so. Some local governments have been very successful in carrying out this responsibility and some have not. What has become general is the increasing recognition of the need to ensure such measures are supported through local administrative and financial capacity building, with some functions, such as technical assistance or in some cases regulation, retained by central government. Governance structures ensuring effective mechanisms for participation and empowerment of civil society is another key factor and significant progress has been made in Latin America and the Caribbean, even in countries where water management has been traditionally viewed as hierarchical and pyramidal. However, participation in decision-making remains a challenge, especially when traditionally excluded groups such as **women** and **indigenous populations** are concerned. Although there are exceptions, that these efforts have been more successful in decentralizing the "voice" but not as much in decentralizing the "vote" in water resource management issues.

The region has displayed significant interest in modernizing existing **legal frameworks**, especially in Latin America with most countries having initiated programs to develop, modify or modernize existing water legislation. All of these developments have displayed mixed results. As a result, important questions have been raised as to why this happens, what constitutes a "good law", the purpose of legal reforms, how they should be implemented and what conditions are required for successful implementation.

Financing infrastructure. Despite economic disparities throughout the region, financing for the development and maintenance of infrastructure is a common problem. Governments are increasingly promoting private sector involvement in the financing of water projects although emerging trends suggest that public funds or funds from project beneficiaries will still be needed to ensure viability of many projects. This accompanies a shift in trend from financing large infrastructure projects toward small infrastructure projects, and financing the more "soft" components of water resources development, as well as the trend towards exploring alternative energy sources, such as solar and wind. Although important and complementary, these sources are not yet considered viable substitutes

for hydraulic or fossil fuel energy. A debate has also emerged between the advocates and opponents of dams, debate that is expected to continue. There are important social and environmental issues related to infrastructure, especially dams large and small. It is apparent, however, that the region has realized that infrastructure is a key element for solving water-related problems but that it has to be accompanied by social and environmental considerations. Following an extended period of non-investment during the 1980s, the region has realized that infrastructure is a key element for solving water-related problems and that it must serve not only national strategic goals and objectives, but also local goals and needs. It has also been learned that no infrastructure can be built free of environmental cost and that no environmental restriction is free of economic cost. An adequate consideration of all these factors is the new challenge. No sector in the region conscientiously wants to repeat the mistakes of the past. There is increased recognition that such infrastructure must address local needs as well as serving national strategic goals and objectives and must be accompanied by improvement of social and environmental considerations. Countries within the region need to determine the appropriate balance between "hard" and "soft" components of water management and the relation between hydraulic infrastructure and economic development.

2. Implementing Integrated Water Resources Management

Advances and reforms. Adoption of IWRM largely reflects he availability of water, with early approaches searching for a reasonable compromise among various competing uses of water when quantity and/or quality conflicts arose. The shift toward more integrated government in the 1990s included the integration of water with other sectors. This resulted in some confusion, especially when the IWRM approach was introduced in legislation and thus required by law in some countries. Ensuing efforts have sought to clarify these issues and determine when IWRM is appropriate for countries in the region. The challenge facing the region is to determine appropriate models of IWRM and how these have contributed to improving productivity, efficiency and sustainability of water-related services for users.

The region has committed itself to IWRM, with numerous countries drafting national IWRM policies, strategies and plans, addressing surface and **ground water** resource and **water quality** issues. These have been facilitated largely by international guidelines and demonstrations. The concept of **payment for environmental services** is increasing in popularity as a means for financing environmental activities, especially in watersheds. This concept has proved socially and politically acceptable, despite continuing controversy related to the founding concepts and assumptions.

River basin organizations (RBO) are increasingly being developed as vehicles for decentralization and the implementation of IWRM, in line with globally trends. Problems have been realized in the sustainability of many of these organizations, particularly those linked to programs funded through international organizations. While increasing recognition of this problem has resulted in mechanisms to improve their sustainability it is too early to draw conclusions and this remains one of the biggest challenges to the river basin organizations at the local and national level. At the regional level the many **transboundary river basins** have necessitated the successful development of agreements towards a shared management of these water resources. Although these agreements follow the spirit of the international norms regarding shared water resources, all of them are agreed on a bi national or multi national basis between the bordering countries.

Despite the importance of the regions coastline, and development of IWRM, **coastal zone management** within the context of water management remains a significant challenge. Pollution from municipal and industrial wastewaters, agriculture, mining and other land sources continues to present a major problem. Coordination mechanisms for management of coastal zone pollution are few, but the region is attempting a variety of instruments that include policy, planning, management, and economic instruments.

3. Water and Sanitation for All

High levels of urbanization and economic disparity along with a significant rural population presents a significant challenge to the provision of services. The Americas have secured considerable advances in the provision of services. However, a significant number of people still lack access to safe drinking water or adequate sanitation and there are persistent differences in coverage between urban and rural areas. Issues of coverage are often undermined by poor water quality and service reliability. Low levels of wastewater treatment are contributing to problems

of both surface and groundwater pollution. In response the region is trying new and innovative instruments, like incentives for private participation in wastewater treatment projects, as well as tradable pollution permits. Persistent questions remain around the suitability of developing water quality criteria for specific watersheds associated with targeted investments.

Financial sustainability of service providers remains an issue and large subsidies are still being provided through national budgets. Nevertheless, the region has made substantial advances towards modernization of the water supply and sanitation sub-sector, attracting private participation and financing, regulation, and advancement towards meeting the **Millennium Development Goals** (MDGs). If the effort made by the Latin American and Caribbean countries in the 1990s is maintained, it seems like the region, as a whole will meet its commitments to the MDGs. Individually some countries are more likely to meet them than others, but this commitment has attracted attention to the problem by all governments in the region. Significant challenges remain however and there are questions as to the regions' institutional capacity to absorb the funding required to achieve these goals and how to address such constraints.

4. Water for Food and the Environment

Irrigation has played an important social and economic role in the region, facilitated by sizeable investments in infrastructure. However, not enough attention has been afforded to ensure the efficient use of water. The concept of "virtual water" is changing the way in which water is perceived and used, emphasizing more productive uses focused in those areas where a country has natural competitive advantages. Despite such concepts many still advocate increasing agricultural frontiers in order to improve food security. The efficiency of both large and small schemes is being debated across the region along with consideration of factors in determining project size and the contribution to poverty amelioration and food security. Considerations about the limit where efficiency, productivity and technological advance can satisfy the increasing demand for food and the limit to which rain fed agriculture yields could be taken and under which conditions, with a view toward improving yields and sustainability are also topics of discussion. The impact of the commercial liberalization and the new global tendencies also needs to be evaluated.

Latin America has also experienced rather successful results in the transfer of public irrigation districts (PIDs) to farmer associations. The pre existing conditions that made these possible and an evaluation of the impact of such transfers in relation to efficiency, productivity, and competitiveness of the irrigation districts is now required to build on lessons learnt. Such lessons would help to answer questions being asked regarding the size limits to which infrastructure can be transferred to users associations and why this has not happened more often. The role of governments as conflict mediator between users also has to be defined, as well as how to reduce the problem of clandestine users who illegally draw water from irrigation canals. Government also needs to facilitate the process of determining sustainable limits for the development and operation of agriculture. This can only be achieved through improving the definition and classification of environmental issues associated with irrigated agriculture.

5. Risk Management

The frequency of natural disasters across the Americas has significant impacts on the economies of the region, as well as loss of life. While the region has some of the world's most advanced weather and climate forecasting centers, natural disasters large resources are consumed through civil protection and disaster mitigation, establishing and maintaining costly disaster prevention systems and organizational capabilities. Preventive and protective measures in the region include traditional structural and non-structural measures, mechanisms of risk transfer through insurance and the creation of emergency funds. Learning from the natural disasters, both catastrophic and lesser events that have occurred in recent years, natural hazard vulnerability reduction risk management, investment in mitigation and emergency preparedness and response measures are all part of actions to be implemented at the regional, national and local community levels.

Understanding risk opens options for reducing the potential impacts of natural hazards. Risk indicators and, more broadly, risk information that can be interpreted by non-experts are necessary inputs for decision makers to effectively manage natural hazard risks. The variety of hazards in combination with the differences in capacity to manage risk among countries in the Americas means that risk indicators must be developed on a country basis and also that responses must be tailored to the specific situation of the country. However, many risks are shared by groups of countries and this allows for collaboration and sharing of experiences.

8. REFERENCES

This section lists the references cited in the text. Annex 6 includes an annotated bibliography of documents relevant to water-related topics in the region.

Alé, Jorge (2004). "Financiamiento de Empresas del Sector Sanitario: el caso chileno". Presentation at the GWP/ABRH/ANA/SRH-MDMA/IDB/World Bank/OAS First Latin American Seminar on Water Resources Public Policies, Brasilia, Brazil, September 2004.

AOL News (2005). "Tropical Storm Alpha Forms in the Caribbean". http://www.aolsvc.news.aol.com/news/article.adp?id=20051022173709990003&ncid=NWS00...

ASCE (2003). "2003 Progress Report; Dams". ASCE http://www.asce.org/reportcard/index.cfm?reaction=full&page=6

ASCE (2005). "Civil Engineering and Dam Safety Groups Support Reintroduction of Dam Repair and Rehabilitation Act". http://www.asce.org/prressroom/news/display_press.cfm?uid=1762

Aylward, B. (2002). "Land-use, Hydrological Function and Economic Valuation". UNESCO Symposium/Workshop on Forest-Water-People in the Humid Tropics, Kuala Lumpur, Malaysia, 2002.

AWRA (2005). Second National Water Resources Policy Dialogue. February 14-15, 2005. Tucson, AZ.

Ballestero, Maureen; Brown, Ernesto; Jouravlev, Andrei; Küffner, Ulrich and Zegarra, Eduardo (2005). "Administración del agua en América Latina: situación actual y perspectivas". Series Natural Resources and Infrastructure No. 90. ECLAC. Santiago, Chile. May, 2005.

Beltrán, Javier (2001). "_Pueblos Indígenas y Tradicionales y Áreas Protegidas; Principios, Directrices y Casos de Estudio". Comisión Mundial de Áreas Protegidas, Best Practice Protected Area guidelines Series No. 4. IUCN/WWF/Cardiff University. Cambridge, UK, 2001 (http://www.iucn.org)

Bender, Stephen (2005). OAS. Comunicación personal.

Bosshard, Peter (2005). "Will the Terminator Reduce Poverty?". International Rivers Network, 2005 (http://www.irn.org/programs/finance/index.php?id=050916critique.html).

Braga, Ben (2004). Presentation at the Workshop on Water Quality Management for the Americas, Fortaleza, Brazil, 12-13 April 2004. International Water Resources Association, 2004.

Braga, Ben (2005). Contribution to the Regional Document for The Americas. ANA, Brasilia, Brazil, 2005.

Brandling-Bennet, David, M. Libel and A. Migliónico (1994). "El Cólera en las Américas en 1991". Notas de Población, No. 60, Centro Latinoamericano de Demografía (CELADE), Santiago, Chile, 1994.

Brazil (2005). "Estrategia Común para la Gestión del Agua Entre los Países de América Latina y El Caribe; Propuesta Preliminar". Desarrollo e Implementación de Mecanismos para Diseminar Lecciones Aprendidas y Experiencias en Gestión Integrada de los Recursos Hídricos Transfronterizos en América Latina y El Caribe. Proyecto DELTAmérica. Mayo 2005.

Bruijnzeel, L. A. (2001). "Hydrology of Tropical Montane Cloud Forests: A Reassessment." *Land Use and Water Resources Research* 1: 1.1-1.18, 2001.

Castro, José Esteban (2004). "Barreras y Condiciones para la Participación de la Empresa y el Capital Privados en los Servicios de Agua y Saneamiento en Latinoamérica y África; A la Búsqueda de la Sustentabilidad Económica, Social, y Ambiental" Un Debate Sobre los Principales Hallazgos de la Investigación. Escuela de Geografía y Medioambiente, Universidad de Oxford, Reino Unido. http://users.ox.ac.uk/~prinwass/

Chávez, Guillermo and Regina Martínez (2000). "Aspectos jurídicos de la gestión del agua por cuenca hidrológica en México. OMM/CNA/PROMMA/CCC. Geneva, Switzerland, and Mexico DF, Mexico, 2000.

Celedón Cariola, Eugenio and María Angélica Alegría (2004). Análisis del Proceso de Privatización de los Sistemas de Agua Potable y Saneamiento Urbanos en Chile. REGA, Revista de Gestión del Agua en América Latina. Vol. 1, No. 2. Jul/Dic 2004, pp 65-85. GWP South America. Santiago, Chile, 2004.

CIA, (2005). "The World Fact Book" (http://www.odci.gov/cia/publications/factbook/index.html). US Central Intelligence Agency. Washington D. C. 2005.

Civil Engineering (2005). "Water Financing Bill Faces Lingering Hurdles in Senate". The Magazine of the American Society of Civil Engineers. Vol. 75, No. 9. September 2005. http://www.pubs.asce.org

Cline, Sarah A., M. Rosegrant, and C. Ringler (2004). "The Role of Water Rights and Market Approaches to Water Quality Management in the Americas". Presentation at the TWCWRM/ANA/IDB Workshop on Water Quality Management for the Americas, Fortaleza, Brazil, 12-13 April 2004. Proceedings in press.

CNA (2002). Programa Hidráulico Región XIII Aguas del Valle de México y Cutzamala. Comisión Nacional del Agua. México, 2002.

CNA (2005). Statistics of the National Water Commission, Mexico DF, Mexico. 2005. http://www.cna.gob.mx

CN/RCA (2005). Aportes y Observaciones de las Organizaciones Sociales al Documento Regional de Las Américas. Proceso Preparatorio del Componente de Sociedad Civil del Comité Operativo de Las Américas. Consultative Network/Regional Comité of the Americas, Buenos Aires, San Salvador, México. 2005.

Corrales, María Elena (2003). "Gobernabilidad de los servicios de agua potable y saneamiento en América Latina". Comité Asesor Técnico de América del Sur (SAMTAC), GWP. http://www.gwpsamtac.org

Day of the Americas Organizing Committee (2003). "Día de Las Américas, Resúmenes. Tercer Foro Mundial del Agua, Kyoto, Japón, 19 de Marzo del 2003".San José, Costa Rica, 2003.

De Azevedo, Luiz Gabriel T. and Alexandre Moreira Baltar (2000). "The World Bank and Dams in Latin America". IWRA/IDB Dams, Development, and Environment. São Paulo, Brazil, 2000.

De Ford, Federico Valerio (2005). Implicaciones del Tratado de Libre Comercio Centroamérica-Estados Unidos Sobre el Recurso Hídrico y la Prestación de Servicios. Global Water Partnership Centro América, San José, Costa Rica, 2005.

Donoso, Guillermo (2004). "Water Quality Management in Chile: A Proposal Focusing on the Use of Economic Instruments". Presentation at the TWCWRM/ANA/IDB Workshop on Water Quality Management for the Americas, Fortaleza, Brazil, 12-13 April 2004. Proceedings in press.

Dourojeanni, Axel and Andrei Jouravlev (2002). "Evolución de políticas hídricas en América Latina y el Caribe". ECLAC Serie recursos naturales e infraestructura No. 51, LC/L.1826-P (http://www.eclac.cl). Santiago, Chile, 2002.

Dourojeanni, Axel, Andrei Jouravlev, and Guillermo Chávez (2002). "Gestión del agua a nivel de cuencas: teoría y práctica". ECLAC Serie recursos naturales e infraestructura No. 47, LC/L.1777-P (http://www.eclac.cl). Santiago, Chile, 2002.

Easter, K. William and R. Johansson (2004). "The Effectiveness of Market Approaches to Water Quality management". Presentation at the TWCWRM/ANA/IDB Workshop on Water Quality Management for the Americas, Fortaleza, Brazil, 12-13 April 2004. Proceedings in press.

ECLAC (1998). "Recomendaciones de las reuniones internacionales sobre el agua: de Mar de Plata a París". LC/R.1865 (http://www.eclac.cl) . Santiago, Chile 1998.

ECLAC (1999). "Tendencias Actuales de la Gestión del Agua en América Latina y El Caribe". LC/L.1180 (http://www.eclac.cl),Santiago, Chile 1999.

ECLAC, (2004). Statistical Yearbook for Latin America for Latin America and the Caribbean (http://www.eclac.cl/cgi-bin/getProd.asp?xml=/publicaciones/xml/1/21231/P21231.xml&xsl=/deype/tpl-i/p9f.xsl&base=/tpl-i/top-bottom.xsl). UN Economic Commission for Latin America and the Caribbean. Santiago, Chile. 2005.

ECLAC/IDB (2000). "A matter of development: How to Reduce Vulnerability in the Face of Natural Disasters". LC/MEX/L.428, México, DF, México, 2000.

Environment Canada (2005). Text of the 1987 Federal Water Policy. http://www.ec.gc.ca/water/en/info/pubs/fedpol/e_fedpol.htm

EOS (2005). "Are Natural Hazards and Disaster Losses in the U.S. Increasing?". Transactions, American Geophysical Union, Vol. 86, No. 14, 11 October 2005. Washington, DC. http:///www.agu.org/pubs/eos

Escobar, Jairo (2002). "La contaminación de los ríos y sus efectos en las áreas costeras y del mar". ECLAC Serie recursos naturales e infraestructura No. 50, LC/L.1799-P (http://www.eclac.cl). Santiago, Chile, 2002.

FAO (2000). "Irrigation Latin America and the Caribbean in Figures". Water reports # 20. UN Food and Agriculture Organization. Rome, Italy. 2000.

FAO (2002). Land-Water Linkages in Rural Watersheds Electronic Workshop. UN Food and Agriculture Organization, Rome, 2000.

FAO (2003). "Review of World Water Resources by Country". Water reports # 23. UN Food and Agriculture Organization. Rome, Italy. 2003.

FAO. AQUASTAT (2000). Information System on Water and Agriculture. 2000. http://www.fao.org/ag/agl/aglw/aquastat/regions/lac/print6.stm

FAO. AQUASTAT (2004). Information System on Water and Agriculture. 2004. http://www.fao.org/ag/agl/aglw/aquastat/regions/lac/print6.stm

FAO. AQUASTAT (2005). Information System on Water and Agriculture. 2005. http://www.fao.org/ag/agl/aglw/aquastat/regions/lac/print6.stm

Ferreira Carneiro, Paulo Roberto (2004). Água e Conflito na Baixada dos Goytacazes. REGA, Revista de Gestión del Agua en América Latina. Vol. 1, No. 2. Jul/Dic 2004, pp 87-100. GWP South America. Santiago, Chile, 2004.

Flay, Randolph B. & Narasimhan, T. N. (2005). Centralized versus Decentralized Approaches to Groundwater Management in the Western United States: How Hydrogeologic and Political Forces Shape Management (http://www.waterscape.org/documentsindex.htm). Waterscape International Group.2005.

Flows-News on Payment for Watershed Services (2005), "Review: Payments for Watershed Services and the myth of simple solutions". World Bank International Institute for Environment and Development and Bank Netherlands Watershed Partnership (Flows@flowsonline.net), 2005.

García, Luis E. (2003). "Institutional Framework for Integrated Water Resources Management in Latin America, Some Experiences from the Inter-American Development Bank", in Water Policies and Institutions, C. Tortajada, B. Braga, A. Biswas and L. García, editors. Water Resources Management Series, Oxford University Press, New Delhi 2003.

García, Luis E. and Ricardo Quiroga (2002). "Consideraciones Institucionales para Abordar Bienes Públicos Regionales: Programa Trinacional de Desarrollo Sostenible de la Cuenca Alta del Río Lempa". Regional Public Goods & Regional Development Assistance Conference 2002. IDB/ADB/USAID. Washington, D.C. 2002. http://www.iadb.org

García, Luis E., Diego J. Rodríguez and Felipe Albertani (2004). "Contribution of Water Resources Development to Regional Development: Case Studies from Latin America", in Water as a Focus for Regional Development, A.K. Biswas, O. Ünver and C. Tortajada, editors. Water Resources Management Series, Oxford University Press, New Delhi 2004.

García, Luis E., Enrique Aguilar and Salvador Parrado (2005). "Gestión Integrada de Recursos Hídricos, Documento Conceptual". Informe OMM/PROMMA No. S/N, Actividad GPH 01/2004. Comisión Nacional del Agua, México DF, México, 2005.

Garduño, (2004). Administración del Agua. Curso sobre Gestión Integrada de Recursos Hídricos. World Bank Institute – BID-GWP. San José, Costa Rica, 24-18 de Mayo, 2004.

Gentes, Indigo (2001a). "Derecho al agua de los pueblos indígenas en América Latina". ECLAC Serie recursos naturales e infraestructura No. 38, LC/L.1673-PI (http://www.eclac.cl). Santiago, Chile, 2001.

Gentes, Indigo (2001b). "Derecho al agua de los pueblos indígenas en América Latina". Documento original. ECLAC (http://www.eclac.cl), Santiago, Chile, 2001.

Gleick, Peter (2002). "The World's Water; The Biennial Report on Freshwater Resources 2002-2003". Island Press, Washington, D.C. 2002.

GWP (2000). "Framework for Action: Responding to the Forum (post Hague report)". GWP, Stockholm, Sweden, 2000. (http://www.gwpforum.org).

GWP (2004). "Current Status of National Efforts to Move Towards Sustainable Water Management Using an IWRM Approach. Informal Stakeholder Baseline Survey". GWP Stockholm, Sweden, and Oslo, Norway, 2004.

GWP, JICA, CCAD, MINAE ?(2004). Memoria; Foro Centroamericano del Agua: Avances, Retos y Desafíos para una Gestión Integrada. Hacia el IV Foro Mundial del Agua. San Salvador, El Salvador, 2004. http://www.gwpcentroamerica.org

Hayward, Becky, editor (2005). "From the mountain to the tap: how land use and water management can work for the rural poor". United Kingdom Department for International Development (DFID), Forestry Research Programme, and University of Newcastle upon Tyne (http://www.frp.uk.com) . Rowe the Printers, UK, 2005.

Hutton, Guy and Laurence Haller (2004). Evaluation of the Costs and Benefits of Water and Sanitation Improvements at the Global Level. Water, Sanitation and Health, Protection of the Human Environment, World Health Organization, Geneva, Switzerland, 2004.

ICOLD (1998). International Commission on Large Dams. 1998.

IDB (1998). "Coastal and Marine Resources Management in Latin America and the Caribbean" IDB No. ENV-129. Washington, D.C. 1998(http://www.iadb.org).

IDB (2005). "Water and the Millennium Development Goals; investment needs in Latin America and the Caribbean". IDB, Washington, D.C., 2005 (http://www.iadb.org).

IGRAC (2005). Data Processing of the Inventory of Transboundary Aquifers of the Americas. IGRAC for UNESCO/OAS ISARM Americas Programme, November 2005. (http://www.igrac.nl)

International Network of Basin Organizations (2005). The Network Newsletter, No. 13. Paris. December 2004-January 2005 (http://www.inbo-news.org).

IRN (2004). http://www.irn.org/programs/meso

IWRA (2003). "Meeting Furure Water Needs: a Reality Check". Proposal for Session FINA06, 3rd Forum, Kyoto, Japan, March 20, 2003.

Jouralvlev, Andrei (2003). "Los municipios y la gestión de los recursos hídricos". ECLAC Serie recursos naturales e infraestructura No. 66, LC/L.2003-P (http://www.eclac.cl). Santiago, Chile, 2003.

Jouravlev, Andrei (2001). "Administración del agua en América Latina y el Caribe en el umbral del siglo XXI". ECLAC Serie recursos naturales e infraestructura No. 27, LC/L1564P (http://www.eclac.cl). Santiago, Chile, 2001.

Jouravlev, Andrei (2004). "Los servicios de agua potable y saneamiento en el umbral del siglo XXI". ECLAC Serie recursos naturales e infraestructura No. 74, LC/L.2169-P (http://www.eclac.cl). Santiago, Chile, 2004.

Koundouri, P., et al. (2003). "Economics of Water Management in Developing Countries: Problems, Principles and Policies". Cheltenham, UK.

Landell-Mills, N. and I. T. Porras (2002). "Silver bullet of fools'gold? A global review of markets for forest environmental services and their impact on the poor". London, International Institute for Environment and Development.

Lee, Terence (1990). "Water Resources Management in Latin America and the Caribbean". Studies in Water Policy and Managemnent, No. 16, Westview Press. ISBN 0-81330-7999-7.

Lentini, Emilio (2004). La Regulación de los Servicios de Agua y Saneamiento: El Caso de la Concesión de Buenos Aires. REGA, Revista de Gestión del Agua en América Latina. Vol. 1, No. 2. Jul/Dic 2004, pp 11-24. GWP South America. Santiago, Chile, 2004.

Limaye, Shrikant (2005). "IWRM: Easy to Talk About, Hard to Implement". Water Front, No. 2, June 2005. Stockholm, Sweden 2005.

Llop, Armando (2005). "La Gestión de los Recursos Hídricos en Argentina". Comunicación personal.

Llop, Armando (2005a). "Marcos Legales e Institucionales para la Gestión de los Recursos Hídricos y El Uso del Agua en la Agricultura". Comunicación personal.

Llop, Armando (2005b). "La Regulación de los Servicios de Agua Potable y Saneamiento". CELA. INA. Mendoza, Argentina.

López, Alexander, editor (2002). "Conflicto y cooperación ambiental en cuencas internacionales centroamericanas: repensando la soberanía nacional". Universidad de Costa Rica, Funpadem, Universidad Nacional, Fundación Kukulkán. San José, Costa Rica, 2002.

Lundqvist, Jan and Malin Falkenmark (1999). "Towards Upstream/Downstream Hydrosolidarity". Proceedings of Seminar Towards Upstream/Downstream Hydrosolidarity, SIWI, Stockholm, Sweden, 1999.

Mann, Howard (2005). The Final Decision in Methanex v. United States: Some New Wine in Some New Bottles. International Institute for Sustainable Development. Winnipeg, Canada. 2005. (http://www.iisd.org)

Miletto, Michela (2005). OAS, Personal communication.

Mora Portuguez, Jorge (2004). "Acciones y Proyectos Realizados por la Red Centroamericana de Acción del Agua (FAN-CA)". Project profiles submitted to the OCA for the 4th Forum. San José, Costa Rica 2004.

NOAA (2003). "North American Drought: A Paleo Perspective" http://www.ncdc.noaa.gov/paleo/drought/drght_home.html

NOAA (2005). "Billion Dollar U.S. Weather Disasters" (http://lwf.ncdc.noaa.gov/oa/reports/billionz.html)

NOAA/WMO/IDB (2003). "The Benefits and Costs of an El Niño Southern Oscillation (ENSO) Early Warning Systsem in Mexican Agriculture". Study on the Prediction and Amelioration of Socioeconomic Impacts of El Niño/Southern Oscillation (ENSO) in Latin America and the Caribbean, Final Report,Annex III, Vol. II. WMO/IDB ATN/JF-6579-RG. Geneva, Switzwerland, 2003 (http://www.wmo.ch).

O'Connor, M. (2000). "Pathways for environmental evaluation: a walk in the (Hanging) Gardens of Babylon." Ecological Economics 34(2): 175-194.

OECD (2003). "Perverse Incentives in Biodiversity Loss". Working Party on Global and Structural Policies; Working Group on Economic Aspects of Biodiversity. ENV/EPOC/GSP/BIO(2003)2/FINAL.

OECS (2004). "Grenada: Macro-Socio-Economic Assessment of the damages caused by Hurricane Ivan, September 7, 2004". OECS/ECLAC report to the World Bank. 2004. http://www-wds.worldbank.org/servlet/WDS_IBank_Servlet?pcont=details&eid=000012009_20041105094109

OLADE (2003). (http://www.olade.org)

Orozco, Randall Marín (2001). "Competencias Municipales en Materia Ambiental". Ensayos No. 1, mayo, IFAM, 2001 (http://www.ifam.go.cr/publish/article_263.html).

PAHO (2001). "Informe Regional sobre la Evaluación 2000 en la Región de las Américas. Agua potable y saneamiento, estado actual y perspectivas" (http://www.bvsde.ops-oms.org/cepis/e/bvsaas.php). Pan-American Health Organization. Lima, Peru. 2001.

PAHO (2001). "Informe regional sobre la evaluación 2000 en la región de las Américas: agua potable y saneamiento, estado actual y perspectivas". Washington, D.C., 2001.

PAHO-CEPIS (2005). Opinión Sobre el Documento "Recommendations for Decision-Making on Basic Sanitation and Municipal Wastewater Services in Latin America and the Caribbean", Final Draft, developed by SararTransformación S.C., Versión 1.1, June 8, 2003. Sergio Rolim Mendonça and Julio Moscoso Cavallini.

Peña, Humberto (2003). "Gestión Integrada de Recursos Hídricos en Chile. Marco Conceptual". Taller Nacional Hacia Un Plan Nacional de Gestión Integrada de los Recursos Hídricos. Santiago, Chile, 2003.

Peña, Humberto (2005). "Estado de la Política Hídrica y Gestión del Agua. Caso Chile". Presentation at the III Simposio de Recursos Hídricos del Cono Sur, Mendoza, Argentina 2005.

Pilar, Jorge V., E. M. Mendiondo, and A. E. Lanna (2001). "Un Modelo de Seguro Agrícola para a Gestão de Riscos na Agricultura em Sequeiro". ABRH, Porto Alegre, Brazil, 2001.

Pochat, Víctor (2005). Entidades de Gestión del Agua a Nivel de Cuencas: Experiencia Argentina. Serie Recursos Naturales e Infraestructura, No. 96. CEPAL, Santiago, Chile. 2005.

Porto, Mônica and Francisco Lobato (2004). Mechanisms of Water Management: Economics Instruments and Voluntary Adherente Mechanisms (Part 2 of 2). REGA, Revista de Gestión

del Agua en América Latina. Vol. 1, No. 2. Jul/Dic 2004, pp 131-146. GWP South America. Santiago, Chile, 2004.

Porto, M., R. L. Porto, et al. (1999). "A Participatory Approach to Watershed Management: The Brazilian System." Journal of the American Water Resources Association 35(3): 675-684.

Querol, María (2003). "Estudio sobre los convenios y acuerdos de cooperación entre los países de América Latina y el Caribe, en relación con sistemas hídricos y cuerpos de agua transfronterizos". ECLAC Serie recursos naturales e infraestructura No. 64, LC/L.2002-P (http://www.eclac.cl). Santiago, Chile, 2002.

Rodríguez, Diego (2005). "Año 2015: América Latina cumple con los objetivos del milenio en agua potable y saneamiento: Mito o realidad". Artículo preparado para el BID. Washington, D.C. 2005.

Russell, Cliford S. and Christopher D. Clark (2006). "Economic Instruments and Nonpoint Source Water Pollution", Water Quality Management in the Americas. A.K. Biswas, C. Tortajada, B. Baraga, and D. Rodríguez, editors. Springer-Verlag, The Netherlands, 2006.

Siles, Jackie, L. Aguilar and S. Lara (2005). "Manejo de Cuencas Hidrográficas. El género hace la diferencia". UICN-Género y Ambiente (http://www.generoyambiente.org).

Skees, Jerry R., and A. J. Leiva (2005). "Analysis of Risk Instruments in the Irrigation Sub-sector in Mexico". Final Report from GlobalAgRisk submitted to the IDB-Netherlands Water Partnership Program (INWAP). Kentucky 2005.

Solanes, Miguel (2005). Efficiency, Equito and Liberalization of Water Services in Buenos Aires, Argentina. Paper presented at the Service Expert meeting-Joint OECD and World Bank, Paris, France, 3-4 Febryary 2005.

Solanes, Miguel, Luis García and Harmut Bruehl (2004). Reporte Reunión Sobre Planificación y Gestión Integrada de Aguas". Reunión de Buenos Aires, BID-CEPAL-GWP, Julio 2004. ECLAC/ GWP-SAMTAC, Santiago, Chile 2004.

Stranger, Sigrid and A. Chechilnitzky (2003). "Informe sobre el abastecimiento de agua potable y saneamiento y la gestión de los servicios sanitarios en Chile". Taller Nacional Hacia un Plan Nacional de Gestión Integrada de los Recursos Hídricos. Santiago, Chile, 2003.

Sunman, Hilary (2002). "Opciones y Retos Para el Financiamiento del Sector Hídrico en América Latina y el Caribe". Anales del Seminario sobre temas estratégicos del agua en América Latina y el Caribe. Agenda para la acción, Fortaleza, Brazil, March 2002. Washington, D.C., 2002 (http://www.iadb.org).

Thaxton, Melissa, L. Aguilar, J. Siles, and S. Lara (2005). "Agua. El género hace la diferencia". UICN-Género y Ambiente (http://www.generoyambiente.org).

Thurnhofer, Manuel (2005). Agencia Suiza para el Desarrollo y la Cooperación (COSUDE), Asesor Regional en Agua y Saneamiento para América Central, Programa AGUASAN-COSUDE, A.C., Managua, Nicaragua. Personal Communication. 2005.

Tognetti, Sylvia S., G. Mendoza, B. Aylward, D. Southgate, and L. García (2004). "A Knowledge and Assessment Guide to Support the Development of Payment Arrangements for Watershed Ecosystem Services (PWES)". Prepared for the World Bank Environment Department with support from the Bank-Netherlands Watershed Partnership Program. Washington, D.C., 2004.

Tognetti, Sylvia S., G. Mendoza, D. Southgate, B. Aylward, and L. García (2003). "Assessing the Effectiveness of Payment Arrangements for Watershed Ecosystem Services (PWES)". Paper presented at the Third latin American Congress on Watershed Management, Regional Forum on Payments for Environmental Services. Arequipa, Perú, 2003.

UN Habitat (2005a). "Responding to the Challenges of an urbanizing World: UN Habitat Annual report 2005 (www.unhabitat.org). United Nations Human Settlements Programme. Nairobi, Kenya. 2005.

UN Habitat, (2005). Water and Sanitation in the World's Cities: Local Action for Global Goals (www.unhabitat.org). United Nations Human Settlements Programme. Nairobi, Kenya. 2005.

UNDP (1994). "Statements and Recommendations from Major International Meetings on Water Resources, Water Supply and Sanitation". New York, 1994.

UNDP (2005). "Human Development Indicators" (http://hdr.undp.org/reports/global/2003/pdf/hdr03_HDI.pdf). UN Development Program. New York. 2005

UNEP (2003). "Recommendations for Decision-Making on Basic Sanitation and Municipal Wastewater Services in Latin America and the Caribbean", Ronald Sawyer, Andrés Buenfil Friedman and Anne Delmaire. Final Draft, Working document developed by SararTransformación S.C., Versión 1.1, June 8, 2003.

Van Noordwijk, Meine and F. Agus (2004). "Dam-busting forest, water myth-understandings". World Agroforestry Centre (http://www.worldagroforestry.org) Bogor, Indonesia Regional Centre, 2004.

Vaughan, Scott (2003). "Privatization, trade policy, and the question of water". Iddri Seminars, No. 9. Paris, France, 2003.

Vaughan, Scott (2005). OAS. Personal comunnication.

Vaughan, Scott (2005b). OAS. Personal communication.

Vosti, Stephen, R.L. Harris, and M. Glave (2003). "Socio-economic Vulnerability Analysis of ENSO in Latin America and the Caribbean; An Overview of Results and Policy Implications". Study on the Prediction and Amelioration of Socioeconomic Impacts of El Niño/Southern Oscillation (ENSO) in Latin America and the Caribbean, Final Report,Annex II, Vol. II. WMO/IDB ATN/JF-6579-RG. Geneva, Switzwerland, 2003 (http://www.wmo.ch).

WCD (2000). "Dams and Development, a New Framework for Decision-Making". World Commission on Dams. Earthscan Publications, UK and USA, 2000.

WHO/UNICEF (2000). "Evaluación Mundial del Abastecimiento de Agua y el Saneamiento en 2000". (http://www.who.int/docstore/water_sanitation_health/Globassessment/GlasspdfTOCspan.htm)

WMO/IDB (2003). Study on the Prediction and Amelioration of Socioeconomic Impacts of El Niño/Southern Oscillation (ENSO) in Latin America and the Caribbean, Final Report. WMO/IDB ATN/JF-6579-RG. Geneva, Switzwerland, 2003 (http://www.wmo.ch).

World Bank (2000). "Statistics of the World Bank Portfolio". http://www.worldbank.org/html/extdr/pb/dams/factsheet.htm

World Bank (2005). "Infrastructure and the World Bank: a Progress Report". Infrastructure Vice-Presidency, World Bank, Washington, D.C. 2005. http://www.worldbank.org

World Bank 2005. "World Development Indicators (2005)" (http://www.worldbank.org/data/wdi2005/index.html). The World Bank. Washington, D.C., 2005.

World Resources Institute (2005). "Earth Trends: The Environmental Information Portal" (http://earthtrends.wri.org/index.cfm). Washington D. C., 2005.

WRI (2002). "Recursos Mundiales 2002. La guía global del planeta". WRI/UNDP/UNEP/World Bank/IDB. Washington, D.C., 2002 (http://www.wri.org).

WRI and WWI (1998). "Watersheds of the World"; Ecological Value and Vulnerability". WRI/WWI, Washington, D.C. 1998.

World Water Forum (2003). Águas, Cidades e Florestas: A Importância das Áreas Forestais Protegidas Para Suprimento de Água nas Cidades. Brasilia 2003, pp 64-68.

ANNEXES

ANNEX 1

1.1 List of preparatory meetings

OPERATIVE COMMITTEE

DATE	MEETING	OBJECTIVE
10/28/2004	Mexico City, National Water Commission.	Installation of the Operative Committee.
02/23/2005	Mexico City. Thematic and Regional Beacons Meeting.	Review and editing of the Operative Committee structure. Review the activity matrix. Review the criteria and or guidelines for the organization of local workshops and regional meetings. Review the progress in selecting and financing local projects. Discussion of the role and responsibility of the multilateral agencies as OAS, IADB and WB. Consulting Network of the Americas.
04/18/2005	New York. XIII UN CSD Meeting.	Conformation of the Consulting Network. Definition of the local initiatives selection criteria. Financial resources for the preparatory process of the Americas. Revision of the regional preparatory events. Definition of criteria for the preparatory events
06/28/2005	Tabasco, Mexico. International Conference of Water: "Growing water for the future".	Presentation of advances from the different representatives of the OCA. Review and discussion about the following preparatory events. Discussion of the local initiatives criteria, death lines and establishment of a selection committee. Financial resources for the Preparatory process. Logistic aspects during the Forum. Transfer of the Coordination of the OCA from GWP to OAS.
07/27/2005	Washington D.C. Meeting hosted by the World Bank	Follow up. Regional Document. Participation of Civil Society Themes and Sessions for OCA at the 4th World Water Forum

CONSULTATIVE NETWORK

DATE	MEETING
11/18/05 – 11/19/05	Buenos Aires, Argentina
11/25/05 – 11/26/05	San Salvador, El Salvador
11/29/05 – 11/30/05	Mexico City, Mexico

PARTICIPANTS

4th World Water Forum Secretariat, World Water Council, WWC, Global water Partnership, GWP, Organization of American States, OAS, US Department of State, Ministry of the Environment, Brazil, Mexico's Water Advisory Council, Mexico's Ministry of Foreign Affairs, Mexico's National Water Commission.

Luis García, Advisor of the 4th Forum Secretariat/ **Maureen Ballestero,** GWP/ **Enrique Aguilar,** Consultant/ **Scott Vaughan,** OAS/ **María Apostolova,** OAS/ **Stephen Bender,** OAS/ **Abel Mejía,** World Bank/ **Carolina Urrutia,** World Bank/ **Eduardo Vázquez,** Water Advisory Council/ **Mariana Mazón,** Water Advisory Council/ **Salomón Abedrop,** ANEAS/ **Roberto Olivares,** ANEAS/ **Alejandra Salazar,** FANCA/ **Jorge Mora Portuguez,** FANCA/ **Manuel D'Argence García,** Government of Tabasco/ **Yolanda Osuna,** Government of Tabasco/ **Jerome Delli Priscoli,** US Army Corps of Engineers/ **Kenneth Reid,** AWRA/ **Diego Masera,** UNDP/ **Cristobal Jaime,** CNA/ **César Herrera,** CNA/ **Ricardo Martínez,** CNA/ **José Antonio Moreno,** CNA/ **Juan Carlos Valencia,** CNA/ **Virginia Ugalde,** CNA/ **George Alcalá,** US Army Corps of Engineers/ **Rina Mussali,** CNA.

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Satoshi Ojima, 44th Forum Secretariat, **Manuel D'Argence García,** Tabasco Government, **Yolanda Osuna,** Tabasco Government, **José Antonio Moreno,** 4th Forum Secretariat, **María Apostolova,** OAS, **Mariana Mazón,** Water Advisory Council/ **George Alcalá,** US Army Corps of Engineers/ **Roberto Olivares,** ANEAS/ **Boris Graizbord,** Colegio de LEAD Program/ **Raúl Mendoza Justo,** FAN-Mexico/ **Salomón Abedrop,** ANEAS/ **Rafael Maldonado,** CALAS, FANCA/ México, **Jorge Mora Portuguez,** FANCA/ **Graciela T. de Cobo,** Tabasco Government/ **José Antonio Rodríguez,** CNA/ **María Isabel Badillo,** CNA/ **Maureen Ballestero,** GWP/ **Marianela Argüello,** GWP/ **Ursula Oswald Spring,** CLAIP/ UNAM/**Cecilia Martínez Leal,** ONU-HABITAT/ **Carlos Valdez Mariscal,** SEDSOL-DGEIZUM/ **Rémi Rusquin,** CIMA/ **Raúl Hernández García,** Alternativas-Agua para Siembre/ **Diane Tate,** U.S. Government/ **Shelley Mc Milland,** World Bank/ **Victor Pliego V,** Colegio Arquitectos/ **Cristóbal Jaime Jáquez,** CNA/ **Alejandro Alva Martínez,** Red de Cuerpos de Agua, FANCA.

4th World Water Forum Secretariat, GWP-CA, GWP-SA, OAS, IDB, World Bank

1.2 List of participants in the preparatory meetings of the Civil Society Organizations

NOVEMBER 2005

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1.3 Operative Committee of the Americas

program of preparatory events and meetings for the IV Forum

#	EVENT	PLACE AND DATE
	Events and Meetings Held	
1	Seminario de Políticas Públicas de Recursos Hídricos	Brasilia, Brasil, Septiembre 2004
2	Evaluación Ambiental Estratégica, Licenciamiento y Salvaguarda	Brasil, Noviembre 2004
3	Foro Centroamericano del Agua	El Salvador, 30 nov. 1, 2 y 3 de diciembre 2004
4	Foro Social de Brasil	Porto Alegre, Brasil, enero 2005
5	Conferencia sobre Humedales de Alta Montaña en los Andes Tropicales	Bogotá, Colombia febrero, 2005
6	V Reunión de la Conferencia de Directores Generales Iberoamericanos del Agua	Cartagena de Indias, (Colombia) los días 14 y 15 de junio, 2005
7	Reunión preparatoria para la Reunión Ministerial de Medio Ambiente y Salud de las Américas (MiSAMA) y Reunión Interministerial sobre Objetivos de Desarrollo del Milenio en Salud y Ambiente.	Argentina, 15 al 18 de junio 2005
9	Conferencia de Aguas Internacionales del GEF	Salvador, Brasil. 19-26 junio 2005
11	Taller Capacitación para Periodistas	Ciudad Valles, San Luis Potosí, México, 22 y 23 de junio de 2005
12	Primer Foro Municipal Latinoamericano del Agua: "Gestionando el Agua Localmente"	Ciudad Valles, San Luis Potosí, México, 23 y 24 de junio de 2005
13	Conferencia Internacional del Agua	Villahermosa, Tabasco, México, 28, 29 y 30 de junio 2005
14	Convención Anual de ANEAS	Puebla, México 3, 4 y 5 de agosto de 2005
15	Reunión Regional Preparatoria hacia el IV Foro. (Sudamérica)	Sao Paulo, Brasil, 1, 2 y 3 de setiembre 2005
16	Foro de Ministros de Medio Ambiente de América (PNUMA)	Venezuela, setiembre 2005 (en que ciudad)
17	Evento Cubano Local hacia el IV Foro	La Habana, Cuba, Setiembre 2005 (en que ciudad)

OBJECTIVE	ORGANIZER	CONTACT (Telephone, e-mail)
Documento de la Posición de las Américas (Memorias en Elaboración)	BID y SAMTAC	María Elena Zúñiga (Chile) Tel: 532-210-2164 Correo electrónico: gwpsamtac@eclac.cl
Insumos para los temas de Medio Ambiente y GIRH	Banco Mundial	
Estudios de caso, compromisos para talleres locales, primer borrador de una posición centroamericana (memorias en elaboración)	GWP-CATAC	Maureen Ballestero Tel: (506) 666-1596 Fax: (506) 666-2967 correo electrónico: tempis@racsa.co.cr
Participación de organizaciones sociales en el Foro Mundial del Agua. (memoria en elaboración)	FANCA	Jorge Mora Portuguéz Tel: (506) 280-1530 (506) 283-6461 Fax: (506) 281-3290 Correo electrónico: jmorapo@racsa.co.cr
Insumos para los temas Agua, Alimentación y Medio Ambiente, estudios de caso y mejores prácticas dentro del enfoque de ecosistemas.	Banco Mundial	
Información, participación agencias nacionales de agua de los gobiernos de los países de Ibero América. Estudios de caso, mejores prácticas. Presentar el Foro y el proceso de las Américas.	Secretariado	
Declaración Ministerial, insumo para tema de Agua y Saneamiento y Agua y Desarrollo. (PNUMA-OEA)	PNUMA y OEA	Oscar Ceville Tel: 202-458-6455 Fax: 202-458-3560 Correo electrónico: oceville@oas.org
Estudios de caso, mejores prácticas, intercambio con otras regiones. Contar con un espacio para presentar el Foro y el proceso de las Américas (OEA)	OEA presenta y trae insumos. También será atendida por Ben Braga	
Información, participación y capacitación de periodistas mexicanos y del Continente y promoción y acercamiento a los temas del IV Foro Mundial del Agua	WWC/4th Forum	Ulrike Kelm Tel: (52) 55 51 7440 00 ext 1124 Fax: (52) 55 51 74 40 61 Correo electrónico: ulrike.kelm@cna.gob.mx
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Gobierno de Tabasco, México. Primera presentación de Proyectos. Cuarta reunión del Comité Operativo (28). Se presentarán los resultados de los eventos en los que se haya participado	Gobierno de Tabasco Comité Operativo	Manuel D'argence Tel: 00-52-993-313-3690 Correo electrónico: mdargence@sedespa.gob.mx Maureen Ballestero Tel: (506) 666-1596 Fax: (506) 666-2967 Correo Electrónico: tempis@racsa.co.cr
ANEAS	ANEAS	Roberto Olivares Tel/Fax: 01 (55) 5543 66 00 / 05 Correo Electrónico: aneas@aneas.com.mx
Posibilitar la participación de las organizaciones sociales del continente americano en el proceso del IV Foro, generando espacios de encuentro que permitan canalizar las propuestas, planteamientos e iniciativas de la sociedad civil.	FAN	Ninon Machado Tel: 55 21 81 68 00 11 Fax: 55 21 25 27 87 Correo Electrónico: ipanemasede@yahoo.com.br
Declaración Ministerial, insumo para tema de Agua y Saneamiento y GIRH. (PNUMA invita y solicita un espacio en agenda)	PNUMA	
Aportes locales. Experiencias. Promoción e información	Gisel Pérez Wong	Gisel Pérez Wong Tel: 0537-8705571 al 79 ext 154 y 194 / 0537-8796787 Correo electrónico: gisel@hidro.cu

#	EVENT	PLACE AND DATE
18	3era Reunión Ministerial para autoridades nacionales responsables en políticas de descentralización, gobiernos locales y participación pública	Washington, EUA, setiembre 2005
19	Reunión JICA en El Caribe	Setiembre 2005
20	International Forum on the Plata Basin. FAO, UNESCO, Green Cross	Itaipú, Brasil, 6, 7, 8 y 9 de setiembre 2005
	Other Events and Meetings	
21	Curso Internacional Instrumentos Económicos para la Gestión Integrada de los Recursos Hídricos (GIRH)	Jiutepec, Morelos, México, 3 a 7 de octubre, 2005
22	Foro Acuerdos de Transparencia en la Contratación para el Sector de Agua Potable y Saneamiento Básico Ambiental	Santa Marta, Magdalena, Colombia, 6 de Octubre 2005
23	V Diálogo Interamericano de gestión del Agua	Montego Bay, Jamaica, 9-14 octubre 2005
24	Taller Interamericano sobre la Participación Ciudadana en el Uso Sustentable del Agua	Sedes Alternas de Lagunas, Oaxaca 23 al 25 de Octubre y Oaxaca, 26 al 28 de Octubre, 2005 (Oaxaca, Oaxaca, México)
25	XXIV Congreso CA de Ingeniería Sanitaria y Ambiental. VII Congreso Nacional de Recursos Hídricos, Ingeniería Hidráulica y Ambiental	San José, Costa Rica, 25 al 29 de Octubre, 2005
26	Conferencia Internacional sobre Desalación de Agua para México	Cd. de México, México, 26, 27 y 28 de Octubre de 2005
27	Cumbre de las Américas	Buenos Aires, Argentina, 4 y 5 de noviembre 2005
28	Conferencia Internacional "De la Acción Local a las Metas Globales"	Cali, Colombia, Octubre 31 y Noviembre 4, 2005
30	Reunión final del proceso preparatorio de las Américas, en el marco de la reunión de cierre de las regiones	Monterrey, Nuevo León, México, noviembre 2005
31	Annual Conference American Water Resources Association 2005	Seattle, Washington. 7-10 Noviembre, 2005
32	Consulta Regional sobre agua y saneamiento para ciudades de Latinoamérica y El Caribe. UN-HABITAT y Secretaría de Desarrollo Social de México	Cd. de México, 8, 9 y 10 de noviembre de 2005
33	Taller Regional Iberoamericano La Innovación Científica y Tecnológica para enfrentar los retos en materia de agua.	Jiutepec, Morelos, México, del 15 al 18 de Noviembre 2005

OBJECTIVE	ORGANIZER	CONTACT (Telephone, e-mail)
Declaración Ministerial. Consultar	OEA	
Insumo para el tema Agua para el Desarrollo	Secretariado Satoshi Ojiva	Sathoshi Ojima Tel: 52 (55) 51 74 44 80 Fax: 52 (55) 51 74 44 75 Correo electrónico: satoshi.ojima@worldwaterforum4.org.mx
Por definir.	Secretariado será el responsable pues a través de ellos se coordinó	
Contribuir al desarrollo de capacidades a través de una introducción a la GIRH y discusión acerca de los pasos para su implementación. Análsis de los principios de Dublin. Comprensión del Rol de instrumentos económicos. Conocimiento de casos y procesos actuales	IMTA, SEMARNAT, CIRA-UAEM, RIPDA-CYTED, LA-WETnet, PNUMA ROLAC, RELOC y Cap-Net, REDICA	Damián Indij Tel 54 11 47 23 39 48 Correo Electrónico: dindij@sinectis.com.ar www.la-wetnet.org
Presentar los avances en los procesos de contratación de los municipios colombianos con base en pactos de transparencia impulsados por el Gobierno Nacional y del Pacto Antisoborno suscrito entre las empresas fabricantes de tuberías de acueducto y alcantarillado.	AIDIS/ACODAL	José Fernando Cárdenas Zapata, Bibian Ximena García Martín Tel: 245-9539 Fax: 323-1408 (Colombia) Correo Electrónico: comunicaciones@acodal.org.co
Discusión de documentos base de los ejes temáticos y perspectivas transversales, insumos para el tema de GIRH e iniciativas locales. OEA-Red Interamericana de Recursos Hídricos, Sexta reunión del Comité Operativo.	OEA	Basil Fernández Tel: 01-876-927-0189 Correo electrónico: commander@mail.cwjamaica.com WEB: http://www.oas.org/usde/News/english/DialogueV/news009.htm
Iniciativas locales, información del foro, propuestas para el documento final.	CNA, Centro de Soporte Ecológico de la Costa de Oaxaca, Adalberto Noyola	Adalberto Noyola Tel: (52-55) 5623 3662 (52-55) 5622-3321 Fax: (52-55) 5646-2798 Correo Electrónico: noyola@pumas.iingen.unam.mx
Facilitar el más amplio intercambio de experiencias y conocimientos de los miembros de la Región II de AIDIS con el estado actual y las tendencias de desarrollo de la Ingeniería Sanitaria, Hidráulica y Ambiental...	ACREH, AIDIS, GWP	Yessenia Calderon (Costa Rica) Tel: (506) 256-6443 Fax: (506) 253-3717 correo electrónico: acreh@cfia.or.cr
Promover el conocimiento y las necesidades de investigación sobre desalación y los requerimientos que tendrá México en el futuro.	Universidad Nacional Autónoma de México (UNAM) Dr. Gerardo Hiriart	Gerardo Hiriart Le Bert Tel: 55 52 03 16 59 Correo electrónico: gerardo367@yahoo.com.mx
Declaración presidencial (CNA) OEA proporcionará información de apoyo	OEA, gestión para incluir tema en participación del Presidente Fox	Oscar Ceville Tel: 202-458-6455 Fax: 202-458-3560 Correo electrónico: oceville@oas.org
Espacio de discusión académica en torno al agua y a la educación. Difusión de experiencias y programas participativos	Mariela García Vargas Universidad del Valle/ CINARA/CEPIS-OPS/ UNESCO-IHS/PAS-BM, IRC	Mariela García Vargas Tel: +57 2 3392345 Fax: +57 2 3393289 Correo Electrónico: garcia_mariela@yahoo.com
Aportes del Continente	COA en pleno	Thomas Martin (AWRA) Annual Conference
Información del Foro. Discusión y estudios de caso en: usos del agua, acceso al agua, manejo integrado del agua, leyes de agua y políticas, manejo y restauración de cuencas	AWRA	Co-Chairperson Tel: 360-681-4590 Fax: 13-681-3699 Pacific Northwest National Laboratory 1529 Sequim Bay Rd. Sequim, WA 98382. Correo electrónico: thomas.martin@pnl.gov
Este evento tendrá especial énfasis en agua potable y saneamiento en áreas urbanas y en zonas de precarios, así como en el impacto sobre el desarrollo	UN HABITAT	Cecilia Martínez Leal Tel: 00 52 55 50 80 09 40 ext 57051 Correo Electrónico: cmartinez@sedesol.gob.mx
	IMTA	Alvaro Aldama Rodríguez

ANNEX 2

list of organizations represented in the Consultative Network of the Committee of the Americas

Consultative Network of the Americas
List of confirmed organizations

National Institutions=3 / Civil Society Organizations=32 / Academy=8 / Sub-regional Financing Organizations=4 / Technical Assistance Organizations= 13 / Professional Organizations= 1 / Private Sector= 3 TOTAL=63

National institutions

No	TYPE	ORGANIZATION	COUNTRY	CONTACT
1	Institución Nacional	Agencia Nacional de Agua ANA	BRASIL	BENEDITO BRAGA Director
2	Institución Nacional	Dirección Nacional de Aguas	COSTA RICA	JOSÉ MIGUEL ZELEDÓN Director
3	Institución Nacional	Instituto Nacional de Recursos Hidráulicos	CUBA	GISEL PÉREZ WONG Directora de Ciencia y Tecnología
Civil Society NGO's				
1	ONG Sociedad Civil	Alianza de Género y Agua	COLOMBIA CHILE MEXICO	MARIELA GARCIA VARGAS MARÍA ANGÉLICA ALEGRÍA DENISE SOARES Instituto Mexicano de Tecnología del Agua (IMTA)
2	ONG Sociedad Civil	Alternativas y Procesos de Participación Social AC	MEXICO	RAUL MENDOZA JUSTO Coordinación de Educación
3	ONG Sociedad Civil	Asociación Nacional de Usuarios de Riego (ANUR A.C.)	MEXICO	ARNULFO SANTIAGO PALACIOS Presidente Consejo de Admon. ALBERTO YUSO LÓPEZ Director General
4	ONG Sociedad Civil	Centro de Derecho Ambiental y Recursos Naturales (CEDARENA)	COSTA RICA	ROLANDO CASTRO Coordinador Programa GIRH
5	ONG Sociedad Civil	CENTRO HUMBOLDT	NICARAGUA NICARAGUA NICARAGUA	AMADO ORDOÑEZ Director Ejecutivo VICTOR CAMPOS Sub-Director CLEMENTE MARTÍNEZ Coordinador de Campaña Agua
6	ONG Sociedad Civil	COALICION RIOS VIVOS	BRASIL	ALEJANDRO MENEZES
7	ONG Sociedad Civil	Ecobiosfera	PANAMA	RENÉ A. CHANG Coordinador de Proyectos. Ecobiosfera

TELEPHONE	FAX	P.O. BOX	E-MAIL	OTHER
(61)-2109-5431	(61)-2109-5415	SPS Area 5 Qyadra 3 Bloco M 70610-200 Brasilia, DF	benbraga@ana.gov.br	http://www.ana.gov.br
506-281-2020	506-255-4856	Apartado: 5583-1000 San José	mzeledon@ims.ac.cr	
0537-8705571 al 79 ext 154 y 194 / 0537-8796787		Humboldt #106 esq. P., Vedado Plaza de la Revolución Habana 4 CP 10400 Ciudad La Habana, CUBA	gisel@hidro.cu	http://www.hidro.cu
00 52 777 329 3668	00 52 777 329 3668	Paseo Cuauhnauahc No 8532 Colonia Progreso 62550, Jiutepec, Morelos, México	mgarcia@univalle.edu.co maria.alegría@moptt.gov.cl dsoares@tlaloc.imta.mx	Actual Representante www.imtanet.imta.mx Trabaja con Alianza de Género y Agua en México
01 238 37 1 25 50	01 238 37 1 25 33	Vicente Guerrero 141 San Lorenzo Teotipilco. Tehuacán, Puebla. México C.P. 75 855 A. P. 306	raulmendoza@alternativas.org.mx	http://www.alternativas.org.mx
(55) 55-63-34-36 55-63-3436	(55) 56-11-96-97	Millet Número 83 Desp. 412 Col. Insurgentes Extremadura Del Benito Juarez, C.P. 03740 México D.F.	anur@cablevision.net.mx	
(506) 283-7080	(506) 224-1426	Apartado: 134-2050 San Pedro	rcastro@cedarena.org	www.cedarena.org/hidrico
			direccion@humboldt.org.ni pdessost@humboldt.org.ni	Acepta invitación por escrito y designa a los participantes Representante Centro Humboldt
(505) 249-8922 (505) 250-6454 (505) 250-6452	(505) 249-8922 (505) 250-6454 (505) 250-6452	Barrio Costa Rica, de los semáforos del Colonial, 2 cuadras Abajo y 2 cuadras al Lago Apdo Post.: 768 Managua, Nicaragua	agua@humboldt.org.ni	http://www.humboldt.org.ni
			alems@riosvivos.org.br	
(507) 229-7143	(507) 229-7142	Entrega General, Estafeta Zona 7, Plaza Concordia Panamá. Rep. de Panamá	ecobiosfera2003@yahoo.es	

	No	TYPE	ORGANIZATION	COUNTRY
8	ONG Sociedad Civil	Fideicomisos Anbientales del Istmo Centro Soporte Ecológico Costa de Oaxaca	MEXICO	CARLOS PAILLES
9	ONG Sociedad Civil	Fundación para el Desarrollo Urbano (FUDEU)	COSTA RICA	FREDDY MIRANDA Director Ejecutivo
10	ONG Sociedad Civil	Grupo para la Educación y el Manejo	PANAMA	IMA M. AVILA-Coordinadora
11	ONG Sociedad Civil	Grupo Promoción de la Agricultura Ecológica (GPAE)	NICARAGUA	MARIA LOURDES GARCÍA Facilitadora
12	ONG Sociedad Civil	Plataforma del Agua	HONDURAS	KENNETH RIVERA-Facilitador LUIS GRÁDIZ-Coordinador Nacional
13	ONG Sociedad Civil	PRONATURA A.C. / Directora General	MEXICO	SUSANA ROJAS GONZÁLEZ DE CASTILLA
14	ONG Sociedad Civil	Red Centroamericana de Instituciones de Ingeniería (REDICA)	COSTA RICA	LILLIANA ARRIETA Secretaria Técnica
15	ONG Sociedad Civil	Red de Cuerpos de Agua del Distrito Federal	MEXICO	ALEJANDRO ALVA MARTINEZ
16	ONG Sociedad Civil	RED PANTANAL Ecología e Açao (ECOA)	BRASIL	RAFAELA NICOLA Coordinadora Proyecto
17	ONG Sociedad Civil	SARAR Transformación SC	MEXICO	RON SAWYER
18	ONG Sociedad Civil	Consejo Indígena y Campesino de Agroforestería Comunitaria (ACICAFOC)	COSTA RICA	VARINIA ROJAS MONCADA Coordinadora área temática Manejo Comunitario de Agua y Servicios
19	ONG Sociedad Civil	Espacio de Salud A.C.	MEXICO	GEORGE ANNA CLARK
20	ONG Sociedad Civil	4th Forum Programa México	MEXICO	J. EUGENIO BARRIOS O. Coordinador de Proyecto Manejo de Cuencas Hidrográficas
21	ONG Sociedad Civil	Centro Mex. de Derecho Ambiental	MEXICO	ALEJANDRA SERRANO-PAVÓN
22	ONG Sociedad Civil	UICN / Oficina Regional para Mesoamérica Coordinadora de Área Temática de Humedales, Agua y Zonas Costeras	COSTA RICA	ROCIO CÓRDOBA Coordinator Área Temática de Humedales, Agua y Zonas Costeras para Mesoamérica
23	ONG Sociedad Civil	Centro Latinoamericano de Estudios Hídricos (CLAEH)	ARGENTINA	MARTA FRANCO-Directora

CONTACT	TELEPHONE	FAX	P.O. BOX	E-MAIL OTHER
52-958-70405	52-958-70406	Bahía de Santa Cruz #119, Oaxaca, México	csemex@hotmail.com Sector T, Bahía de Huatulco	Fideicomisos Ambientales del Istmo
(506) 280-1530 (506) 283-6461	(506) 281-3290	San Pedro, de la Bomba del Higueron 200 Sur. En el 1er. semáforo casa esquinera a la izquierda. Apartado Post.: 1449-1002	fmcastro@racsa.co.cr	
(507) 270-0933	(507) 675-9416	Direcc. Post.: 0832-0974 W.T.C. Panamá, Panamá Edificio Tucuncari 19 Apto 3 Planta Ambiental Sostenible (GEMAS) Baja, Calle 65 S. Francisco, Panamá, Panamá	igemas@cwpanama.net	Preferiblemente enviar documentos al Apdo. Postal.
(505) 2 68 23 02	(505) 2 68 24 38	Lugo Rent a Car, 1 cuadra al lago, frente al Parque El Carmen - Oficinas de SIMAS Managua, Nicaragua Apartado Postal: A-136	gpae@gpae.net	www.simas.org.ni
(504) 992-2949 movil (504) 239-8814	(504) 220-1100	Apartado Postal: 976 Nac. Unidas. Direcc.: Casa de las Nac. Unidas, Col. Palmira Tegucigalpa, Honduras	kenneth.rivera@undp.org	www.plataformadelagua.un.hn
			srojas@pronatura.org.mx	
(506) 228-9611 (506) 827-4514	(506) 223-9329	Apartado Post.: 5117-1000 San José, Costa Rica	liliarrieta@yahoo.com.mx	www.redica.net No cuenta con presupuesto asignado pero quiere apoyar actividades con puntos focales y participar eventos regionales.
52 (55) 53 36 97 03	52 (55) 53 36 97 03	Av. Galvez y Fuentes #211 Col. Educación. C.P. 04400 Distrito Federal, México	redcuerposaguadf@yahoo.com.mx redaguadf@gmail.com	
55 (67) 324-3230	55 (67) 324-3230	Rua 14 de Julho, 3169 Centro, Campo Grande MS Brazil	rnicola@riosvivos.org.br	Proyecto hacia la Conservación del Pantanal y Populaciones www.ecoa.org.br
52 (739) 3950364	52 (739) 395-3001	AP 8, Tepoztlán Morelos 62520 México	rsawyer@laneta.apc.org	
(506) 240-6274	(506) 241-1996	50 mts Sur y 50 Noreste Pizza Hut Los Colegios Moravia, San José, Costa Rica. Ap. Post.: 2089-1002 San José, Costa Rica	ambiental@acicafoc.net	www.acicafoc.net
(52-777) 318 0720		Apartado Postal: 1-1576, Cuernavaca, Morelos 62001 México	esac@laneta.apc.org	
(55) 5286 5631	(55) 5286 5637	Av. México 51 Col. Hipódromo México, D.F.	ebarrios@wwfmex.org	
(52) 11-24-57 ext 23		Atlixco #138 Col. Condesa, C.P. 06140, México D.F.	aserrano@cemda.org.mx	www.cemda.org.mx
506-241-0101	506-240-9934	Apdo. 146-2150 Moravia Costa Rica	rocio.cordoba@iucn.org	http://www.uicnhumedales.org
54-11-4211-5816	54-11-4347-4249	Río Negro 1062 Adrogue Buenos Aires- Argentina. Código Postal: 1846	martabfranco@uolsinectis.com.ar	

	No	TYPE	ORGANIZATION	COUNTRY
24	ONG Sociedad Civil	Centro de Información Comunicación Ambiental de Norte y América, A.C. (CICEANA)	MEXICO	MARGIE SIMON ORTIZ
25	ONG Sociedad Civil	Fundación Hombre Naturaleza	MEXICO	GIOVANNA ACHA ALEMÁN (Directora de Comunicación Educativa)
26	ONG Sociedad Civil	Instituto de Pesquisas Avancadas em Economia e Meio Ambiente (IPANEMA)	BRASIL	NINON MACHADO DE FARIA LEME FRANCO
27	ONG Sociedad Civil	CGIAB Agua Sustentable	BOLIVIA	JUAN CARLOS ALURRALDE Director Ejecutivo
28	ONG Sociedad Civil	Fondo Mexicano para la Conservación de la Naturaleza	MEXICO	EDNA AGUIÑAGA
29	ONG Sociedad Civil	Centro de Acción Legal Ambiental y Social de Guatemala (CALAS)	GUATEMALA	YURI MELINI-Director
30	ONG Sociedad Civil	Asociación Interamericana de Ingeniería Sanitaria y Ambiental (AIDIS)	BRASIL	ADALBERTO NOYOLA (Presidente electo y representante ante el 4th Forum4)
31	ONG Sociedad Civil	Fundación Mexicana para la Educación Ambiental A.C.	MÉXICO	RODOLFO OGARRIO R AMÍREZ-ESPAÑA
32	ONG Sociedad Civil	Water Law and Indigenour Rights (WALIR)	MÉXICO	RUTGERD BOELENS COORDINADOR GENERAL FRANCISCO PEÑA
			ESTADOS UNIDOS	PAUL GELLES
			ECUADOR	PAULINA PALACIOS
			PERU	PATRICIA URTEAGA ARMANDO GUEVARA GIL
			BOLIVIA	ROCÍO BUSTAMANTE
			CHILE	INGO GENTES
			FRANCIA	THIERRY RUF
	Academy			
1	Sector Académico	Centro Agronómico Tropical de Investigación y Enseñanza (CATIE)	COSTA RICA	PEDRO FERREIRA JORGE FAUSTINO Especialista en Cuencas
2	Sector Académico	Instituto Polìtécnico Nacional	MEXICO	Dra. NORMA PATRICIA MÚÑOZ S.
3	Sector Académico	UNAM (Instituto de Ingeniería)	MEXICO	SERGIO MANUEL ALCOCECR MARTÍNEZ

CONTACT	TELEPHONE	FAX	P.O. BOX	E-MAIL OTHER
565-90509 5659-7657	5659-7657 5659-6024	Av. Progreso #3, P.B. Col. Del Carmen, Viveros de Coyoacán 04100, México D.F.	ciceana@ciceana.org.mx	
			giovanna_acha@yahoo.com	
55 21 2527 8747 55 21 8168 0011	55 21 2527 8747	Rua Serafim Valandro110 6/304 Botafogo 22.260 Río de Janeiro, RJ	ipanemasede@yahoo.com.br	
591-7143863 591 2 2151744	591 2 2151744	Direcciòn: Avenida Vera 6766 Irpavi . POBOX 13078	oso@aguabolivia.org	www.aguabolivia.org
00-55-228-813-6058 00-55-228-813-6060		Jerico 26 Col. Badillo	fmedna@xal.megared.net.mx	www.fmcn.org
(502) 2474-4545 (502) 2474 4549	(502) 2473-0813	Avenida Mariscal No. 13-59 zona 11 Colonia Mariscal C.P. 01011 Ciudad de Guatemala, Guatemala	direccion@calas.org.gt	www.calas.org.gt
(52-55) 56233662 (52-55) 5622-3321	(52-55) 5616-2798	Instit. de Ingeniería UNAM Circuito Escolar, Ciudad Univ., Coyoacán 04510 México, DF México	noyola@pumas.iingen.unam.mx	www.aidis.org.br La sede de la organización está en Brasil pero la persona contacto y representante ante el Comité está en Méx. www.aidis.org.br
			gcisneros@fundea.org.mx fundea@mx.inter.net.mx	
		Universidad de Wageningen	rutgerd.boelens@wur.nl	www.eclac.cl/dmi/proyectoswalir
(52) 444811-0101 Ext 6102 / 6106		El Colegio de San Luis A.C. Parque de Macul 155 Colinas del Parque San Luis Potosí, SLP, México CP	frapecolsan.edu.mx	
		University of California at Riverside, University of Colorado at Boulder, School of Law	getches@colorado.edu	
		CAMAREN	bichilu@andinanet.net	
		Univ. Católica del Perú Facultad de Derecho	purteaga@pucp.edu.pe aguevar@pucp.edu.pe	
		Universidad Mayor San Simón, Cochabamba	vhrocio@pino.cbb.entelnet.bo	
		Universidad Jesuita Alberto Hurtado / Santiago de Chile Escuela de Derecho	igentes@eclac.cl	
		Institute de Recherche pour le Dévelpment / Montpellier	thierry.ruf@ird.fr	
506-556-6081 506-558-2652	506-556-6166 506-556-1533 506-556-9649	Turrialba 7170 CATIE Costa Rica	ferreira@catie.ac.cr faustino@catie.ac.cr	www.catie.ac.cr
52-55-5729-6022	52-55-5729-6022 ext 46022	Estudios Profesionales en Ciencias Médico Biológicas Av. Luis Enrique Erro s/n Ed. de laSecretaría Académica 1er Piso Col. Zacatenanco Del. Gustavo A. Madero. México 07738, D.F.	nmunoz@ipn.mx	www.ipn.mx
52-55-5622-34-22/23			salcocerm@iingen.unam.mx	Asistente de la Dirección: Licda. María de losÁngeles Machorro Geralo AMachorroG@iingen.unam.mx

No	TYPE	ORGANIZATION	COUNTRY	CONTACT
4	Sector Académico	Instituto Tecnológico Estudios Superiores Monterrey	MEXICO	ISMAEL AGUILAR BARAJAS
5	Sector Académico	ACADEMIA MEXICANA DE CIENCIAS	MEXICO	LUIS MARIN
6	Sector Académico	OXFORD University	REINO UNIDO	JOSE ESTEBAN CASTRO Senior Research Associate
7	Sector Académico	Universidad Nacional de Costa Rica Proyecto PRIGA	COSTA RICA	JOSÉ MILLÁN
8	Sector Académico	INCAE	COSTA RICA	ANA MARÍA MAJANO
	Sub regional financing organization			
1	Organismo Sub-regional de Financ.	Agencia Suiza para el Desarrollo y la Cooperación (COSUDE)	NICARAGUA EL SALVADOR	WARNER THUT Director residente adjunto para Centroamérica MANUEL THURNHOFER Jefe de Programa AGUSAN / COSUDE
2	Organismo Sub-regional de Financ.	Banco Centroamericano de Integración Económica (BCIE)	HONDURAS	MARCO CUADRA Gerente de Negocios
3	Organismo Sub-regional de Financ.	Agencia Interncional de Cooperación del Japón (JICA)	El Salvador	MAKOTO KITANAKA
4	Organismo Sub-regional de Financ.	Agencia Interncional de Cooperación del Japón México (JICA)	Mexico	KAWAI KOJI / ATSUSHI KAMISHIMA
	Technical Assistance organization			
1	Organismo de Asistencia Técnica	Comité Asesor Técnico de Sur América (SAMTAC)	BRASIL	CARLOS TUCCI
2	Organismo de Asistencia Técnica (CATHALAC)	Centro del Agua del Trópico Húmedo para América Latina y el Caribe	PANAMA	EMILIO SEMPRIS Director (507) 317 0057
3	Organismo de Asist. Técnica	OFICINA INTERNACIONAL DEL AGUA	FRANCIA	JEAN-FRANCOIS DONZIER
4	Organismo de Asist. Técnica	Comisión Centroamericana de Ambiente y Desarrollo (CCAD)	EL SALVADOR	MARCOS GONZÁLEZ Secretario EJecutivo
5	Organismo de Asist. Técnica	Food and Agriculture Organization FAO	CHILE	GUSTAVO GORDILLO DEANDA Sub-Director Regional MARCO PORTO Representante Regional FAO Chile
6	Organismo de Asist. Técnica	Comunidad Andina	PERÚ	ALLAN WAGNER PALACIOS Secretario General

TELEPHONE	FAX	P.O. BOX	E-MAIL	OTHER
			iaguilar@itesm.mx	
52-555-6224212 52-555-4181000	52-555-5502486		lmarin@geofisica.unam.mx lmarin@mail.com	
44 (0) 1865 284990 44 (0) 1865 459267	44 (0) 1865-554465	St. Anthony`s College, Oxford OX2 6JF, United Kingdom	esteban.castro@st-antonys.ox.ac.uk	http://ocwr.ouce.ox.ac.uk
506-261-0101	506-237-7593	Biblioteca Joaquín García Monge, III nivel. UNA, Costa Rica Apartado P.: 86-3000 Heredia, Costa Rica	omillan@una.ac.cr	www.una.ac.cr/priga
506-437-2379	506-433-9606	Apdo: 9060-4050 Alajuela, Costa Rica.	ana.majano@incae.edu	www.incae.ac.cr
(505)-266-3010	(505)-266-6697	De la Clínica Las Palmas 1 cuadra abajo. Managua	werner.thut@sdc.net managua@sdc.net aguasan@integra.com.sv	
504-240-2148	50-240-2149		MCuadra@bcie.org	Otro contacto: Gabriela Cerrato: gcerrato@bcie.org
503-263-0940	503-263-0935	Apartado Postal: 01-114. Dirección: Calle y Colonia La Mascota, No. 521-A, San Salvador, El Salvador, C.A.	jicael@jica.go.jp	Confirmación enviada por Gledy Aritomi, Asesora Formulación de Proyectos http://www.jica.go.jp
			kawai.koji@jica.go.jp kamishima.atsushi@jica.go.jp	
55-51-3316-6408	55-51-3334-7604	Rua Lavradio, 150 c1 90690 370 Porto Alegre- RS Brasil -GWP- SAMTAC a/c María Elena Zúñiga Av Dag Hammarskojold 3477 Vitacura Casilla 179-D Santiago -Chile	tucci@iph.ufrgs.br mariaelena.zuniga@cepal.org	http://www.eclac.org/drni proyectos/samtac/samtac.htm
(507) 317 1640 (507) 317 0053	(507) 317 0127	Edificio 801 Ciudad del Saber Clayton Panamá. // Apartado Postal: 873372, Panamá 7 República de Panamá	emilio.sempris@cathalac.org	www.cathalac.org
			jf.donzier@oieau.fr	
503-248-8800	503-248-8894	Blvd. Orden de Malta No 470 Santa Elena, Antiguo Cuscatlán, La Libertad El Salvador.	mgonzalez@ccad.sv	
337-2100 (Santiago Chile)	337-2101	Organización de las Naciones Unidas para la Agricultura y Alimentación (FAO) Oficina Regional Avda. Dag Hammarskjold 3241 Vitacura Santiago Chile	Gustavo.GordilloDeAnda@fao.org	El Punto Focal para el tema es el Sr. Jan Van Wambeke, oficial principal de Tierras y Aguas: JanVanWambeke@fao.org
511-411-1400	511-221-3329	Paseo de la República 3895 Lima 27-Perú. Casilla Postal: 18-1177 Lima 18- Perú.	contacto@comunidadandina.org	Solicita envío de documentos y la relación de actividades programadas. El Dr. Héctor Maldonado Lira, Dir. General de la Comunidad Andina, llamó para dejar en claro que su organización no hará aportes económicos para el Comité Consultivo y sus eventos. www.comunidadandina.org

No	TYPE	ORGANIZATION	COUNTRY	CONTACT
7	Organismo de Asist.Técnica	SIECA	GUATEMALA	HAROLDO RODAS MELGAR Secretario General
8	Organismo de Asist. Técnica	Red Regional de Agua y Saneamiento de Centroamérica (RRAS-CA)	HONDURAS	HUMBERTO PUERTO Secretario Ejecutivo
9	Organismo de Asist. Técnica	UNESCO	URUGUAY	MARÍA CONCEPCIÓN DONOSO
10	Organismo de Asist. Técnica	Comisión Económica para América Latina (CEPAL)	CHILE	MIGUEL SOLANES
11	Organismo de Asist. Técnica	Comité Regional de Recursos Hidráulicos (CRRH)	COSTA RICA	MAX CAMPOS Secretario Ejecutivo
12	Organismo de Asist. Técnica	OSPESCA/PREPAC	EL SALVADOR	MARIO GONZALEZ RECINOS Director Ejecutivo Regional
13	Organismo de Asist. Técnica	CARICOM Caribbean Environmental Health Institution (CEHI)	GUYANA	VINCENT SWEENY Director Ejecutivo CEHI
Professional organization				
1	Organismo Profesional	Canadian Water Resources Association (CWRA)	CANADA	Dr. Chandra Madramootoo McGill University CWRA Executive Member
Private sector				
1	Sector Privado	AMANCO	GUATEMALA	ANDREAS EGGENBERG
2	Sector Privado	Veolia Water para América Latina / Consorcio Internacional de Medio Ambiente (CIMA)	MEXICO	RÉMI URQUÍN-Director División Agua
3	Sector Privado	Associaçao das Empresas de Saneamiento Básico Estaduais (AESBE)	BRASIL	MARCO THADEU ABICALI, Asesor Técnico

TELEPHONE	FAX	P.O. BOX	E-MAIL	OTHER
502-236-82151	502-236-81071 502-233-73750	4a. Av. 10-25, zona 14 Guatemala, C.A. Código Postal: 01014	hrodas29@sieca.org.gt	
(504)-238-5835	(504)-238-5243	Colonia La Reforma, Calle La Salle, No 1309 Tegucigalpa, Honduras. Ap. Postal: No 2020 Tegucigalpa, Honduras	rrasca@123.hn	www.rrasca.org
(598-2) 413 20 75	(598-2) 413 20 94	Edificio Mercosur-Luis Piera 1992, 2o. Piso - Cas. correo 859 - 11200 Montevideo - Uruguay	mcdonoso@unesco.org.uy	
56-2-210-2000	56-2-208-1946		miguel.solanes@cepal.org	
(506) 231-5791	(506) 296-0047	Apartado Postal: 1527-1200 San José, Costa Rica	maxcampos@aguayclima.com	crrhcr@racsa.co.cr
(503) 2263-1123	(503) 2263-1128	REPAC/OIRSA Edificio OIRSA Calle Ramón Belloso, final pasaje Isolde, Colonia Escalón San Salvador, El Salvador. Ap. postal: (01) 61	mgonzalez@sgsica.org	
		Caribbean Community Secretariat Office of the Secretary General Third Floor Bank of Guyana Building 1 Avenue of the Republic Georgetown	vsweeney@cehi.org.lc	
514-398-7834	514-398-7767	Brace Centre for Water Resources Management McGill University, Macdonald Campus 21, 111 Lakeshore Road Ste. Anne de Bellevue Quebec, Canada H9X 3V9	chandra.madramootoo@mcgill.ca	www.cwra.org
(502)-2475-9092 (502) 2473-0404 (502) 2473-0066 Dir.	(502)-2473-1187	Amanco Guatemala S.A. Av. del Ferrocarril 16-67 Zona 12 Guatemala Guatemala	andreas.eggenberg@amanco.com	www.amanco.com www.amanco.com.gt
00-52-55-5722-7704	00-52-55-5722-7712	Tomás Alva Edison 176 Colonia San Rafael 06470 México D.F.	remi.usquin@cima.com.mx	
00-55-61-3264888	00-55-61-3264888	SBN, Quadra 1, Bloco “B” 403 Zip code: 70041-902 Brasília - DF, Brazil	mtabicalil@aesbe.org.br	www.aesbe.org.br (portugués)

ANNEX 3
selected regional indicators

Table A3.1 General Indicators

COUNTRY/SUBREGION	Economy Class 2005 (1)	Human Development Index	Population 2004 (1)
Canada	HI:OECD	0.949	31,902,430
Mexico	UMI	0.814	103,795,200
United States	HI:OECD	0.944	293,507,400
NORTH AMERICA			429,205,030
Belize	UMI	0.753	282,600
Costa Rica	UMI	0.838	4,061,474
Salvador	LMI	0.722	6,657,687
Guatemala	LMI	0.663	12,628,480
Honduras	LMI	0.667	7,141,464
Nicaragua	LI	0.690	5,604,000
Panama	UMI	0.804	3,027,812
CENTRAL AMERICA			39,403,517
Antigua and Barbuda	UMI	0.797	80,000
Aruba	HI: noOECD		99,000
Bahamas, The	HI: noOECD	0.832	320,090
Barbados	UMI	0.878	271,789
Bermuda	HI: noOECD		64,000
Cayman Islands	HI: noOECD		44,000
Cuba	LMI	0.817	11,364,810
Dominica	UMI	0.783	71,460
Dominican Republic	LMI	0.749	8,861,412
Grenada	UMI	0.787	105,700
Haiti	LI	0.475	8,591,753
Jamaica	LMI	0.738	2,664,766
Netherlands Antilles	HI: noOECD		221,992
Puerto Rico	HI: noOECD		3,928,740
St. Kitts and Nevis	UMI	0.834	46,985
St. Lucia	UMI	0.772	163,651
St. Vincent and the Grenadines	UMI	0.755	108,294
Trinidad and Tobago	UMI	0.801	1,323,368
Virgin Islands (U.S.)	HI: noOECD		113,142
THE CARIBBEAN			38,444,952
Argentina	UMI	0.863	38,226,050
Bolivia	LMI	0.687	8,986,396
Brazil	LMI	0.792	178,718,400
Chile	UMI	0.854	15,956,000
Colombia	LMI	0.785	45,300,000
Ecuador	LMI	0.759	13,213,080
Guyana	LMI	0.720	772,056
Paraguay	LMI	0.755	5,781,569
Peru	LMI	0.762	27,546,700
Suriname	LMI	0.755	442,968
Uruguay	UMI	0.840	3,399,400
Venezuela, RB	UMI	0.772	26,127,000
SOUTH AMERICA			364,469,619
THE AMERICAS			871,523,118
THE WORLD			6,345,127,000
AMERICAS as percentage of World's value			13.74%
LAC as percentage of world's value			8.61%

Sources: (1) World Bank, 2005; (2) World resources Institute 2005; (3) UNDP 2005

Populaton Growth 2004 (%) (1) (2)	Surface Area (Km²) (1)	Population Density 2004 (inhab./Km²) (1)	% Urban Population 2003 (3)	Per Capita Gross Domestic Product 2004(current US$) (1) (3)
0.86%	9,970,610	3.20	80.4%	30,711
1.46%	1,958,200	53.01	75.5%	6,518
0.92%	9,629,090	30.48	80.1%	39,752
1.05%	**21,557,900**	**19.91**	**79.0%**	**31,043**
3.20%	22,960	12.31	48.4%	3,870
1.41%	51,100	79.48	60.6%	4,529
1.89%	21,040	316.43	59.4%	2,377
2.58%	108,890	115.97	46.3%	2,174
2.45%	112,090	63.71	45.6%	1,032
2.24%	130,000	43.11	57.3%	777
1.46%	75,520	40.09	57.2%	4,555
2.21%	**521,600**	**75.54**	**52.3%**	**2,240**
0.60%	440	181.82	37.8%	10,032
	190	521.05		
0.84%	13,880	23.06	89.4%	15,777
0.44%	430	632.07	51.7%	9,327
	50	1,280.00	100.0%	3,579
	260	169.23	100.0%	35,136
0.34%	110,860	102.51	75.7%	2,626
0.35%	750	95.28	72.0%	3,761
1.40%	48,730	181.85	59.3%	2,107
1.05%	340	310.88	40.7%	4,126
1.78%	27,750	309.61	37.5%	411
0.83%	10,990	242.47	52.2%	3,013
0.81%	800	277.49	69.0%	11,712
0.77%	8,950	438.97		
0.59%	360	130.51	32.2%	8,447
1.89%	620	263.95	30.5%	4,452
-0.80%	390	277.68	58.2%	3,724
0.81%	5,130	257.97	75.4%	9,479
1.39%	340	332.77		
1.03%	**231,260**	**166.24**	**59.5%**	**1,192**
0.80%	2,780,400	13.75	90.1%	3,963
1.94%	1,098,580	8.18	63.4%	976
1.19%	8,514,880	20.99	83.0%	3,384
1.15%	756,630	21.09	87.0%	5,898
1.59%	1,138,910	39.77	76.4%	2,150
1.56%	283,560	46.60	61.8%	2,292
0.41%	214,970	3.59	37.6%	1,018
2.42%	406,750	14.21	57.2%	1,233
1.46%	1,285,220	21.43	73.9%	2,483
1.10%	163,270	2.71	76.0%	2,504
0.57%	176,220	19.29	92.5%	3,865
1.75%	912,050	28.65	87.6%	4,184
1.33%	**17,731,440**	**20.55**	**81.1%**	**3,256**
1.22%	**40,042,200**	**21.77**	**77.9%**	**16,804**
1.14%	**133,941,500**	**47.37**	**48.3%**	**6,444**
	29.90%			2.61
	15.26%			0.57

Table A3.2 Water Resource Indicators

COUNTRY/SUBREGION	Mean Annual Precipitation 1961-1990 (km^3/Year) (4)	Mean Annual Precipitation 1961-1990 (mm) (4)
Canada	6,111.2	613
Mexico	1,472.0	752
United States	5,832.8	606
NORTH AMERICA	13,416.0	622
Belize	39.1	1,703
Costa Rica	149.5	2,926
El Salvador	36.3	1,725
Guatemala	217.3	1,996
Honduras	221.4	1,975
Nicaragua	310.9	2,392
Panama	203.3	2,692
CENTRAL AMERICA	1,177.8	2,258
Antigua and Barbuda	0.5	1,136
Aruba		
Bahamas, The	17.9	1,290
Barbados	0.6	1,395
Bermuda		
Cayman Islands		
Cuba	148.0	1,335
Dominica		
Dominican Republic	58.7	1,205
Grenada		
Haiti	40.0	1,441
Jamaica	22.5	2,047
Netherlands Antilles		
Puerto Rico	18.4	2,056
St. Kitts and Nevis	0.5	1,389
St. Lucia		
St. Vincent and the Grenadines		
Trinidad and Tobago	11.3	2,203
Virgin Islands (U.S.)		
THE CARIBBEAN	318.4	1,377
Argentina	1,642.1	591
Bolivia	1,258.9	1,146
Brazil	15,335.7	1,801
Chile	1,151.6	1,522
Colombia	2,974.6	2,612
Ecuador	591.8	2,087
Guyana	513.1	2,387
Paraguay	459.5	1,130
Peru	2,233.7	1,738
Suriname	380.6	2,331
Uruguay	222.9	1,265
Venezuela, RB	1,710.1	1,875
SOUTH AMERICA	28,474.6	1,606
THE AMERICAS	43,386.8	1,084
THE WORLD	107,924.0	806
AMERICAS as percentage of world's value	40.2%	
LAC as percentage of world's value	29.1%	

Sources: (4) FAO 2003

Total Renewable Water Resources (Km^3) (4)	Dependency Ratio (% of Water Availabilty inflowing from abroad) (4)	Per Capita Water Availability 2004 (m^3/person/year) (4)	Water Stress
3,505.0	1.8	109,866	1.31%
457.2	10.5	4,405	17.11%
3,069.4	8.0	10,458	15.62%
6,428.0		**14,977**	**9.39%**
18.6	13.8	65,817	0.67%
112.4	0.0	27,675	2.38%
25.2	29.6	3,785	5.05%
111.3	1.9	8,813	1.80%
95.9	0.0	13,429	0.90%
196.7	3.5	35,100	0.66%
148.0	0.4	48,880	0.56%
708.0		**17,968**	**1.28%**
0.1	0.0		
	0.0		
0.0	0.0	66	
0.1	0.0	294	
	0.0		
	0.0		
38.1	0.0	3,352	21.53%
	0.0		
21.0	0.0	2,370	16.12%
	0.0		
14.0	7.2	1,629	7.04%
9.4	0.0	3,528	4.35%
	0.0		
7.1	0.0		
0.0	0.0		
	0.0		
	0.0		
3.8	0.0	2,871	8.03%
	0.0		
86.0		**2,237**	**15.45%**
814.0	66.1	21,294	3.57%
622.5	51.2	69,271	0.22%
8,233.0	34.2	46,067	0.72%
922.0	4.1	57,784	1.36%
2,132.0	0.9	47,064	0.50%
432.0	0.0	32,695	3.93%
241.0	0.0	312,154	0.68%
336.0	72.0	58,116	0.15%
1,913.0	15.5	69,446	1.05%
122.0	27.9	275,415	0.55%
139.0	57.6	40,890	2.26%
1,233.2	41.4	47,200	0.68%
17,130.0		**47,000**	**0.96%**
24,352.0		**27,942**	**3.25%**
43,764.0		**6,897**	**8.69%**
55.6%		405.1%	
42.0%		488.0%	

Table A3.3 Water Use Indicators

COUNTRY/SUBREGION	Total Water Withdrawals (2)		Per Capita Water Withdrawals 2004 (m^3/person/year) (2)	Sectoral Withdrawals (%) (3)		
	Mm^3	As % of Total Renewable Water Resources		Agriculture	Industry	Domestic
Canada	45,974	1.3%	1,494	12	69	20
Mexico	78,219	17.1%	798	77	5	17
United States	479,293	15.6%	1,698	41	46	13
NORTH AMERICA	**603,486**	**9.4%**	**1,468**	**44**	**42**	**14**
Belize	125	0.7%	500	0	89	11
Costa Rica	2,677	2.4%	703	53	17	29
El Salvador	1,273	5.1%	205	59	16	25
Guatemala	2,005	1.8%	176	80	13	6
Honduras	860	0.9%	133	81	11	8
Nicaragua	1,300	0.7%	256	83	3	14
Panama	824	0.6%	289	28	5	66
CENTRAL AMERICA	**9,064**	**1.3%**	**252**	**64**	**14**	**22**
Antigua and Barbuda						
Aruba						
Bahamas, The						
Barbados						
Bermuda						
Cayman Islands						
Cuba	8,204	21.5%	733	69	12	29
Dominica						
Dominican Republic	3,386	16.1%	405	66	2	32
Grenada						
Haiti	985	7.0%	124	94	1	5
Jamaica	409	4.4%	159	49	17	34
Netherlands Antilles						
Puerto Rico						
St. Kitts and Nevis						
St. Lucia						
St. Vincent and the Grenadines						
Trinidad and Tobago	305	8.0%	237	6	27	67
Virgin Islands (U.S.)						
THE CARIBBEAN	**13,289**	**15.5%**	**362**	**64**	**9**	**27**
Argentina	29,072	3.6%	790	74	9	16
Bolivia	1,387	0.2%	167	83	3	13
Brazil	59,298	0.7%	349	62	18	20
Chile	12,539	1.4%	824	64	25	11
Colombia	10,711	0.5%	253	46	5	50
Ecuador	16,980	3.9%	1,367	82	5	12
Guyana	1,642	0.7%	2,163	97	1	2
Paraguay	489	0.1%	93	72	9	20
Peru	20,132	1.1%	776	82	10	8
Suriname	665	0.5%	1,565	93	3	4
Uruguay	3,146	2.3%	947	96	1	2
Venezuela, RB	8,368	0.7%	344	47	7	45
SOUTH AMERICA	**164,429**	**1.0%**	**476**	**68**	**13**	**19**
THE AMERICAS	**790,268**	**3.2%**	**953**	**50**	**35**	**15**
THE WORLD	3,802,320	8.7%	628			
AMERICAS as percentage of world's value	20.78%		151.76%			
LAC as percentage of world's value	6.97%		81.77%			

Sources (2) World Resources Institute 2005; (3) UNDP 2005; (5) PAHO 2001; (6) FAO 2000

Access to Potable Water (%) (3)		Access to Sanitation (%) (3)					
Urban 2002	Rural 2002	Urban 2002	Rural 2002	% of Wastewater Treatment 2000 (5)	Arable Land & Permanent Crops 2002 (1000 Ha) (6)	Irrigated Land 2002 (1000 Ha) (6)	% of Irrigation
100.0%	100.0%	100.0%	99.0%	80.0%	45,879.0	785.0	1.7%
97.0%	72.0%	90.0%	39.0%	15.4%	27,300.0	6,320.0	23.2%
100.0%	100.0%	100.0%	100.0%	100.0%	178,068.0	22,500.0	12.6%
99.3%	**92.1%**	**97.7%**	**82.7%**	**84.6%**	**251,247.0**	**29,605.0**	**11.8%**
100.0%	--	--	--	56.7%	102.0	3.0	2.9%
100.0%	92.0%	89.0%	97.0%	4.0%	525.0	108.0	20.6%
91.0%	68.0%	78.0%	40.0%	2.0%	910.0	45.0	4.9%
99.0%	92.0%	72.0%	52.0%	1.0%	1,905.0	130.0	6.8%
99.0%	82.0%	89.0%	52.0%	0.0%	1,428.0	80.0	5.6%
93.0%	65.0%	78.0%	51.0%	34.0%	2,161.0	94.0	4.3%
99.0%	79.0%	89.0%	51.0%	18.3%	695.0	35.0	5.0%
96.0%	**81.4%**	**79.8%**	**53.5%**	**10.3%**	**7,726.0**	**495.0**	**6.4%**
95.0%	89.0%	98.0%	--	100.0%	10.0	8.0	80.0%
--	--	--	--				
98.0%	--	100.0%	100.0%	80.0%	12.0	1.0	8.3%
100.0%	100.0%	99.0%	100.0%	100.0%	17.0	1.0	5.9%
					1.0		
					1.0		
95.0%	78.0%	99.0%	95.0%	18.9%	3,788.0	870.0	23.0%
100.0%		86.0%	75.0%	0.0%	20.0		
98.0%	85.0%	67.0%	43.0%	48.7%	1,596.0	275.0	17.2%
97.0%		96.0%	97.0%	0.0%	12.0		
91.0%	59.0%	52.0%	23.0%	0.0%	1,100.0	75.0	6.8%
98.0%	87.0%	90.0%	68.0%		284.0	25.0	8.8%
					8.0		
99.0%	99.0%	96.0%	96.0%		8.0		
98.0%	98.0%			46.1%	18.0	3.0	16.7%
					14.0	1.0	7.1%
92.0%	88.0%	100.0%	100.0%	65.0%	122.0	4.0	3.3%
83.7%	**64.9%**	**72.2%**	**44.1%**	**28.8%**	**7,011.0**	**1,263.0**	**18.0%**
97.0%				10.0%	35,000.0	1,561.0	4.5%
95.0%	68.0%	58.0%	23.0%	30.0%	3,106.0	132.0	4.2%
96.0%	58.0%	83.0%	35.0%	15.4%	66,580.0	2,920.0	4.4%
100.0%	59.0%	96.0%	64.0%	16.7%	2,307.0	1,900.0	82.4%
99.0%	71.0%	96.0%	54.0%	10.8%	3,850.0	900.0	23.4%
92.0%	77.0%	80.0%	59.0%	5.0%	2,985.0	865.0	29.0%
				50.0%	510.0	150.0	29.4%
100.0%	62.0%	94.0%	58.0%	8.0%	3,115.0	67.0	2.2%
87.0%	66.0%	72.0%	33.0%	14.0%	4,310.0	1,195.0	27.7%
98.0%		99.0%	75.0%	0.1%	67.0	51.0	76.1%
98.0%		95.0%	85.0%	76.9%	1,340.0	181.0	13.5%
85.0%	70.0%	71.0%	48.0%	10.0%	3,408.0	575.0	16.9%
95.0%	**59.6%**	**73.4%**	**39.3%**	**12.7%**	**126,578.0**	**10,497.0**	**8.3%**
96.7%	**77.6%**	**85.6%**	**63.4%**	**63.2%**	**392,562.0**	**41,860.0**	**10.7%**
94.0%	72.0%						

Latinoamerica & El Caribe: consumo de energia / energy consumption 2003

COUNTRY	POPULATION 10*6 inhab	GROSS DOMESTIC PRODUCT (3) 10*9 1995 US$	FINAL ENERGY CONSUMPTION 10*9 Boe	PER CAPITA GDP (3) 1995 US$/inhab	PER CAPITA FINAL CONSUMTION Boe/inhab	ENERGY INTENSITY (2)(3) Boe/10*9 1995 US$	CONSUMPTION				CO_2 EMISSIONS (*)	
							ELECTRICITY		OIL PRODUCTS		ELECTRICITY GENERATION 10*6 tons	OVERALL ENERGY SECTOR 10*6 tons
							FINAL 10*3 GWh	PER CAPITA Kwh/inhab	TOTAL (1) 10*6 Boe	PER CAPITA Boe/inhab		
	A	B	C	B/A	C/A	C/B	D	D/A	E	E/A	F	G
ARGENTINA	38.401	246.647	314.726	6,423	8,196	1,276	80.026	2,084	174.210	4.5	20.457	121.514
BARBADOS	0.270	1.843	1.897	6,826	7,026	1,029	0.782	2,896	2.495	9.2	0.578	1.085
BOLIVIA	8.898	8.485	19.599	954	2,203	2,310	3.665	412	15.280	1.7	1.728	8.022
BRAZIL	177.268	759.611	1,146.394	4,285	6,467	1,509	329.771	1,860	595.385	3.4	19.925	300.535
COLOMBIA	44.562	103.030	168.338	2,312	3,778	1,634	36.518	819	90.881	2.0	6.488	56.917
COSTA RICA	4.245	16.270	18.381	3,833	4,330	1,130	6.708	1,580	12.764	3.0	0.438	5.905
CUBA	11.306	48.360	61.984	4,277	5,482	1,282	12.489	1,105	42.355	3.7	7.225	24.711
CHILE	15.774	96.253	148.738	6,102	9,429	1,545	41.895	2,656	91.453	5.8	13.822	55.025
ECUADOR	13.343	23.749	48.047	1,780	3,601	2,023	8.366	627	49.048	3.7	3.266	20.030
EL SALVADOR	6.638	11.681	23.114	1,760	3,482	1,979	4.839	729	14.259	2.1	1.561	6.166
GRENADA	0.094	0.298	0.454	3,170	4,830	1,523	0.130	1,383	0.522	5.6	0.079	0.214
GUATEMALA	12.309	19.093	50.523	1,551	4,105	2,646	5.808	472	22.298	1.8	2.781	11.120
GUYANA	0.766	0.575	5.295	751	6,913	9,209	0.644	841	3.661	4.8	0.607	1.559
HAITI	8.827	3.641	12.534	412	1,420	3,442	0.283	32	3.964	0.4	0.206	1.652
HONDURAS	7.001	5.023	23.637	717	3,376	4,706	3.817	545	13.725	2.0	1.514	6.364
JAMAICA	2.651	5.379	17.554	2,029	6,622	3,263	6.516	2,458	25.313	9.5	5.695	10.917
MEXICO	103.301	484.332	701.409	4,689	6,790	1,448	160.384	1,553	636.419	6.2	113.350	369.997
NICARAGUA	5.489	4.309	16.308	785	2,971	3,785	1.653	301	9.204	1.7	1.522	3.935
PANAMA	3.116	9.842	16.678	3,159	5,352	1,695	4.358	1,399	12.893	4.1	1.610	5.465
PARAGUAY	5.922	8.731	26.853	1,474	4,534	3,076	4.315	729	9.006	1.5	0.000	3.911
PERU	27.148	66.143	77.056	2,436	2,838	1,165	20.206	744	51.622	1.9	3.323	24.989
DOMINICAN REPUBLIC	8.819	18.270	38.587	2,072	4,375	2,112	11.893	1,349	41.070	4.7	7.631	16.714
SURINAME	0.423	0.588	4.188	1,390	9,901	7,122	1.339	3,165	4.151	9.8	1.034	2.294
TRINIDAD & TOBAGO	1.307	8.157	65.582	6,241	50,178	8,040	5.876	4,496	254.216	194.5	4.458	26.122
URUGUAY	3.408	16.670	16.035	4,891	4,705	962	5.970	1,752	9.719	2.9	0.016	4.090
VENEZUELA	25.554	63.492	256.399	2,485	10,034	4,038	62.477	2,445	181.508	7.1	28.279	128.948
TOTAL	**536.840**	**2,030.472**	**3,280.310**				**820.728**		**2,367.421**		**247.593**	**1,218.201**
REGIONAL AVERAGE				**3,782**	**6,110**	**1,616**		**1,529**		**4.4**		

(*) OLADE estimate based on Energy Balances and IPCC Methodology \ Estimación OLADE con base en Balances Energéticos y Metodología IPCC

(1) Final Consumption + Transformation Center Consumption + Own Consumption \ Consumo Final + Consumo en Centros de Transformación + Consumo Propio

(2) Final Energy Consumption / Gross Domestic Product \ Consumo Final de Energía / Producto Interno Bruto

(3) Information of 2003 (base year 1995) \ Información de 2003 (año base 1995)

Generation by Type of Plant (Gwh)

COUNTRY	HYDRO	THERMO.	NUCLEAR	OTHERS	TOTAL
BARBADOS	0	870,000	0	0	870,000
BRAZIL	290,006,420	60,758,740	14,080,400	0	364,845,560
COSTA RICA	6,021,880	157,150	0	1,385,880	7,564,910
CHILE	24,176,510	20,878,490	0	0	45,055,000
EL SALVADOR	1,704,620	1,930,230	0	1,128,850	4,763,700
GUATEMALA	2,176,590	4,189,490	0	195,020	6,561,100
HAITI	197,000	315,000	0	0	512,000
JAMAICA	353,490	6,792,520	0	0	7,146,010
NICARAGUA	207,300	2,021,000	0	270,700	2,499,000
PARAGUAY	51,781,110	420	0	0	51,781,530
DOMINICAN REPUBLIC	1,562,180	11,928,720	0	0	13,490,900
TRINIDAD & TOBAGO	0	6,436,600	0	0	6,436,600
VENEZUELA	60,177,330	29,639,580	0	0	89,816,910
TOTAL	**570,026,380**	**409,480,880**	**32,148,400**	**9,000,450**	**1,020,656,110**
REGIONAL AVERAGE				**718**	**56**

(*) OLADE estimate based on Energy Balances and IPCC Methodology \ Estimación OLADE con base en Balances Energéticos y Metodología IPCC
(1) Final Consumption + Transformation Center Consumption + Own Consumption \ Consumo Final + Consumo en Centros de Transformación + Consumo Propio
(2) Final Energy Consumption / Gross Domestic Product \ Consumo Final de Energía / Producto Interno Bruto
(3) Information of 2003 (base year 1995) \ Información de 2003 (año base 1995)

Installed Capacity by Type of Plant * 1,000 (MW)

COUNTRY	HYDROPOWER POTENTIAL (MW)	INSTALLED CAPACITY BY TYPE OF PLANT (MW)				
		HYDRO	THERMO	NUCLEAR	OTHERS	TOTAL
ARGENTINA	44.5000	9.7820	19.7720	1.0180	0.0263	30.5983
BARBADOS	0.0000	0.0000	0.2095	0.0000	0.0000	0.2095
BOLIVIA	190.0000	0.4790	0.8726	0.0000	0.0012	1.3528
BRAZIL	260.0000	67.7910	16.7050	2.0070	0.0000	86.5030
COLOMBIA	93.0850	8.8930	4.6900	0.0000	0.0700	13.6530
COSTA RICA	6.2200	1.2950	0.3950	0.0000	0.2478	1.9378
CUBA	0.6500	0.0570	3.9010	0.0000	0.0004	3.9584
CHILE	26.0460	4.2790	6.4560	0.0000	0.0020	10.7370
ECUADOR	23.4670	1.7330	1.4100	0.0000	0.3978	3.5408
EL SALVADOR	2.1650	0.4420	0.5140	0.0000	0.2624	1.2184
GRENADA	0.0000	0.0000	0.0320	0.0000	0.0000	0.0320
GUATEMALA	10.8900	0.6270	1.3528	0.0000	0.0290	2.0088
GUYANA	7.6000	0.0005	0.3075	0.0000	0.0000	0.3080
HAITI	0.1730	0.0630	0.1810	0.0000	0.0000	0.2440
HONDURAS	5.0000	0.4657	0.5783	0.0000	0.0000	1.0440
JAMAICA	0.0240	0.0230	0.6671	0.0000	0.1200	0.8101
MÉXICO	51.3870	9.8490	37.5607	1.3650	0.9626	49.7373
NICARAGUA	1.7000	0.1040	0.5107	0.0000	0.0775	0.6922
PANAMA	3.6980	0.8330	0.4910	0.0000	0.2312	1.5552
PARAGUAY	12.5160	7.4100	0.0061	0.0000	0.0000	7.4161
PERU	61.8320	3.0320	2.9371	0.0000	0.0007	5.9698
DOMINICAN REPUBLIC	2.0100	0.5421	4.1842	0.0000	0.8040	5.5303
SURINAME	2.4200	0.1890	0.2000	0.0000	0.0000	0.3890
TRINIDAD & TOBAGO	0.0000	0.0000	1.4160	0.0000	0.0000	1.4160
URUGUAY	1.8150	1.5380	0.6330	0.0000	0.0000	2.1710
VENEZUELA	46.0000	12.4910	8.0860	0.0000	0.0000	20.5770
REGIONAL TOTAL	853.1980	131.9183	114.0686	4.3900	3.2328	253.6097
(*) GEOTHERMAL, SOLAR						

ANNEX 4
successful local actions in the region

WATER FOR GROWTH AND DEVELOPMENT

Local actions details:

ID	LA1577		
First name	Ernesto	Last name	Guhl
Organization	Quinaxi		
Country	Colombia		
Gender	Male		
Email	eguhl@quinaxi.org		
Scope of the action:	Basin		
Region:	Americas		
Name of Local Action:	Recovery of deteriorated water ecosystems		

Framework theme: Water for Growth and Development
Crosscutting perspectives: Capacity-building and Social Learning; Application of Science, Technology and Knowledge; Targeting, Monitoring and Implementation Knowledge.

Type of organization(s)
Empresa de Energia de Bogota EEB: Enterprises and facilities that are either private managed as public-private partnerships
Quinaxi: Civil society organizations

Description and location of the problem and activity as implemented
Close to 10 million people live in the Bogota river basin, including the population of the city of Bogota, and around a third of the industrial activities of the country take place here. The multiple purpose reservoirs in this basin show increasing contamination due to the manner and intensity of the different activities that are performed in it, which has lead to situations of eutrophication of these bodies of water, with grave environmental and social consequences. Quinaxi prepared plans for the EEB so as to be able to recover these bodies of water and mitigate the environmental impact that they are having on the nearby towns.

Impact of implemented activity (social, economical, environmental, etc.)
The plan of action proposed for the Muña reservoir has been 3 years in the making. The results this plan seeks are the improvement in the quality of life for the people who live near the reservoir and the reduction of the presence of mosquitoes and bad odors that are generated in its area of influence. The results of the proposed actions have been monitored periodically with positive results. They also seek to take advantage of the conditions of the reservoir for improving the quality of the Bogota river in its lower basin and its mouth in the Magdalena river. On the other hand, the plan for the Tomine reservoir includes different activities along the reservoir basin and its effects will benefit the high basin of the Bogota river. Direct actions have been proposed for the body of water that the EEB is to develop, as well as indirect measures that other actors in the basin are to take in the next 2 years. The plan's proposed actions have been disclosed to the community and the ones that are currently in operation have caused jobs to be generated in the region.

Types of stakeholders involved
Public services companies:
Empresa de Energía de Bogota; Acueducto de Bogota; EMGESA
Environmental authorities:
Corporación Autónoma Regional de Cundinamarca, CAR
Ministry of the Environment
Local authorities: Municipalities of Sibate, Guatavita, Guasca and Sesquile; Government of Cundinamarca
Nongovernmental organizations: Quinaxi; Ecofondo; Amigos de Tomine
Research centers: Universidad de los Andes

Means of stakeholder involvement and role they play(ed)
The Muña reservoir plan of action has a surveillance committee. The action plan's activities have been socialized towards the heart of its zone of influence through a group of women in the region, who facilitate communications between the EEB and the community. Quinaxi proposed a series of reference and prospecting scenarios that were worked on in an inter-institutional workshop in which participated officials from the management levels of the EEB, with an end to obtaining the future vision of the reservoir and the most probable scenarios, that served as a base for the shaping of the directing plan's program and projects.

Long-term commitment and targets
The Muña reservoir plan of action is a set of jobs and activities of different types, planned to be performed during ??
the direct actions of the directing plan of the Tomine reservoir are planned to be performed during the next two years.

Originality and Innovative Ideas
The formulation of these plans is based on a participatory planning methodology, that is being developed as a job performed by EEB officials in conjunction with experts on the situation and the territory, as a result of the proposals prepared by Quinaxi for the application of the instruments and tools necessary for reaching the proposed objectives. Based on the results of the application, the Institute has been perfecting a prospective environmental territorial planning methodology that is considered very innovative and integrating, thanks to the participatory and preventive character of the planning processes.

Costs involved
The development cost of the methodology and preparation of the plans has been an estimated US$200.000. The budget for the development of the Muña work and actions is estimated at US$4.000.000. These resources will be appropriated by the EEB, EMGESA, and the Bogota Aqueduct. The cost of the actions performed to date is estimated at US$800.000.
The budget for the direct activities of the directing plan for the Tomine reservoir is estimated at US$2.000.000. The actions developed to date have cost US$500.000.

Lessons learned that you would propose to present at the 4th World Water Forum
The achievements of the work that has been done lie in the use of participatory work methodologies and information management, that are the result of the collaborative efforts of its team of specialists from Quinaxi, the EEB, the permanent participation of representatives of the municipalities, the environmental and municipal authorities, representatives of the civil society and other watershed actors, who interact as experts and specialists in the territory. This results in consensus and the appropriation on the part of the members of the work group of the planning instruments, methodologies and results of the process.

Local actions details:

ID	LA1171
First name	Julio Last name Ruano
Organization	Itzamna Society (El Progreso Community Water Committee (7 miles))
Country	Belize
Gender	Male
Email	Artistmai1981@btl.net
Scope of the action:	District
Region:	Americas
Name of Local Action:	Community Drinking Water Management by Gravity
Framework theme:	Water for Growth and Development
Crosscutting perspectives:	Institutional Development and Political Processes; Capacity-building and Social Learning

Name and types of the implementing organization(s)
Itzamna Society: Civil society organization

Description and location of the problem and activity as implemented
The resource of water was insufficient for the community and the water that was being used was unhealthy. So a proposal was presented for a drinking water system for the community of El Progreso (7 miles), Pine Ridge Road, Cayo District, Belize, Central America. The drinking water system project was undertaken in 2002 and it solved the problem of incomprehension in the community, and now has brought development to the community. The difficulties were access to funds for the undertaking of the project, the difficult access to the area, and the fact that the Government was very slow and did not respond to the needs of the community.

Impact of implemented activity (social, economical, environmental, etc.)
The result that is expected is that there be healthy drinking water for all the homes in the community. After the installation of the system the community was given 7 months of water for free and then a monthly fee was instituted. With the monies gathered in this way, expansion jobs were performed in the community. Now, the time that used to be put into looking for water is poured into other work, the water that is consumed is healthy, and jobs have been created. The economic impact is that now there are more farming products because there is irrigation. Thanks to the water system, 13,006 acres of forest below the National Park have been protected, and this has had an impact at the local level, on the watershed, and at the national level as well. The fact that approximately 3000 indigenous inhabitants and peasants now have drinking water has had an indirect impact on them.

Types of stakeholders involved
The result that is expected is that drinking water has reached the homes in the community. After the installation of the system the community was given 7 months of water for free and then a monthly fee was instituted. With the monies gathered in this way, expansion jobs were performed in the community. Now, the time that used to be put into looking for water is poured into other work, the water that is consumed is healthy, and jobs have been generated. The economic impact is that now there are more farming products because there is irrigation. Thanks to the water system, 13,006 acres of forest below the National Park have been protected, and this has had an impact at the local level, on the watershed, and at the national level. The fact that approximately 3000 indigenous inhabitants and peasants now have drinking water has had an indirect impact on them.

Means of stakeholder involvement and role they play(ed)
1. The Community and the Village Council that undertake the planning of the work and the manual labor.
2. SIF- Provided the funds for the system's project.
3. The Mennonite Community and religious groups – technical assistance.

Long-term commitment and targets
The monthly fee goes to the maintenance of the system and to a fund that is managed by the water committee; these funds will serve to renew the system long-term, and each 3 months there is a community meeting where a financial report is generated. The commitments are that there is to be supervision on the part of the local Government, and there are the regulations of the water committee's certificate.

Originality and Innovative Ideas
Yes, the system can be considered innovative because of the system of gravity. The system was made possible thanks to the Mennonite community's knowledge and its technology at the local level and thanks to the experience they have in the water system.

Costs involved
The cost of the project was US$350,000, and the measures that were taken to reduce costs are that the community provided the manual labor worth US$55,000. The funds for the project were given by the Social Investment Fund (SIF).

Lessons learned that you would propose to present at the 4th World Water Forum
Yes, the system can be one of experience for other communities because it is a system using gravity without the cost of fuel and is administered by the community; there can be exchanges with other groups who are interested in the possibility of having a system by gravity.

Local actions details:

ID	LA1199
First name	Gustavo Last name Heredia
Organization	Programa Agua Tuya
Country	Bolivia
Gender	Male
Email	gustavoh@aguatuya.com
Scope of the action:	City
Region:	Americas
Name of Local Action:	Creation of "Water Committees" in peri-urban zones (local action to be presented at the ID TS0050 session organized by the WECF part of the Women's Coalition)
Framework theme:	Water for Growth and Development

Crosscutting perspectives: New Models for Financing Local Water Initiatives; Application of Science, Technology and Knowledge

Name and types of the implementing organization(s)
PLASTIFORTE SRL: Enterprises and facilities that are either private managed as public-private partnerships

Water Committees: Civil society organizations
Municipalities, municipality associations and the Municipal Drinking Water Company (Empresa Municipal de Agua Potable): National and local Governments, authorities and associated.

Description and location of the problem and activity as implemented
In the department of Cochabamba (Bolivia) there is a great demand for drinking water and sanitation services. Due to the lack of attention on the part of the public sector, the peri-urban and rural districts of the main municipalities of the department are organized around the water problem and are starting to build solutions of their own. Many of the districts are forming "Water Committees" (organized civil society) in order to take on small drinking water system construction projects. The Programa Agua Tuya (Your Water Program) is starting to offer integrated solutions in the field of water. The community acquires these distribution systems with its own resources and covers 100% of the real costs of construction.

Impact of implemented activity (social, economical, environmental, etc.)
The Programa Agua Tuya (Your Water Program) to date has built over 170 drinking water systems, giving access to water to more than 85,000 inhabitants in poor peri-urban and rural areas.

Types of stakeholders involved
The Programa Agua Tuya (private program) centers all its activities on supporting the Water Committees (organized civil society), using a demand focus. That is, it is constantly seeking to satisfy the unsatisfied demands of the Water Committees. In order to be able to offer soft credit and so that the users (who turn into owners of the systems) can cover the investment

costs, the Program has strategic alliances with NGOs and local foundations, municipalities, municipal associations and the Municipal Drinking Water Company (Empresa Municipal de Agua Potable).

Means of stakeholder involvement and role they play(ed)

- Water Committees: The organized users invest their own resources so as to take on the project and turn into the system's owners and operators (through the committee).
- Women: In most of the cases there are women on the Water Committees.
- Cidre NGO: Offers bland credits to the water committees for the users (partners) to make the necessary investments (approximately 180 US Dollars/dwelling)
- Programa Agua Tuya (Your Water Program): Facilitates the process and works with the water committee from the conception of the project based on the specific needs of the community, to the construction of same.
- Municipalities: Municipal contributions allow for the investment on the part of the user to decrease partially.
- Municipal drinking water companies: This facilitates the expansion of the municipal water companies in the poorest peri-urban zones.

Long-term commitment and targets

The continuity of the actions is guaranteed from the moment the projects are 100% financed by the people's own local resources. There are no external contributions. The future plans include expanding the operation to other departments in Bolivia, documenting the projects so as to make known the successful experiences and replicate the working model in other areas. The World Bank's Water and Sanitation Program and the UNDP have committed to undertaking a case study on the Agua Tuya program in January of 2006. This case study will be published and may be used to share the lessons learned during this process.

Originality and Innovative Ideas

Technological innovation: As an example of the development of appropriated technologies, we present the case of the Torre Hidroneumática (hydro-pneumatic tower). This multiple sector focus allows us to combine capacities and create synergies for reaching common objectives.
Innovation in municipal water company coverage expansions: We make viable the expansion of the municipal networks by building small community systems that are then connected to the main system.

Costs involved

The total investment on the part of the users comes to USD 3,000,000 in the 170 water systems built to date. The approximate investment per house is of USD 180. As financing mechanisms, we have alliances with NGOs and foundations that provide credit for the Water Committee. In the course of a year this credit is covered via monthly payments on the part of the users.

Lessons learned that you would propose to present at the 4th World Water Forum

The lessons learned throughout the last nine years can be summarized in three areas that have to be worked on in order to fulfill sustainable water projects:

1. Sense of ownership of the infrastructure: The only way to guarantee that a water project will be sustainable is through the sense of ownership (appropriation) of the infrastructure built.
2. Focus on gender: The issue of the distribution of water has a very strong gender component, because cultural tradition says that women are the ones in charge of managing the water in the homes.
3. Appropriated Technologies: A drinking water project could not be sustainable over time if it did not make use of appropriated technologies.
4. Multiple Sector Alliances: The best way to obtain innovative solutions and sustainable projects is through multiple sector alliances (public sector, private sector, NGOs-foundations and civil society). The local private sector can be a great ally of local and national public institutions and instances of international cooperation.

Local actions details:

ID	LA1175
First name Maximiliano	Last name Matute
Organization	Patronato, Nueva esperanza
Country	Honduras
Gender	Male
Email	coaforpla2004@yahoo.com
Scope of the action:	Basin
Region:	Americas
Name of Local Action:	River basin administration and the installation of hydroelectricity in the community
Framework theme:	Water for Growth and Development
Crosscutting perspectives:	Institutional Development and Political Processes; Capacity-building and Social Learning

Name and types of the implementing organization(s)

Patronato promejoramiento la Nueva Esperanza: Civil society organization
Patronato del Agua Los Angeles: Civil society organization

Description and location of the problem and activity as implemented

There was a need for all the inhabitants of the community to have drinking water. Before, some had systems using hoses, but this meant a big investment and poor families could not afford it. The lack of drinking water increased gastrointestinal diseases especially in children and more during the winter months. Not having drinking water at home limited women, especially in terms of resting or being able to spend time on productive activities, for they had to carry water over long distances.

Impact of implemented activity (social, economical, environmental, etc.)

To reduce the high rates of gastrointestinal diseases in children, maintain the protection of sources of water, achieve an efficient administration of the project, which is done by having the inhabitants pay a monthly fee which is administered by a water commission.

Types of stakeholders involved

The community was directly involved in the undertaking during the entire process, from the request to the municipality as local Government after the constant visits of the different financial support organizations, and the negotiations with the owner of the land (of the micro watershed), and lastly, in the work of installation of the project.

Means of stakeholder involvement and role they play(ed)

1. The Municipal Government in accompanying the search for financing.
2. GTZ donating organizations with funds for the purchase of materials.
3. The community in the social work.

Long-term commitment and targets

The project administration is handled by the community, this is what they have trained for. The inhabitants pay a monthly fee in order to have resources for operations and repairs, and they also pay two people permanently who are in charge of surveillance of the micro-watershed, and administration of the water towards each of the districts. Currently the community is administering the installation of a small hydroelectric station that will generate electricity for the community, it has 26,000 US Dollars approved by the UNDP, a small donations program with which it will start the negotiations for the development of the project.

Originality and Innovative Ideas

It is innovative in the sense that the communities develop the capacity for management, and for administering their own resources.

Costs involved

The costs are not available at the moment.

Lessons learned that you would propose to present at the 4th World Water Forum

1. The community was directly involved
2. It generated management capacity
3. It allows the systems to be sustainable and allows for the protection of water sources

Local actions details:

ID	LA1378
First name Jorge Eduardo	Last name Corrales Celedón
Organization	Compañía de Acueducto y Alcantarillado Metropolitano de Santa Marta "Metroagua S.A., E.S.P"
Country	Colombia
Gender	Male
Email	jcorrale@metroagua.com.co
Scope of the action:	District
Region:	Americas
Name of Local Action:	Study, Model and Artificial Recharge of the Santa Marta Aquifer
Framework theme:	Water for Growth and Development

Crosscutting perspectives: Institutional Development and Political Processes; Application of Science, Technology and Knowledge; Targeting, Monitoring and Implementation Knowledge.

Name and types of the implementing organization(s)

Compañía de Acueducto y Alcantarillado Metropolitano de Santa Marta "Metroagua S.A., E.S.P": Enterprises and facilities that are either private managed as public-private partnerships
Ministerio de Ambiente Vivienda y Desarrollo Territorial: National and local Governments, authorities and associated

Description and location of the problem and activity as implemented

The city of Santa Marta is located in the Colombian Caribbean, it has a population of 430,000, and its main economic activity is tourism, from which it receives approximately 80,000 visitors during the tourist seasons. Under normal conditions the city is supplied 60% by surface water and 40% by subterranean sources, but in the summer months this situation changes and the aquifer permits supplying 60% of the population. Due to the excessive proliferation of wells close to the coast, there has been over-exploitation locally. With the help of the FEFLOW software, a mathematical model of the aquifer was made in order to detect the flow trends and their interrelation with the sea.

Impact of implemented activity (social, economical, environmental, etc.)

The mathematical model of the aquifer allowed the flow tendencies to be made known, as well as their interrelation with the sea; said model is calibrated and currently used to optimize the exploitation regime. With the relocation of the production wells and the improved water balance in the system, the advance of the sea has been controlled and the sustainable exploitation of same is being ensured. By optimizing the exploitation of the subterranean sources on the part of the aqueduct, its production went from 163 lps in 1992 to 426 lps in 2005, improving the quality of life for the town of Samario and attracting private investment to the city, both in tourism and in industrial and trade development.

Types of stakeholders involved

National and international scientific research entities such as the Universidad de Los Andes, Colciencias, the International Research Centre for Canadian Development (CIID) and Jacques Whitford participated in the first stage of the study (1992 to 1994), contributing technological and economic support. The Triple A Business Group gave support in the second stage (1998 to 2005), and the Federal Polytechnic School of Zurich (Switzerland) collaborated with the Mathematical Model. Currently, the District Administrative Department for the Environment (DADMA) and the INTROPI (Tropical Research Institute of the Universidad del Magdalena) are working on the manufacture of the Aquifer Vulnerability Map and outlines for the manufacture of the Management Plan for the Santa Marta Aquifer.

Means of stakeholder involvement and role they play(ed)

Universidad de los Andes: Contribution of 32 million Pesos (1991). General management of the first stage of the project (1992 to 1994).
Metroagua S.A., E.S.P.: Contribution of 32 million Pesos (1991), contribution of 640 million Pesos (1997 to 2005). Co-general management of the first stage of the project (1992 to 1994) and general management of the second stage of the project (1997 to 2005).
Colciencias: Contribution of 60 million Pesos (1991).
The International Research Centre for Canadian Development (CIID): Contribution of 173.000 Dollars (1991) and technological support.
DADMA: Contributions to research of 153 million Pesos and support with environmental management.
Corpamag: Contributions to research of 509 million Pesos and support with environmental management.

Long-term commitment and targets

Work is being done with the environmental authorities who have jurisdiction in the area of the study (DADMA and CORPAMAG), on the manufacture of an Aquifer Management Plan, so that the corrective and maintenance measures that guarantee the adequate exploitation of the subterranean water resource may be taken.

Originality and Innovative Ideas

With regards to this project, actions were taken that made it a pioneer in Latin America in the artificial recharge of the coastal aquifers, by means of the implementation of artificial recharge systems.
Another technological implementation was the Mathematical Model of the Aquifer.

Costs involved

In the first stage (1992 to 1994). The International Research Centre for Canadian Development (CIID): Contribution of 173.000 Dollars (1991); Universidad de los Andes: Contribution of 50.180 Dollars (1991); Metroagua S.A., E.S.P.: Contribution of 50.180 Dollars (1991); Colciencias: Contribution of 94.088 Dollars (1991).
Second stage (1997 to 2005). Metroagua S.A., E.S.P.: Contribution of 256.404 Dollars (1997 to 2005); DADMA: Contribution of 61.297 Dollars (2004 to 2005); Corpamag: Contribution of 203.921 Dollars (2004 to 2005); Universidad del Magdalena: INTROPIC (Tropical Research Institute), Contribution of 3.606 Dollars (2004 to 2005).

Lessons learned that you would propose to present at the 4th World Water

The information above confirms that the project on the Study, Model and Artificial Recharge of the Santa Marta Aquifer has been considered a management model for coastal aquifers in Latin America, which confirms that the participation of same in the project presented before the UNESCO International Geo-Science Program (IGCP), which is meant to identify methodologies for the management of aquifers in Latin America based on successful experiences, on certifying the research methodology with the ISO-9001 norm, facilitates the application of other similar aquifers. This is even more the case if we take into account that ICONTEC demands procedures and working instructions that facilitate the undertaking of the work and ensure its correct execution.

Local actions details:

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Scope of the action:	Country
Region:	Americas
Name of Local Action:	Latin American Water Forum
Framework theme:	Water for Growth and Development
Crosscutting perspectives:	Institutional Development and Political Processes
Type of organization:	National and local Governments, authorities and associated; International and intergovernmental institutions

Description and location of the problem and activity as implemented

Concern regarding the minimal amount of water available for human use; the millions of inhabitants of Latin America that do not have access to drinking water and the poverty in which they find themselves.

With this in mind, the I Latin American Water Forum took place in Ciudad Valles from June 23 to 25 of this year, at which the "Valles Declaration" was drawn up. The declaration will be presented at the 4th World Water Forum to take place in Mexico City in 2006.

Impact of implemented activity (social, economical, environmental, etc.)
This document will allow the mayors to communicate the aspects that are to be taken into consideration in integral water management at the World Water Forum, in the light of Latin America's reality.

Types of stakeholders involved
The participation of the World Conservation Union (IUCN), the United Nations Commission on Sustainable Development (UN-CSD), the Association of Municipalities of Mexico (AMMAC), the Central American Water Resources Regional Committee (CRRH), the National Water Commission (CONAGUA), Municipal Presidents from 12 countries in Latin America and the Caribbean, the State Government and the city council of Ciudad Valles

Means of stakeholder involvement and role they play(ed)
In compliance with what was established by the program during the first day of work at the I Latin American Water Forum, there were talks on water given by Mr. Manuel Dengo, Ms Rocío Córdoba, Ms Patricia Ramírez and the representative of the CONAGUA as coordinator of the 4th World Water Forum.

During the second day of work at the I Latin American Water Forum there were work sessions, the reflections of which regarding the problem of water in Latin America and the Caribbean gave support to the "Valles Declaration".

Long-term commitment and targets
The "Valles Declaration" document, which will be presented at the 4th World Water Forum by the municipal presidents, will be divulged so that those mayors and municipalities that see fit to do so may adhere to the document.
Originality and Innovative Ideas

This action, if not innovative, is precise, because it is a good opportunity for the participants at the World Water Forum to become aware of what local decision-makers in Latin America think, given that the slogan of the World Forum directly affects the world environment.

Costs involved
The I Latin American Water Forum had expenses of $1 200,000.00. These were covered by the city council of Ciudad Valles with the participation of the State Government.

Additionally, the IUCM and the CRRH paid for the airline tickets for some of the Central American municipal presidents.

Lessons learned that you would propose to present at the 4th World Water Forum
CIUDAD VALLES DECLARATION ON WATER MANAGEMENT
The Mayors and Mayoresses of Latin America, gathered at the I Latin American Water Forum: "Managing Water Locally", which took place in Ciudad Valles, San Luis Potosí, Mexico, on June 23 and 24, 2005,

Agree:

1. To declare water to be a public good that is not subject to appropriation; and access to water to be a basic human right.
2. To protect the social groups that are most vulnerable and in situations of risk, guaranteeing the provision of drinking water for the greatest percentage of the population, as well as sanitation and the final disposal of wastewater, in coordination with regional and national Government entities.
3. To contribute to diminishing the vulnerability of water vis-à-vis local, regional and global threats, promoting the environmental education of the formal and informal population concerning the value of water, in its natural, socioeconomic and cultural aspects in the productive processes, as well as the development of their perception of environmental risks, and in this way achieve a new culture regarding the sustainable use of water; but, at the same time, guaranteeing the subsistence and feeding safety of the inhabitants of the localities implicated.
4. To create, consolidate and strengthen the environmental institutional structure of the municipality – with a focus on ecosystems, in a participatory fashion and with social equity – so that it is responsible for the sustainable management of water, with a focus on the ecosystem that considers the care, conservation and sustainable use of the land and the forest as an indispensable condition for the protection and conservation of water; strengthening and promoting the education of municipal human resources and of citizens as essential pillars in the search for solutions to the problem of water.
5. To promote national and international municipal associations, brotherhood among municipalities, as an instrument of the exchange of experiences and knowledge regarding integral water management and the surveillance of its application. In this context, to create a Network of Environmentally Sustainable Municipalities – LAMAS Network -, as well as the Best Practices Bank, in the municipalities of Latin America, among other environmental issues.
6. To support the legislative initiatives before the National Congresses so as to achieve reforms oriented to the decentralization of water management at the local level.
7. To promote the creation of permanent structures for the shared administration of border and trans-border hydrographic watersheds and develop joint strategies among the municipalities for the sustainable management of river basins that take into account the use and protection of the hydro-regulating forest fringes, land use, control of the disposal of mining, farming and animal husbandry, industrial and domestic waste.
8. To fix economic, financial and legal mechanisms that facilitate integral water management, starting with the fulfillment of the international commitments taken on for the transfer of capital with preferential conditions and technologies to the local Governments of the countries in development for the acquisition of equipment and accessories that will permit creating and improving the efficiency and use of the distribution networks, drainage and treatment plants.
9. To develop mechanisms to facilitate the participation of citizens and civil society organizations in the creation and execution of water policies and laws, on the basis of a joint participation agreement, with a multiple-sector approach.
10. To develop a Social Communications Program with an international, national and local reach that may contribute to the creation of a public opinion that is well-informed and a citizen awareness of the rights and responsibilities of the different public, private, academic and community actors.
11. To consider the condoning of the external debt of the countries that are less developed as a source of financing so as to contribute to solving the problem of the deterioration or inexistence of water distribution networks, drainage and treatment plants, among other needs, that these countries have, for their administration by the local Governments.
12. The excellent organization undertaken by the municipality of Ciudad Valles, San Luis Potosí, Mexico, is acknowledged, headed by the Mayor, Mr. Jorge Terán Juárez, in the celebration of this forum and the crystallization of this Declaration.

Local actions details:

ID	LA0727
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Scope of the action:	Basin
Region:	Americas
Name of Local Action:	Flower and fish treatment and reuse of wastewater in the Valle de Mezquital, Hidalgo, Mexico.
Framework theme:	Water for Growth and Development

Crosscutting perspectives: Capacity-building and Social Learning; Application of Science, Technology and Knowledge

Type of Organization: Professional associations and public and private knowledge and education centers; Enterprises and facilities that are either private managed as public-private partnerships; National and local governments, authorities and associated

Description and location of the problem and activity as implemented

The Valle del Mezquital, Estado de Hidalgo (Mexico) is located on the southwest border of the state of Hidalgo and is the site of one of the world's largest wastewater risk systems (over 85,000 has.). The emission of 60 m3/s from the Mexico City Metropolitan Area towards the region increased the production of farming and animal husbandry, but generated problems of digestive diseases and the accumulation of various pollutants. The wastewater that comes into the valley represents values of up to 600 million coliform fecal matters per 100 ml. and is reduced to several hundreds or thousands. The same thing happens with the concentration of helminth eggs that go from over a hundred to less than one per liter. Large amount of phosphorus and heavy metals have been added in the area, which have accumulated in the soil (Cifuentes et al. 1994; Downs, et al. 2000). The condition of sanitary risk has lead to the establishment of legal norms that limit the growing of vegetables but also the productive activities of the local population. This has upset the local communities, and often they keep using water illegally for this purpose.

It is necessary therefore to set up wastewater treatment systems that will decrease the problem. Unfortunately the setting up of conventional water treatment systems is very costly. This work represents a community and academic experience of treatment via wetlands, which were adapted for the production of flowers and fish. The background for this adaptation was an experiment performed by a work group in Texcoco, State of Mexico (Belmont et al. 2004), that has been in production for 10 years. The initial proposal was made in 1995 to a group of producers of milk who used the wastewater for the production of fodder, particularly alfalfa. It was supposed that they could be more sensitive because, besides fodder, they produced vegetables and were aware of the Federal Government's restrictions on the use of wastewater. The system has been developed with the community group "La Coralilla", from Ocotza, Villagrán, Municipality of Ixmiquilpan, State of Hidalgo.

Impact of implemented activity (social, economical, environmental, etc.)

In the course of the project, samples and analyses of water have been made in order to know and improve the way it works, obtaining removals of between 80 and 90% of organic matter, total coliform bacteria (90 and 95%). The treated water that passes through the fish tanks still preserves the high levels of nutrients, which allows algae to grow. This has allowed for the creation of a highly productive water system, well-oxygenated (12 mg/L), alkaline (pH 8.7), semi-hard (102 mg of CaCO 3 /L), and with high levels of nitrogen and phosphate nutrients (2 mg of nitrates/L and 1.5 mg of phosphates/L).

A wastewater treatment infrastructure has been created with a flow of 1 liter/second in the system; there is a yearly production of 700 Kg. of fish, 5,000 flowers, 170,530 Pesos in gross income and expenses of 20,080 Pesos. The system is operated by a group of nine people on average and the varying support of another 5 people, as well as the participation of a group of 10 academics.

Types of stakeholders involved

Sociedad Cooperativa "La Coralilla" S.C.R.L. Ex-Hacienda de Ocotza, Villagrán, Municipio de Ixmiquilpan, Estado de Hidalgo. Hñahñu (Otomies from the valley of the Mezquital) indigenous community organization whose main productive activity was gathering, goat breeding, agriculture by irrigation, and cattle breeding for the production of milk. Currently it is water treatment and the production of alcatraz and tilapia flowers. Universidad Nacional Autónoma de México, Facultad de Estudios Superiores Zaragoza, Programa de Biología (National Autonomous University of Mexico, Zaragoza Faculty of Higher Studies, Biology Program). University and research centre for biology, ecology and natural resources. Gobierno del Estado de Hidalgo, Secretaría de Agricultura, Dirección de Pesca (Government of the State of Hidalgo, Agriculture Secretariat, Department of Fishing), Fundación Hidalgo Produce, A.C. (Hidalgo Produce Foundation), organization that brings together the federal and state Governments to drive the technological development of farming and animal husbandry, forestry and fishing. H. Ayuntamiento Municipal de Ixmiquilpan, Estado de México (Ixmiquilpan Municipal City Hall, State of Hidalgo). Centre for Alternative Wastewater Treatment, Sir Sandford Fleming College, Lindsay, Ontario, Canada. Water Quality Centre, Trent University, Peterborough, Ontario, Canada. Wetland Biogeochemistry Institute, Louisiana State University, United States of America.

Means of stakeholder involvement and role they play(ed)

Sociedad Cooperativa "La Coralilla" S.C.R.L. Ex-Hacienda de Ocotza, Villagrán, Municipio de Ixmiquilpan, Estado de Hidalgo. Hñahñu (Otomies from the valley of the Mezquital) indigenous community organization that provided the land, the local materials and the manual labor for the building and maintenance of the system.

Universidad Nacional Autónoma de México, Facultad de Estudios Superiores Zaragoza, Programa de Biología (National Autonomous University of Mexico, Zaragoza Faculty of Higher Studies, Biology Program). Made the initial design of the treatment via wetlands, has sampled the quality of the water, and accompanied the producers in the process of adopting and assimilating the new treatment and production system.

Gobierno del Estado de Hidalgo, Secretaría de Agricultura, Dirección de Pesca (Government of the State of Hidalgo, Agriculture Secretariat, Department of Fishing) and the H. Ayuntamiento Municipal de Ixmiquilpan, Estado de Hidalgo (Ixmiquilpan Municipal City Hall, State of Hidalgo). They have provided economic support for the building of the wetlands and fish tanks.

Fundación Hidalgo Produce, A.C. (Hidalgo Produce Foundation). Provided the financial support for the equipment and scholarships for undertaking the water quality samples.

Centre for Alternative Wastewater Treatment, Sir Sandford Fleming College, Lindsay, Ontario, Canada, Water Quality Centre, Trent University, Peterborough, Ontario, Canada, and Wetland Biogeochemistry Institute, Louisiana State University, United States of America. Provided assistance in the design of the wetlands based on flower-growing.

Long-term commitment and targets

The setting up of a small laboratory for water quality analysis has been considered, that would completely depend on and be made by the members of the local community. The university would support them in the design of the installations and the training of technicians, for determining physical, chemical and biological parameters.

On the other hand, there have been visits from neighbors in the region and school groups, so starting formal broadcasting and training activities has been considered so as to reproduce or adapt the system in the region in places that have similar social and economic conditions. Additionally, there is a commitment to undertake tests and mount the experiments in order to perform extraction and concentration of the heavy metals that have been caught in the sediments during the process.

Originality and Innovative Ideas

The system that has been set up is original and innovative for the following reasons: (1) it uses treatment and reuse for the production of two products (flowers and fish); (2) it is the result of the convergence of different actors, academic, governmental and local; and (3) an indigenous community group showed it was open to learning, applying and adapting technological innovations by developing new activities and values, besides which they switched their main economic income and several associated cultural practices (such as their feeding habits).

The technology developed has an ecological base because the wetlands are based on taking advantage of the biogeochemical cycles and the biological diversity in the rhizosphere to transform, assimilate or eliminate pollutants. The peasants appropriated the new concepts, techniques and practices on the treatment of water and water culture.

Costs involved

In the course of the 10 years that the project has been in existence, investments have been made at different times and scales, reaching an investment of fixed assets of $ 1,303,660.00 including the commercial value of the land (that covers half the investment and was an available resource for the community group before the project was started), adapting the land ($21,000.00) and corresponding civil work to the building of the tanks for the wetlands and the tanks for the fish ($401,000.00), mainly. The financing came mainly from the municipal and state Governments, particularly the Ixmiquilpan City Hall and the Agriculture Secretariat, Fishing Department, of the State of Hidalgo.

Lessons learned that you would propose to present at the 4th World Water Forum

The lesson that can be shared is that an apparent problem represented by the legal prohibition of the use of wastewater in the growing of vegetables can be turned into an opportunity for communities to have better quality food and an alternate source of income.

Local actions details:

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Scope of the action:	sin
Region:	Americas
Name of Local Action:	Community company for the protection and use for eco-tourism of the Río Damajagua (Damajagua River), Dominican Republic
Framework theme:	Water for Growth and Development
Crosscutting perspectives:	New Models for Financing Local Water Initiatives

Type of Organization: Civil society organizations; International and intergovernmental institutions; National and local governments, authorities and associated

Description and location of the problem and activity as implemented

The Damajagua river has 27 waterfalls that take on the role of spas. These are used by tourist companies in Puerto Plata without the community obtaining any economic benefit from this activity.

The association of tourist guides of Damajagua are negotiating a project that includes building service infrastructures, paths and regulations for the use of puddles, as well as activities for the protection of flora and fauna, and the formation of tourist guides with the support of the State Environment and Natural Resources Secretariat. The income generated will be shared with the community. The Damajagua river is a national monument in the categories of the National Protected Areas System.

This action is being undertaken in the municipality of Imbert, Puerto Plata Province, Dominican Republic. Similar actions are being developed in the municipality of Nagua.

Impact of implemented activity (social, economical, environmental, etc.)

Expected results:

- Improved environmental conditions (improved water quality, less garbage, less writing on the rocks, restored flora and fauna).
- Legitimization of the association of guides with exclusive rights over the natural monument of the Damajagua river (co-management agreement with SEMARENA, Tourist Safety, professional training for guides).
- Construction of the indispensable infrastructure for the operation of the area (area for visitors, bathrooms, interpretative paths).
- The activity is now under development, so there are still no results to report.
- The activity generates income that expects to have benefits for the community (building of community infrastructures, support for children's and young people's education).
- New jobs will be created and the current guides will be guaranteed a better wage.
- The environmental impact will be reflected on better water quality, less erosion along the riverbank and better protection of the area's flora and fauna.
- The impact of the project will be at the river basin and regional levels.
- The indirect impact includes the strengthening of the local capacity to manage its resources, greater contact of tourists with the local culture (food, dances, chants, etc.), and increased self-esteem in the community.

Types of stakeholders involved

- Secretaría de Estado de Medio Ambiente y Recursos Naturales (Environment and Natural Resources State Secretariat, Government institution)
- Tourist companies (private sector)
- Asociación de Guías de Turistas (Tourist Guide Association, civil society)
- Ayuntamiento de Imbert (Imbert City Hall, local authority)
- International Resources Group, (IRG)
- Instituto Dominicano de Desarrollo Integral (Dominican Integral Development Institute, IDDI NGO)

Means of stakeholder involvement and role they play(ed)

The SEMARENA is responsible for the resource and dictates the rules of use in the area. It facilitates the training of the guides. The tourist companies are those that take tourists and charge for the service. With this new proposal, their benefits are to be disseminated in favor of the community. The guide association provides the service of interpretation in the area. They are the ones in charge of managing and administering the area. IRG supports the Guide Association financially for the implementation of the activity. IDDI supports the Guide Association in the administration of the funds.

Long-term commitment and targets

The obstacles to sustainability refer to the load of visitors and the economic benefits. Therefore regulations are needed as well as a better distribution of the benefits generated by the area and the capacity of the guide association to gain credibility before the SEMARENA and the tourist companies. As such, the tourist guide training is oriented to this, as are the regulations for hiring the visitations and the use of the natural resources. The SEMARENA and the Guide Association are expected to agree to work together on this.

The recurring costs estimated per year are 1.3 million for the first two years. Income is estimated at 1.6 million a year.

Originality and Innovative Ideas

This action constitutes an innovative experience because it will be a collaborative management within the category of the National Protected Areas System. It is an association based on the community that performs the activity. There are good synergies and alliances between the civil society, OBC, international entity and NGO. This action is fortifying the local capacity regarding the management of natural resources and accounting management. It will bring benefits for the tourist companies, the Guide Association and the community. It constitutes a pilot experience of how to work in conjunction with the Government-civil society.

Costs involved (no more than 500 words)

The total of all costs involved should be clearly reported.

The total costs of the project are RD$ 3.524,592.00 with a contribution from the IRG of RD$ 1,475,300 and a compensatory contribution of RD$ 2,047,792. (The rate is RD$ 30.00 Pesos per US$ 1.). The compensatory contributions include the SEMARENA training, the community work and that of the Guide Association.

Lessons learned that you would propose to present at the 4th World Water Forum

- The collaborative management of protected areas. Transfer of functions and responsibilities from the State to the civil society.
- Use of water for recreational purposes with generation of resources, with an investment in improved infrastructure.
- Importance of the formation of the community in natural resources and accounting management.

This action can be replicated in many contexts in Latin America where the State lacks personnel and resources for the protection of the Resource, and therefore shares the responsibility with the civil society.

Local actions details:

ID	LA1078
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Type of organization:	Basin
Region:	Americas
Name of Local Action:	Nuevo Progreso Micro-Watershed Committee - San Marcos Guatemala
Framework theme:	Water for Growth and Development

Crosscutting perspectives: New Models for Financing Local Water Initiatives; Institutional Development and Political Processes; Capacity-building and Social Learning; Application of Science, Technology and Knowledge; Targeting, Monitoring and Implementation Knowledge.

Type of Organization: International and intergovernmental institutions; Civil society organizations; National and local governments, authorities and associated.

Description and location of the problem and activity as implemented

The water problem: "The land was a desert and water was disappearing due to the high levels of the population, devastation of the trees, and there were no actions for solving the problem". Drinking water for humans is not continuous, it is scarce, there is no protection for the provisioning source, there is no forest management in the water recharging areas. The farming practices have evolved considerably (67% undertake soil and water conservation).

Actions for minimizing the problem

Reforestation program and soil conservation: In Nuevo Progreso, the priest César Guzmán trained the community in soil conservation and reforestation, but only one person – Mr. Jaime Roblero – put these teachings into practice (personal communication on August 2, 2005). "I did not think it was being done but in my heart of hearts I hoped it would work". Doubting, he started a process of provisions and reforestation.

Impact of implemented activity (social, economical, environmental, etc.)

Benefits of reforestation, management and conservation of the forests:

- Energetic forest producers of timber, dead leaves and green fertilizers, flora and increased flow of water, temporary jobs and forest incentives.
- Soil conservation benefits: better production of crops and surpluses for the market (lima beans sell for $US 40.00 the quintal), soil recovery, protection against erosion, less sediments and protection of the rivers.

Family benefits:

- Family energetic forest, for the consumption of timber, serves as a savings because there is no need to buy timber and it decreases the pressure in the municipal forest concessions.
- Soil conservation reached 67% in the plots, municipal concession for the conservation of forest producers of water in the micro-basin.

Types of stakeholders involved

COCODE Nuevo Progreso- Consejos Comunitarios de Desarrollo (Community Development Councils), local organizations recognized by the State for managing their needs, have been recently formed and seek to improve their capacity to manage their water resources.

IUCN-Unión Mundial para la Naturaleza (World Conservation Union), international NGO with 58 years of experience, currently executes the Proyecto de Manejo Integrado de Cuencas Asociadas al Volcán Tacaná (the Integrated Management of Basins Associated to the Tacaná Volcano Project) in Guatemala and Mexico.

INAB-Instituto Nacional de Bosques (National Forestry Institute), governing forestry institute in Guatemala.

OFM-Oficina Forestal Municipal de San José (San José Municipal Forestry Office), a governmental institute recognized for its actions regarding natural resources at the municipal level.

United Nations Development Program (UNDP), Organización Internacional (International organization), facilitates small donations for water and nature conservation projects.

Comité de Microcuencas del Pacífico (Pacific Micro-Basin Committee): local organization integrated by COCOTES from the upper part of the micro-basin of the Coatán river, for the integrated management of river basins.

Means of stakeholder involvement and role they play(ed)

The community of Nuevo Progreso is located at the head of the Coatán river basin which is shared with Mexico, next to another 10 communities that form a micro-basin. The representatives of the communities have gathered and have decided to form, with the help of the World Conservation Union, a Pacific Micro-Basin Committee. This micro-basin committee opens the space at the local and regional levels for the forming of other similar instances and for the formation of a Coatán River Basin Council in Guatemala.

Long-term commitment and targets

The actors are connected to a long-term sustained process of integrated management of water resources in micro-basins, and, in order to fulfill their purposes, have organized themselves into a micro-basin committee to set up medium- and long-term processes. The neighboring communities share the space of the micro-basins and their resources, and they have now decided to also share and coordinate joint actions and efforts.

The relationship between municipalities is also strengthened by belonging to a river basin located in two municipalities, and this is known as an association of municipalities with an end to getting the processes institutionalized. The San Marcos Natural Resources Inter-Institutional Coordinating Office is there to help, an institution made up of governmental and nongovernmental organizations that work in strategic micro-basins in San Marcos-Guatemala.

Originality and Innovative Ideas

Sustainable development:

The community members of Nuevo Progreso have sought to maintain the balance of the investments in infrastructure with the investments in the conservation and management of the natural resources.

The economic sustainability of a community is achieved with the adequate management of its natural resources, the production of subsistence accelerates the deterioration of the area. The community has managed 8 sustainable development projects, of which 4 are environmental, with the participation of 80% of the population.

Applied technologies:

The construction of soil conservation structures has been learned and applied, such as: level curves, live and dead barriers, manufacture of green fertilizers from organic waste and dead leaves, measures for the use of water and rationing of the distribution, community organization and participation, negotiations with municipal authorities, educational tours and the transfer of technology from peasant to peasant. With municipal advice, management plans for the protection of the natural forests, reforestation and production of forest plants in greenhouses are developed and executed.

Costs involved

The cost covered by the UNDP-Programa de Naciones Unidas para el Desarrollo (United Nations Development Program) is $US 1,870.00 for the project entitled "Agro-Forestry and Reforestation".

The IUCN-Unión Mundial para la Naturaleza (World Conservation Union) investment costs in training, educational tours, Pacific micro-basin committee training, are $US. 670.00.

INAB-Instituto Nacional de Bosques (National Forestry Institute) with the payment of forestry incentives for 101.27 hectares for municipal forest management in 2004, $US. 935.00, and in 2005, $US 2,854.00.

Lessons learned that you would propose to present at the I V World Water Forum

Comité de Microcuencas del Pacífico, río Coatán Parte alta Guatemala. The organization of a micro-basin committee at the Coatán river has been in the making since late 2003. The municipalities of San José Ojetenam and Tacaná in Guatemala have united so as to have high-impact activities in their municipalities, they are members of the ADIMAM-Asociación de municipalidades del altiplano marquense (Association of the plateau's municipalities), they gather together the communities neighboring the Coatán riverbank. Accompanied by the IUCN- Unión Mundial para la Naturaleza (World Conservation Union), they held the first meeting in the Rosario-Tacaná community where groups of communities geographically distributed close to and along the Coatán were defined; many of these communities had already undergone voluntary reforestation activities and plant production in greenhouses. Later there were other meetings and a process was determined for the formation of Micro-Basin Committees.

The process was recently initiated with the formation of the Coatán river Micro-Basin Committees in September. Specific work meetings are to be incorporated shortly where joint projects will be defined by river basin, integrating the needs of both countries and short-, medium- and long-term actions.

Local actions details:

ID	LA1238
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Scope of the action:	Basin
Region:	Americas
Name of Local Action:	Silvoapicultura (forestry-beekeeping)
Framework theme:	Water for Growth and Development
Crosscutting perspectives:	Capacity-building and Social Learning
Type of Organization:	International and intergovernmental institutions; Civil society organizations

Description and location of the problem and activity as implemented

In previous years the cultivation of coffee became known as "Green Gold". Today it is no longer an alternative for peasants who are dedicated to this activity to enjoy a significant economic development in the short and medium term. The deterioration of the land and their lifestyles have contributed to the technical backwardness, and the scarce production diversity, the decrease in profitability, the loss of competitiveness, land possession insecurity, as well as several serious problems such as the delay in the renovation of old coffee plants and the low price of the product, the unstable production and yield (it depends on temporary agriculture because of the significant fluctuation in annual rains), all contribute to making the transition from predominantly traditional farming practices to less conventional ones, displace current crops to other crops. In the "El Águila" Micro-Basin, located in the northwest part of the Municipality of Cacahoatán, the communities are Fracción Rancho Quemado, Ejido El Águila, Ejido El Progreso , Ejido Agustín de Iturbide, and Ejido Benito Juárez San Vicente, with an area of 986.75 hectares. The water and nature initiative, which belongs to the Tacaná project, has been driven by the Unión Mundial para la Naturaleza (IUCN, World Conservation Union) since 2000 and seeks to guarantee the sustainable development and the conservation of water resources by implementing their integrated management from the point of view of ecosystems, which began execution in September, 2003. It seeks to have the collaboration of local members. Such is the case of the Fundación Gonzalo Río Arronte (FGRA, Gonzalo Río Arronte Foundation), a Mexican public assistance institution, one of the main goals of which is to support social projects that have to do with sustainable water management. This area covers multiple living zones such as: very humid forest and sub-tropical humid lower mountain in the upper river basin, very humid tropical forest in the middle basin, and humid forest and dry sub-tropical in the lower part of the basins.

Impact of implemented activity (social, economical, environmental, etc.)

Necessary actions and programs were identified through the diagnosis, participatory meetings and the agreement of public, private, and civil society actors who work in the territory. These are comprised of multiple production components, production management with family participation, and a production destined mainly to the local market. Additionally, they form an essential aspect of the domestication of the landscape through the ideas of the rural population and their actions in time and space. Indirectly, they favor the pollination of the fruit trees and not affecting the environment. It is also a group of live organizations, very active, flexible to manage, and they play an important role as pollinators of many plants.

Types of stakeholders involved

The water and nature initiative to which the Tacaná project belongs has been driven by the Unión Mundial para la Naturaleza (IUCN, World Conservation Union) since 2000 and seeks to guarantee the sustainable development and the conservation of water resources on implementing their integrated management from the point of view of ecosystems, which began execution in September, 2003. It seeks to have the collaboration of local members. Such is the case of the Fundación Gonzalo Río Arronte (FGRA, Gonzalo Río Arronte Foundation), a Mexican public assistance institution, one of the main goals of which is to support social projects that have to do with sustainable water management. For this reason the H. ayuntamiento de Cacahoatán (Cacahoatán City Hall) and the Fideicomiso de Riesgo Compartido (FIRCO, Shared Risk Trusteeship) signed an agreement of coordination for the manufacture of guiding plans for the production and conservation of the micro-basins of "Las Guacamayas y el Águila".

Means of stakeholder involvement and role they play(ed)

The Tacaná projet trains and technically assists efforts related to the management of river basins. The active participation of the inhabitants of the micro-basin and the shifting awareness of the communities at the start and the end of the project, putting plans into action to help gather teachings from their application, and the help of the municipal authorities in having the elements with which to detect current problems in their physical, biological and social contexts, all produced a document that enables priorities to be set for short-, medium- and long-term actions from the holistic point of view, seeking the sustainability and recovery of the biodiversity. Additionally, it drives the mix of resources for the sustainable use of the river basin. This governing plan is a document that allows for planning and management for producers vis-à-vis the institutions that have to do with the sector, in compliance with the Sustainable Rural Development Law.

Long-term commitment and targets

The agro-rural development, in this vision, has two perspectives: the sector development based on chains of production, and the territorial, based on regions and municipalities. The development is based on the constitution of networks in each of the support and service areas for the sector, and the formation of alliances and ways of cooperation with national and international organizations.

Originality and Innovative Ideas

One of the strategies that has been applied is the generation of strategic information for better decision-making, evaluating community awareness, increasing the capacity of local actors and driving financing mechanisms for the sustainable use of the entire watershed. Additionally, a technical consulting committee has been set up, and is one means of achieving technical quality control. This committee is comprised of civil organizations and governmental institutions that give guidance and consulting. The team collaborates on the formulation of strategies, they analyze the actions taken, and give follow-up to the execution of the projects.

Costs involved

The cost of the project was 76,355 Pesos. The model was different because the funds were channeled directly to the organized producers of communities with a diagnosis and an integral participatory community development plan. The requirement was that the project committee present the support of a technician, a specific project, arising out of said diagnosis and plan. The communities and producers receive the support so as to be made responsible for the distribution, administration and rendering of accounts concerning said resources.

Lessons learned that you would propose to present at the 4th World Water Forum

The process of progressive change in terms of the quality of life. To guarantee the population not only a healthy environment, but also the resources and means of production for respectable lifestyles; basically, a change in the paradigm or vision of things, a new model that includes: gender equity, citizen participation, community self-management, transformation of patterns of consumption and production methods, sustainable ecological balance and respect for the cultural and ecological diversity.

IMPLEMENTING INTEGRATED WATER RESOURCES MANAGEMENT

Local actions details:

ID	LA0741
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Organization	CENTRO INFANTIL DE RECREACION, CIENCIA Y CULTURA (CIRCYC)
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Scope of the action:	Basin
Region:	Americas
Name of Local Action:	Gran Cosecha de Agua (Large Water Harvest)
Framework theme:	Implementing Integrated Water Resources Management (GIRH)
Crosscutting perspectives:	Capacity-building and Social Learning
Type of organization:	National and local governments, authorities and associated

Description and location of the problem and activity as implemented

- The deforestation in the area known as environmental park, first of all affects the inhabitants of Chilpancingo with a scarcity of water. In June, 2002, the information campaign was started regarding the existence of the Omiltemi park and its importance to the society of Chilpancingo, Guerrero. This got people to participate in the rescue program of this important forest area.
- 40% of the inhabitants of Chilpancingo, Guerrero receive water that comes from Omiltemi and its gradual diminution in provision motivated the demand for the provision of drinking water.

The area where the reforestation is taking place is where devastation has taken place by fire and deforestation.

The Omiltemi park is 30 Kms. to the west of the city of Chilpancingo, with an extension of almost 4,000 has. and with heights that range from 1,800 to 3,000 m. above sea level.

Impact of implemented activity (social, economical, environmental, etc.)

The social impact that this project has provoked is to improve the quality of life for the neighboring communities, recognizing the role of the mountains and forests as important and vital zones for the conservation of the different ecosystems, given that they are a refuge for the flora and fauna and, as if this were not enough, they provide an infinity of benefits for our daily lives.

Results obtained:

Promotional stage: 18,000 were recruited to help in this first stage (June and October, 2002).

Reforestation stage: (June and July)

Year	No. of trees	No. of Has.	No. of people
2003	30,000	12	2,000
2004	20,000	8	1,500
2005	25,000	10	1,800
Total	75,000	30	5,300

Types of stakeholders involved

The CIRCYC, an institution belonging to the Public Education Secretariat of Guerrero, is committed to the community, for it undertakes conservation and reforestation activities in the Omiltemi park so as to prevent its deforestation, and through the media available to it discloses the importance and the benefits that the trees provide us with for improving the quality of our lives and the lives of future generations. Therefore, the CIRCYC orients and educates the different scholastic levels and the community as a whole on such a worthy venture.

Diverse and disinterested basic, intermediate and superior educational

institutions have participated, as well as governmental organizations such as: CONAFOR, SEDENA, and Protección Civil (Civil Protection), CFE (Federal Commission on Electricity), Seguridad Pública (Public Safety); as well as private companies such as: Agua Virgen Omiltemi and the Rotary Club, and religious groups; the interest of society has been awakened, contemplating the future of their children and that of their children's children.

Means of stakeholder involvement and role they play(ed)

In 1975 an agreement was signed between the Faculty of Science at the UNAM (National Autonomous University of Mexico) and the state's governmental authorities, in which scientific activities in the park would be supported for 15 months. Unfortunately, once this term lapsed, the project came to a halt, until June, 2001, when the CIRCYC took it on with a great deal of interest and enthusiasm. The following activities will be performed:

1) Promotional program
2) Installation of an exposition of the project at the School of Architecture to convert the Omiltemi park into an ecotourism project.
3) Direct contact was made with researchers and scientists at the UNAM and creators of the book, "Flora and Fauna of Omiltemi".
4) Undertaking of conferences given by these researchers to the community at large, to students at secondary school level and to teachers.
5) Getting the opinions of the Chilpancingo community regarding the Omiltemi park project.
6) Organization of reforestation brigades during the months of June and July (9 Saturdays a year, taking advantage of the rainy season). We later visited the park one Saturday a month to follow up on the reforestation. It is worth mentioning that the Omiltemi park has a biological and ecological richness thanks to its diversity of environmental units. During the last decades it has served to provide water to the population of Chilpancingo. The water at Omiltemi is one of the most important sources that feed the State capital, because it is of an excellent quality (not hard), and it is relatively cheap because it falls thanks to gravity and is close to the city.

Long-term commitment and targets

The plans are to manage the streams for the substitution of 22 Kms. of pipes, which will bring an increase in the amount of water by avoiding its waste due to current leaks in the pipes (the system is 60 years old).

The media has been asked to support the project by transmitting the information so that the local society is made aware of the actions to be taken. By 2010 the Omiltemi Ecological Park will be 100% reforested, and the aquifers that provide the city of Chilpancingo, Guerrero, with water will be consolidated.

Originality and Innovative Ideas

As part of the commitment taken on by our country, the decade of environmental education created work that is to be undertaken that includes a reforestation campaign for the Omiltemi park, innovating with its participatory and organizational aspects. The first of these is having a permanent mass character and the second is that it came out of a scientific educational institution that today is a promoter of the care of the environment.

The technology used was the mass media and the procedures stipulated in the official reforestation regulations were followed.

The transfer of knowledge was done via formal training, conferences, radio programs, informational brochures and messages printed on fountains and urban walls. The originality of the work lies in the attention placed simultaneously on the spaces occupied in the park (reforestation and surveillance of reforested areas), and at the administrative offices in charge of the issue, promoting simpler processes for the legal protection of the park.

Costs involved

Promotion/divulging $
Painting of walls 2,500
Radio spot 1,900
Banners 2,850
Teaching materials 1,850
Subtotal 9,100 Transfer of people $
Bus rental 34,800
Payment of diesel
(loaned anti-riot buses)
11,400
Subtotal 46,200
Total (per year) 55,300

For the three years we have been working on this: $165,900
The activities we performed to lower costs were making other sectors aware of the project so as to get them to join us in the work.

Lessons learned to present at the 4th World Water Forum

The speed with which positive results have been obtained in the rescue of the Omiltemi park is the element we consider to be interesting for application in other places. The way in which the levels of success were reached lies in making society aware on a permanent basis of the activities and results obtained. The will for and healthy interest in a better world are the key elements for getting the proposed results, which can be increased if there is the decided participation on the part of the authorities and businesses in the region, because support for the transporting and permanent maintenance of the program requires financial resources that in our case were obtained via negotiations and donations in kind, as well as own resources. All of the above shows that society is willing to participate in all activities that guarantee a favorable result for all those involved in the short, medium and long term.

Local actions details:

ID	LA1459
First name Pedro	Last name Osorio Hernandez
Organization	Comité de Recursos Naturales de la Chinantla Alta (CORENCHI), San Felipe Usila, Oaxaca.
Country	México
Gender	Male
Email	geoconservacion@prodigy.net.mx
Scope of the action:	Basin
Region:	Americas
Name of Local Action:	Regional community agreement for preserving natural resources watershed of the Perfume and Santiago rivers"
Framework theme:	Implementing Integrated Water Resources Management (GIRH)
Crosscutting perspectives:	Capacity-building and Social Learning
Type of Organization:	National and local governments, authorities and associated

Description and location of the problem and activity as implemented

Chinantla Alta, is one of the regions officially acknowledged and is considered as of the most important nationally, because of its natural wealth. The communities of Usila River basin occupy 20.5% of 58,053 hectares of vegetation in Chinantla, with mountainside mesophile woods, one of the ecosystems that captures the greatest amount of water, therefore its conservation is very important.
The main problems found were:

- Establishing a consensus for the community and users to take part in integral water management programs.
- Low level of awareness of the value of water.
- Difficulty of the local authorities to invest in infrastructure, water supply, cleaning and production projects.
- Insufficient resources to implement a plan of action.

Impact of implemented activity (social, economical, environmental, etc.)

Results expected before implementation were:

1. Making the local community aware of problems concerning water and its permanent link with forests.
2. Establishing inter-community agreements for conserving resources.
3. Obtaining payment for environmental services and setting up a regional environmental fund.

Types of stakeholders involved

NAME OF ORGANIZATION AND TYPE OF STAKEHOLDER

1. Integrated Ecosystem Management (MIE). Institutional agency.
2. National Forestry Commission (CONAFOR): Government agency.
3. National Protected Natural Areas Commission (CONANP): Government agency.
4. Communities of the San Felipe Usila municipality, plus two who are in the process of joining: Community authorities and local population.
5. Groups of organized women and opportunity program: User population,
6. Geoconservación, A. C.: Consultancy agency.

Means of stakeholder involvement and role they play(ed)

MIE: Provided viable support through consulting services; adoption of an integrated ecosystem management model in the Chinantla region. CONAFOR: provided support by disseminating and implementing its institutional programs. CONANP: Has played a major role, responding to the initiative of the community to certify natural areas of strategic importance for conservation, in order to protect the environment fauna, flora, rivers and communities.

Municipality: Has adopted a very perceptive and supporting attitude to community initiatives and has been present at the management processes implemented by communities and the CORENCHI.

Groups of young community reporters and organized women: Through the environmental awareness and communication strategy, integrated with the MIE, supported the spreading of awareness of a water culture.

Consultora Geoconservación, A. C.: Has provided professional, technical advisory training and undertaken an number of activities, such as ordering of territories workshops.

Long-term commitment and targets

- Strengthen inter-community organization represented by the CORENCHI to promote the efficient and sustainable use of natural resources and the harmonious development of communities;
- Participating in a process of organizational consolidation and institutionalization of their work;
- CORENCHI's links with other regional organizations and stakeholders to strengthen the committee's action, both economically and operationally;
- Signing collaboration agreements, with CONAFOR for example, to continue receiving funding, and setting up the Regional Environmental Fund;
- Signing collaboration agreements with universities to contribute to the knowledge, use and diffusion of the natural resources of Chinantla, as well as training young community reporters to spread the water culture;
- Commitment of state and municipal governments to undertake water and environmental conservation activities and encouraging sustainable rural development.

Originality and Innovative Ideas

Action taken is considered as innovative, because the process of certifying land for conservation represents a milestone in community management processes. There is no similar work in the region, except at Nuevo San Jose Rio Manso, where owners of resources have created and carried out a working plan for the care and rational use of natural resources, particularly water obtained from rainfall. The interaction with Geoconservación A.C., government agencies and identifying problems and defining solution alternatives, was also innovative.
Transfer of technology and knowledge took place in several ways:

- Involving various levels of government with technical support, such as CONAFOR, CONANP, CDI, and others.
- Promoting hands-on training of users, favoring the exchange of experiences and technical visits to learn of other successful agricultural forest production methods; attending congresses and courses on water culture; handling basins and using renewable energy in several scenarios.
- Feedback of experience to users: persons attending events must pass on their knowledge to the people they represent; installing a demonstration model or taking similar action to that during their visit. This has been seen as MIE's key to success.

Costs involved

Cost of actions performed was $632,586.00, and the reduction in cost of initiatives was due to participation of users in the performance of tasks, replicating the traditional forms of cooperation in Oaxaca's indigenous communities, such as tequio and mano vuelta. The means of funding used and who provided it is shown below:

- MIE contributed $632, 586.00 as subcontract costs $66,300.00 of which were invested in training and $ 158,146.50 in technical assistance; $31,629.30 in studies for the performance of a Geographic Information System; $21,500.00 to install water culture areas and $ 12,000.00 for management expenses.
- CONAFOR's provided a partial payment during 2004 of $3,275, 441.76 for payment of environmental services.

Lessons learned that you would propose to present at the 4th World Water Forum

This experience is of great interest on other sites because:

1. The action taken created a demonstration model for the sustainable use of territory and the handling of natural resources, which encourages more users and organizations in the region taking part in this project and adopting similar initiatives.
2. Project involves integral basin management components.
3. Strengthens coordination and social involvement.
4. Encourages the involvement of organized groups with accessible and sufficient funding programs by paying for environmental services.
5. Encourages a new culture regarding the use of natural resources, by creating municipal areas for collecting water and giving talks to schools and to general users.
6. Encourages institutions, NGOs and communities to work towards a single goal.
7. Encourages the Chinanteca culture that is geared to valuing natural resources as common property.

Local actions details:

ID	LA0036
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Gender	Male
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Scope of the action:	Basin
Region:	Americas
Name of Local Action:	Coordination and negotiation agreement for the availability and distribution of surface water at the Lerma Chapala basin description and location of the problem and activity as implemented.
Framework theme:	Implementing Integrated Water Resources Management (GIRH)
Crosscutting perspectives:	Targeting, Monitoring and Implementation Knowledge

Type of Organization: National and local governments, authorities and associated; Civil society organizations; Professional associations and public and private knowledge and education centers

Description and location of the problem and activity as implemented

The Lerma-Chapala basin is in central-western region of Mexico, and although it only represents under 3% of the country's area, it concentrates a little more than 10% of the population. On the other hand, one of every eight irrigation hectares is located in the basin, a third of the Gross Industrial Domestic Product is produced and one fifth of business activity at national level takes place. These socio-economic dynamics place the Lerma Chapala basin above the national average with regard to demographic density and industrial and agricultural production per capita, and at the same time it is where water is most used, as these activities are directly or indirectly sustained by water. Water is not only used in the basin, but it is also sent to the two main urban centers of Mexico, Mexico City and Guadalajara. The Chapala Lake is the largest and most important body of water in the country, as its a total area exceeds 110,000 ha (1,100 km2). It has a storage capacity exceeding 8,100 hm3 and is the most important source of water that supplies Guadalajara population. It also provides nearby irrigation zones and is the basis of tourist, business and service activities, as well as fishing and real estate, and it is an important regional ecosystem, currently part of the Living Lakes International Association. In 1991 an agreement was signed for the distribution of the basin's surface water, and although it was effective between 1991 and 2001, the level of the lake dropped to below that of 1991.

Impact of implemented activity (social, economical, environmental, etc.)

The Agreement resolves problems and conflicts caused by competition in the use of resources among users, in addition to ensuring conservation of the Chapala Lake in the long term. Problems related to conservation of the ecosystem that depends on this important body water are being resolved. There has also been a positive impact on the population and economy on the river bank. Therefore the combination of economic, social and environmental issues, in addition to water-related issues, reduced the negative impact of production activities that depend on this water, as well as to maintain social development by preserving jobs in the field. At the same time, environmental impacts were positive the survival of natural water bodies and thus the survival of its associated ecosystems were assured.

Types of stakeholders involved

For the drafting of the Agreement, the Basin Council had the support of the governments of the states of Guanajuato, Jalisco, Mexico, Michoacan and Queretaro, who share the basin and its resources, and of the federal government, with the participation of the National Water Commission (CNA) and the Department of the Environment and Natural Resources (SEMARNAT). During the last stages of negotiation, these representatives asked for and obtained the direct participation of several user groups in their sectors. Therefore, the GOD received major support from scientific and research institutions, such as the Mexican Water Technology Institute (IMTA) and the Universidad Autoonoma Metropolitana (UAM) for making simulation models, obtaining and assessing several distribution policies, as well as obtaining economic, social and environmental indexes allowing integral assessment of proposed policies.

For its involvement in GOD work, state governments received the advice of experts and specialists in hydrology, modeling, the economy, sociology and ecology, which provided for proper and full involvement in several activities. On the other hand, users had the support of their own technicians and they supported water law advisors who participated in drafting the final document.

Means of stakeholder involvement and role they play(ed)

Fifty-seven work meetings were held by Follow up and Assessment groups (GSE) as well as Order and Distribution (GOD), representing 30,000 man/hours of work. In addition, twelve exhaustive meetings were held to present distribution policy proposals to users groups of all sectors. It should be established that the Order Group developed more than 40 distribution policy proposals.

Users included representatives of agricultural users. Lastly, the involvement of the Mexican Water Technology Institute and the Universidad Autonoma Metropolitana should be mentioned, contributing scientific and technological experience and knowledge for development of tools required, as well as innovative projects in the country, such as assessment of non-consumptive use of water through contingent valuation and assessment of distribution alternatives, taking into account hydrological economic, environmental and social issues.

Long-term commitment and targets

The Surface Water Distribution Agreement is a document that contains cooperation and good will agreements drafted and signed by all members of the Basin Council, and it establishes regulations that improve on those from the 1991 agreement, to distribute water among various users, contributing to the recovery of hydrological balance of the basin. This goodwill agreement must be made into obligatory regulations so it may be applied applicable, that include sanctions in order to ensure compliance with its purpose. It is evident that the agreement is only part of the set of actions called integral and sustainable management and therefore, regulations for distributing surface water do not resolve the complex problems of the basin, although they help.

Originality and Innovative Ideas

- Covers the shortcomings of the prior agreement, mainly regarding unallocated water, a major conflict during the effective term of the prior agreement, particularly during the last cycles. Additionally, the distribution algorithm contains very specific commitments and actions to ensure compliance with its purpose, which was not contemplated in the 1991 Agreement.
- The distribution algorithm, known as joint optimum policy, is based on optimizing the resources used in the entire basin, satisfying at the same time environmental restrictions. The distribution policy was chosen following the assessment from the hydrologic, economic, social and environmental point of view of the alternatives developed.
- It is considered as the exchange of rights for the development of industrial service and water use and public urban use in the future programming of surface water management at the basin, in accordance with National Water Law.

- Concepts and programs of unused and unauthorized volumes were introduced as well as saved volumes that may be used to temporarily satisfy the demand that other sectors may have.

Costs involved

The National Water Commission paid most of the costs incurred when making up the model and its relevant studies. On the other hand, the implementation of the Agreement, particularly commitments in addition to implementation and operation of water distribution policies listed within Clause Six, required a large amount of financial resources. As many of these actions are part of federal and state institution programs, proper programming thereof has been foreseen.

Lessons learned that you would propose to present at the 4th World Water Forum

As it is the only instrument of this kind in the country that regulates the use of the surface water of a basin, it is an example to be followed for other basins. At the first stage we are seeking to replicate the modeling optimizing and integral assessment of alternatives, and to obtain the participation of main stakeholders in the preparation, decision making and negotiation for the Rio Bravo, Valle de Mexico and Balsas basins.

The participation of all involved, including government and users, is essential to achieve agreements and acceptance of several points of view, to ensure that both benefits and negative impacts are distributed equally. Furthermore, the participation of experts and specialists in several disciplines is required to attain a high scientific and technological level and proper discussions and analyses should be conducted tot achieve a better end product.

Local actions details:

ID	LA0235
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Organization	Centro de investigación Científica y de Educación Superior de Ensenada (CICESE)
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Scope of the action:	City
Region:	Americas
Name of Local Action:	Bioremediation of waste water by microbial mats, environmental reduction of the Ensenada Bay and water recovery a model that may be applied to costal municipalities.
Framework theme:	Implementing Integrated Water Resources Management (GIRH)
Crosscutting perspectives:	Application of Science, Technology and Knowledge
Type of Organization:	Professional associations and public and private knowledge and education centers

Description and location of the problem and activity as implemented

Costal municipalities face serious environmental and economic problems, as they discharge a large volume of waste water into water bodies and, in turn, they need good quality of water for their activities. This situation affects the environment, health and the economy of communities close to waste water discharge sites. The community is concerned about the environmental quality of the discharge area and the effect of this type of discharge on the Ensenada Bay, a situation that can be seen around the world.

We are performing bio-remediation work on waste water effluent at the Ensenada municipality treatment plant using bio-reactors packed with microbial mats made from isolated native microbial consortia the site of the effluent's discharge. The treatment system escalated from off site to on site. Escalation and bio-technology problems arose due to the high flow and volume of discharge. This research was conducted at the Gallo creek that receives discharge from the main El Gallo and El Naranjo treatment plants in the Municipality of Ensenada, BC. The first part of the research was performed at the CICESE's Marine Bio-technolgy Department.

Impact of implemented activity (social, economical, environmental, etc.)

It has been determined that bioreactors packed with microbial mats reduce the level of pollutants discharged into the Ensenada Bay. On site, this level helps to preserve the ecology and environmental quality of beaches and the local population, and produces water that may be used for domestic and industrial activities. We have reduced the nitrogenated and phosphated components of the effluent in the short term and the level of total solids, substantially increased oxygen levels. In the medium term we are expecting to implement this initiative at municipal level to improve the environment and economy of the area, and around the world level in areas that have similar problems. As this initiative is at the developmental stage, the evaluation of changes in the area has not yet been concluded. The geographic extent of this action is at local level and it may be applied nationally and internationally as this is a worldwide problem.

Types of stakeholders involved

Sectors involved in this initiative are: FOSEMARNAT, SEMARNAT's sector fund, the National Science and Technology Council, the Marine Bio-technology Department, the Scientific Research and Higher Education Center at Ensenada (CICESE). The collaboration of the State Commission of Public Services at Ensenada has been requested. The person technically responsible for the project is Jose de Jesús Paniagua Michel, Head Researcher of the CICESE's Marine Biotechnolgy Department at

Means of stakeholder involvement and role they play(ed)

The Semarnat-CONACYT sectorial fund provided funding for this project. The CICESE provided laboratory facilities and specialized research equipment for bio-remediation and analyzing water quality. The Ensenada State Commission of Public Services provided access to effluent and its support for research by providing samples of activated mud to isolate the nitrificants required for the kinetics of removing the effluent's nitrogenated and phosphated compounds.

Long-term commitment and targets

The project is at the development and conclusion stage. This biotechnology will continue being used by institutional funds. We are considering submitting proposals to involve every stakeholder in the issue: CONAGUA, CESPE, SEMARNAT, CONACYT, CICESE, UABC, other institutions and industries, and funds that will carry on with this initiative to recover water of usable quality and to preserve the environment and quality of water at beaches and bays.

Originality and Innovative Ideas

This is an innovative action as there is no similar on-site development at either national or international level. Knowledge of engineering, bio-chemistry and molecular biology were combined and applied to characterize microbial consortia that from bio-films and microbial mats which were packed in bio-reactors on site, on the effluent's bio-remediation site. Hydraulic retention time issues were taken into account, as was the morphology of the site for installing bio-reactors and gauging their flow.

Costs involved

This initiative cost 1.6 million pesos, from the basic research stage to application on site. We took into account local materials and components for making microbial mats and designing and constructing bio-reactors. Funding was provided by the SEMARNAT-CONACYT sectorial fund. Logistic support and infrastructure was provided by the CICESE

Lessons learned that you would propose to present at the 4th World Water Forum

This action may be of interest to other communities and countries, as the problem of treated water being discharged into receiving water bodies is worldwide. This initiative may be applied on site by using a combination of bio-reactors packed with microbial mats made from native populations and damp sides is non-existent and represents a real action to conserve the environment and to recover water for human use.

Local actions details:

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Scope of the action:			Basin
Region:			Americas
Name of Local Action:			Integral Management the Ayuquila River Basin
Framework theme:			Implementing Integrated Water Resources Management (GIRH)

Crosscutting perspectives: Institutional Development and Political Processes; Capacity-building and Social Learning; Application of Science, Technology and Knowledge

Type of Organization: Professional associations and public and private knowledge and education centers; National and local governments, authorities and associated; Civil society organizations.

Description and location of the problem and activity as implemented

The Ayuquila-Armeria River is located between the states of Jalisco and Colima. It is one of the most important rivers in the west of the county, since this is the northern limit of the Manantlan Biosphere Reserve. Water resources of the Ayuquila River are continually degrading due to agricultural, industrial and urban activities. Waste water discharge from the towns of Autlan and El Grullo, and the discharge from the Melchor Ocampo sugar mill (IMO) were, for many years, the cause of degradation of the Ayuquila River. However, there are other no less important causes, such as water storage and the diversion and drying of rivers for water purposes that have affected the biotic integrity of the water ecosystem of the Ayuquila river. Pollution and loss of habitat has affected the fish community and reduced the capacity of fish production in the Ayuquila River. As the discharge of industrial water with a high content of organic matter, the water's oxygen content was completely exhausted. This crated a 30 Km section of river in which fish and aquatic invertebrates could not survive. The community's demand due to the mass death of fish, problem of gastrointestinal and skin diseases, and the poisoning and abortion of pets, has led regional stakeholders to take specific action to solve the problem of the river's degradation. An important aspect of degradation and loss of habitat loss is the reduction of the river's volume of flow increasing the concentration of pollutants, leading to loss of habitat and limiting the migration of water species.

Basin's water management. Three levels of water management were development at the level of the Ayuquila River basin representing scales at regional, municipal and local level.

Impact of implemented activity (social, economical, environmental, etc.)

- Creation of the Basin Commission in 1998, that brought about the creation of an a interstate (Jalisco-Colima) discussion forum regarding the management of basin's water.
- Creation of the Basin Department, among the first in the country. It is a technical unit that depends on the initiative's commission and it plans and improves water management conditions within the basin.
- We are working on the integration of a geographic information system of the basin and on the terms of reference for preparation of the basin management plan.
- Zero discharge of waste water from the sugar meal into the Ayuquila River, after more than 30 years of discharge that had turned 30km of the river into a lifeless sewage channel.
- Opening the Autlan de Navarro treatment plant in Jalisco, the municipality with the largest volume of urban waste water discharge in the middle of the basin.
- The result of surveys of the public show that they support the river's cleaning programs and solid-waste recycling. They also acknowledge that water quality downstream from the sugar industry has improved.
- Technical studies and increase in the river's water quality and the introduction of an environmental degradation reversion process.
- Creation of an inter-municipal initiative for the integral management of the Ayuquila River' basin established in 2001 by eight municipalities and increase to ten in 2005.
- Setting up an inter-municipal environmental education program.

Types of stakeholders involved

- Universidad de Guadalajara.
- Sierra Manantlan Biosphere Reserve Directorate – CONANP.
- Manantlan Foundation for Biodiversity of the West.
- Municipalities: Autlan de Navarro, El Grullo, Unión de Tula, El Limón, Tonaya, Tuxcacuesco, Ejutla, San Gabriel, Toliman and Zapotitlan de Vadillo.

Means of stakeholder involvement and role they play(ed)

Ayuquila-Armeria river basin management has been a management and work process for more than 15 years, in which the Universidad de Guadalajara has played a leading role, providing the technical side, in other words, research work (biodiversity inventories, water quality monitoring restoration, etc.). It has provided accurate technical information to local stakeholders and suggested technical actions to improve river conditions. Additionally, it has supported by setting up an ongoing environmental education program that teaches people how to value river resources and support projects, by working with students at all levels, from pre-school to college, as well as civil groups.

The directorate of the reserve, being a federal body, has been the political management group, by virtue of its capacity to negotiate and make cooperation agreements. The Manantlan Foundation has facilitated actions that the reserve directorate and the Universidad de Guadalajara may not take, on account of their nature. It also provides support for obtaining funding. The municipalities provide the organization that facilitates and supplements the effort to improve environmental conditions in the region.

Long-term commitment and targets

The inter-municipal initiative comprises 10 municipalities (Autlan, El Grullo, Union de Tula, Ejutla, El Limon, Tonaya, Tuxcacuesco, Toliman, San Gabriel and Zapotitlan de Vadillo), and the Universidad de Guadalajara, the Manantlan Sierra Reserve Directorate, the Fundación Manantlán para la Biodiversidad de Occidente A.C. and the Government of the State of Jalisco, who provide long-term security with the following actions:

1. Setting up a trust comprised with state and municipal contributions, in addition to funds through the foundation and the university to perform particular studies.
2. Preparing a development strategy through workshops.
3. Preparing annual operating programs allowing proper planning and openness in the use of funds.
4. Commitment of all stakeholders to ensure that the project maintains a long-term view, regardless of political changes.

Originality and Innovative Ideas

This is an innovative activity as a university, a federal government agency, a civil organization and a municipality association have joined forces to clean the Ayuquila-Armeria River and improve the standard of living of people individuals that live near the basin.

Scientific information, political management, environmental education and particular actions for cleaning the Ayuquila River was brought together.
Costs involved

Lessons learned that you would propose to present at the 4th World Water Forum

1. The view of the basin is the basis for natural resources management.
2. Collaboration between the education sector, the government and civil organizations reinforce the work carried out in the basin.
3. Maintaining a long-term view and not expecting short-term results.
4. Environmental education is the basis for obtaining public support for any project.

Local actions details:

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Scope of the action:	Country
Region:	Americas
Name of Local Action:	Prevailing water plan in Mexico
Framework theme:	Implementing Integrated Water Resources Management (GIRH)
Crosscutting perspectives:	Institutional Development and Political Processes
Type of Organization:	National and local governments, authorities and associated

Description and location of the problem and activity as implemented

Population, economic activity and increasing growth rates are concentrated in the center, north and northeast of the country, where availability of water per capita is around 2000 m^3/hab/year, internationally recognized as being dangerously low. This situation causes supply problems, particularly during the dry season.

Every year, there are 24 cyclones over the sea, of which two or three cross over to the land, causing severe damage. The other extreme is that lack of , rainfall causes extended droughts that affect the supply of water and damages agricultural, farming and other economic activities. The northern area is the most affected, due its location in the desert belt of the Northern Hemisphere.

Impact of implemented activity (social, economical, environmental, etc.)

The National Water Program 2001-2006 has contributed greatly to achieving the main targets of the National Development Plan issued by the President. The National Water Commission has pointed the PNH to six national objectives:

- Encourage the efficient use of water in agricultural production.
- Encouraging the extension of coverage and quality of water services, sewage and sanitation.
- Achieving the integral and sustainable management of water in basins and water bodies.
- Promoting the technical, administrative and financial development of the water sector.
- Consolidating the participation of users and the public in the handling of water and promoting a culture of proper use.
- Reducing risks and dealing with the effects of floods and droughts.

In general, the achieving of goals at national level throughout the period of study has been satisfactory: seven of the ten objectives set by the PNH have been achieved 100%. Expectations were exceeded or were slightly less. One objective was fulfilled at acceptable levels and two varied between acceptable and unacceptable throughout the term of study.

Types of stakeholders involved

The planning process involved many users, local authorities, non-governmental organizations and the public in general, through two advisory bodies: the Basin Council and the Water Advisory Council.

Means of stakeholder involvement and role they play(ed)

Basin Boards are bodies that bring together water users and the three levels of government that the National Water Law has established to facilitate the conceptualization and implementation of water policies and programs. It has auxiliary organizations, both permanent and temporary nature. As of September 2001, 25 Basin Boards, 6 Basin Commissions, 4 Basin Committees and 47 Underground Water Technical Committees had been established. The Water Advisory Council is an independent national body comprising members of the public, whose purpose is to support changing strategies in the in the sector, and to promote, coordinate, and direct the effort of the public in attaining a culture of efficient management and use of water in the country. Under this philosophy State Water Citizens Councils have been established in 26 states of the country and 6 consultation forums were held with the attendance of experts.

Long-term commitment and targets

In order to determine strategies to achieve the target proposed for the water sector, possible scenarios of the use of water have been assessed looking towards 2025. Demand was based on:

- Public-urban use. Water service coverage, consumption per person and loss of water in supply networks.
- Agricultural use. Irrigation areas and efficient use of water.
- Industrial use. Participation of various industries in the GDP, as well as water use practices.

Among the scenarios studied, two provide a contrast in relation to water use patterns. For the first, current average conditions (trend scenario) were maintained, and in the second, higher efficiency features are established (sustainable scenario). Based on these scenarios, the main considerations for estimating demand and cost of values are presented.

Originality and Innovative Ideas

In order to prepare the PNH, a process was carried out based on the following governing principals:

- The country's development must be within a sustainability framework.
- Water is a strategic resource of national security.
- The basic unit for management of water is the hydrological basin, as it is the natural form of occurrence of the water cycle.
- The handling of natural resources must be integrated.
- Decisions must be taken with the participation of users.

The process was based on local points of view so could be integrated at nationally, that is, "built from bottom to top", covering the following phases:

- Dividing the Country into 13 administrative water regions.
- Determining the basic data of each region through hydraulic diagnosis.
- Establishing strategic guidelines for hydraulic development of regions.
- Creating hydraulic regional water programs with a broad view for 2001-2025.

Additionally, a strategic planning system was implemented by which each person responsible would follow up each project and process and contribute actions for achieving the six objectives.

Costs involved

It is hard to calculate the cost as various stakeholders and organizations were involved, however, several thousand man-hours were needed to fulfill the Water National Program.

Lessons learned that you would propose to present at the 4th World Water Forum

There are occasions when results and perceptions point to the need for a change in strategic focus in planning and programming process, such is the case of the link between the purposes and goals of programs, access to information, adopting monitoring and impact indicators at the same time as inspection indicators, the link between them and funding allocated, the link between PHR and PNH, and the link between the water sector and social, economic and environmental groups definitively deserve support. Fortunately, the potential net impact of amendments and additions to the LAN is seen as positive and would facilitate adoption of the changes required, both within the institutional framework for participation, as well as for the planning and programming process. The LAN mandate on integrated management of water resources would favor these processes.

WATER SUPPLY AND SANITATION FOR ALL

Local actions details:

ID	LA0319
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Scope of the action:	Basin
Region:	Americas
Name of Local Action:	Water systems and cleaning in rural communities
Framework theme:	Water Supply and Sanitation for All

Crosscutting perspectives: Capacity-building and Social Learning
Name and types of the implementing organization(s): The Coahuila State Water and Cleaning Commission: National and local governments, authorities and associated

Description and location of the problem and activity as implemented:
In general terms, water supply in Coahuila mainly depends on underground extractions. Most of the 28 geo-hydraulic units in the state are over-exploited. Others are hardly available or the quality of their water is poor. To resolve this problem, we have worked on other aspects that are equally important, particularly drilling and equipping wells, building construction water distribution lines and networks, and installing reverse osmosis facilities. A the same time we have conducted a social welfare campaign and promoted community organization the for sustainability of this service.

Impact of implemented activity (social, economical, environmental, etc.)
Between 2000 and 2005, 45 deep wells were sunk; 67 electro-mechanical devices were installed at wells; 37 storage tanks were built; 157.5 km of pipes and water distribution networks were installed; 1761 domestic connection pints installed; 28 reverse osmosis facilities installed and four more reconditioned; 52.1 km of sewage networks installed. Al this helped to extend the supply of water, increasing from 86% in 2000 to 97.4% in 2005. The sewage network increased from 33 % to 45%. It is worth mentioning that Coahuila went from seventh to first place as far s the supply of water is concerned.

Types of stakeholders involved
This was possible largely due to the support of the State Government when it authorized creating a specific area to deal with rural communities within the organizational structure of the States Water and Cleaning Commission. This reinforced liaison between the three levels of government and communities with regard to the sustainability of services. Consultancy companies were also involved in this program, mainly in social services and community involvement. Furthermore, the Rural Programs and Social Involvement Unit of the National Water Commission and technical personnel of the city hall also took part.

Means of stakeholder involvement and role they play(ed)
Staff of the Rural Community Department of the CEAS and companies specialized in providing social support contracted managed to encourage community participation, organizing them to attain and maintain services, and providing community training in the operation, maintenance and administrative and financial management of their systems. CAN staff was on hand throughout all these activities. Users provided hygiene and cleaning workshops in water supply, storage and distribution areas. The participation of women was very important.

Long-term commitment and targets
The commitment is to monitor and supervise the proper operation and maintenance of systems built, with the support of the three levels of government and the participation of communities.

Originality and Innovative Ideas: This program is considered as innovative as ever since it was implemented, communities have organized themselves to operate, maintain and administratively and financially manage their systems. Furthermore, in those communities where the quality of water was poor, reverse osmosis facilities were built to provide purified water at a very low and accessible cost. These facilities were designed using a technology that was not previously available and that does not reduce their operating life.

Costs involved
The main cost of implementing this program was the CEAS creating a rural community department, and equipping and training its technicians and operating bodies and local officials involved in the program. Investment in social support and institutional development cost around 6.8 million pesos. The program was funded with the participation of the municipality, the state and the federation.

Lessons learned that you would propose to present at the 4th World Water Forum
Social support and community participation is essential for sustainability of services. The joint responsibility of the program's stakeholders encourages order, organization and opportunity in the performance of work. Sustainability is achieved by creating favorable conditions through participation, allowing the community to develop a sense of belonging and truly make the project theirs. The participation of women and children in water and cleaning projects was essential, as are most affected by the lack of this service. The participation of the municipality is essential in monitoring system management (is the organization that is closest to the communities benefited). It is cheaper to invest in water and cleaning infrastructure than treating water-related illnesses.

Local actions details:

ID	LA0411
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Scope of the action:	City
Region:	Americas
Name of Local Action:	Strategy to link urban marginal zones to aqueduct and sewage services.
Framework theme:	Water Supply and Sanitation for All

Crosscutting perspectives: New Models for Financing Local Water Initiatives; Capacity-building and Social Learning

Name and types of the implementing organization(s): Empresas Públicas de Medellín: Enterprises and facilities that are either private managed as public-private partnerships

Description and location of the problem and activity as implemented
Colombian standards establish that communities must pay for the networks required to connect themselves to water and sewage services. Families on peripheral settlements do not have employment opportunities and they have insufficient income to pay for such basic services. The State, responsible for guaranteeing services, has not being able to subsidize this investment to the extent required. The combined strategy of funding and contracting with the communities working on connecting water and sewage systems (the program), has contributed specific solutions for the public service access problem and unemployment of very poor people in suburban neighborhoods.

Impact of implemented activity (social, economical, environmental, etc.)
From the outset, the Program has led to the signing of agreements with one hundred and forty-nine community organizations, within an investment of US$ 11.4 million, creating 6,900 jobs of varying duration, and generating an estimated profit for the communities of US$1.02 million, and providing training. The Program meant that 31,000 inhabitants are now connected to the water system and 38,000 to the sewage system, and that 6,200 homes have been connected to the water system service and 7,600 to the sewage system.

Types of stakeholders involved
Municipal bodies, being responsible for ensuring the efficient rendering of private services, including drinking water supply and sanitation services, to the poorest communities, and for creating jobs. The service provider in this particular case, EEPPM, is financially solid and it provides water services in accordance with criteria for efficiency and social responsibility. Community organizations have not only received water and sanitation services, but they also participated using a business criterion to connect users to water services in the neighborhood.

Means of stakeholder involvement and role they play(ed): The joint work performed by the service provider and municipal bodies at the time of creating projects has meant that they have avoid standardizing public services in communities in areas that are unstable and at geological, respecting that established in the Territorial Ordinance plans. The redirecting of paths and defining road routes, specified before the work starts, was carried out by the Department of Public Works and the community. The community has been the main player in developing the city and its own environment, by performing aqueduct and sewage projects that have provided them access to public services in urban peripheral areas. Community organizations have participated as the contractor in the performance of development work and actions and ensure public supervision of the construction process and subsequent operation and maintenance. A key success factor is having a community organization known for its leadership and that represents the community during the entire process in the face of company and local government policies.

Long-term commitment and targets
The 41 years of the Housing Refurbishment Program has shown that, in virtue of its conceptualization, not only is it sustainable to solve urban problems, but also that it may be replicated within rural sectors and developing countries. The EEPPM is currently studying the proposal of linking the Program to 115 municipalities to of Antioquia District. In addition to being means of linking customers with broad financing plans, it has been identified as a leading program in social investment of Medellin public companies in the community.

Originality and Innovative Ideas: We have targeted a "win-win" relationship of mutual respect between the EEPPM and communities. The organization furthers its corporate purpose by learning from the communities and community organizations strengthen their management capacity and their business overview to generate opportunities. A new concept of the community performing work to connect the community to public services has been introduced. In the model, each stakeholder, the company and the community act responsibly in search of their own interest to thus achieve maximum social benefit.

Costs involved
The cost of the business-social balance are considered as those generated from the funding needed to extend social coverage in the Housing Refurbishment Program; implementation of social benefit tax or rate mechanisms as well as the granting of subsidies increased with new users joining the system; and the setting up financing plans for payment of past due accounts for public services; profits generated under the contracts are simply received by community organization, instead of by contractors, without constituting a new cost for the company.

Lessons learned that you would propose to present at the 4th World Water Forum
- The experience is developed in municipalities with organizational structures and efficient operating structures, who are interested in responding to the challenge of ensuring that water and sanitation meet proper quality standards for their community, and handling all other basic requirements.
- The presence of a service provider (EEPPM) with technical and administrative capacity and financial solidity, receiving the credibility and trust of the community in the management of funds.
- The intensive social action that has provided the community access to solutions and to communications channels established
- Establishing community groups with the authority, resources and training required to handle contracts for the installation of water and sanitation infrastructure. The experience has allowed us to demonstrate that excellent results may be achieved with the right advice, support and training.
- The municipality's interest in providing solutions to unemployment problems and to create opportunities for poor communities.

Local actions details:

ID	LA0221
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Scope of the action:	Country
Region:	Americas
Name of Local Action:	Latin American Water Forum
Framework theme:	Water for Growth and Development
Crosscutting perspectives:	Institutional Development and Political Processes
Type of organization:	National and local Governments, authorities and associated; International and intergovernmental institutions

Description and location of the problem and activity as implemented
Concern regarding the minimal amount of water available for human use; the millions of inhabitants of Latin America that do not have access to drinking water and the poverty in which they find themselves.

With this in mind, the I Latin American Water Forum took place in Ciudad Valles from June 23 to 25 of this year, at which the "Valles Declaration" was drawn up. The declaration will be presented at the 4th World Water Forum to take place in Mexico City in 2006.

Impact of implemented activity (social, economical, environmental, etc.)
This document will allow the mayors to communicate the aspects that are to be taken into consideration in integral water management at the World Water Forum, in the light of Latin America's reality.

Types of stakeholders involved
The participation of the World Conservation Union (IUCN), the United Nations Commission on Sustainable Development (UN-CSD), the Association of Municipalities of Mexico (AMMAC), the Central American Water Resources Regional Committee (CRRH), the National Water Commission (CONAGUA), Municipal Presidents from 12 countries in Latin America and the Caribbean, the State Government and the city council of Ciudad Valles

Means of stakeholder involvement and role they play(ed)
In compliance with what was established by the program during the first day of work at the I Latin American Water Forum, there were talks on water given by Mr. Manuel Dengo, Ms Rocío Córdoba, Ms Patricia Ramírez and the representative of the CONAGUA as coordinator of the 4th World Water Forum.

During the second day of work at the I Latin American Water Forum there were work sessions, the reflections of which regarding the problem of water in Latin America and the Caribbean gave support to the "Valles Declaration".

Long-term commitment and targets
The "Valles Declaration" document, which will be presented at the 4th World Water Forum by the municipal presidents, will be divulged so that those mayors and municipalities that see fit to do so may adhere to the document.

Originality and Innovative Ideas
This action, if not innovative, is precise, because it is a good opportunity for the participants at the World Water Forum to become aware of what local decision-makers in Latin America think, given that the slogan of the World Forum directly affects the world environment.

Costs involved
The I Latin American Water Forum had expenses of $1 '200,000.00. These were covered by the city council of Ciudad Valles with the participation of the State Government.

Additionally, the IUCM and the CRRH paid for the airline tickets for some of the Central American municipal presidents.

Lessons learned that you would propose to present at the 4th World Water Forum

CIUDAD VALLES DECLARATION ON WATER MANAGEMENT

The Mayors and Mayoresses of Latin America, gathered at the I Latin American Water Forum: "Managing Water Locally", which took place in Ciudad Valles, San Luis Potosí, Mexico, on June 23 and 24, 2005, Agree:

13. To declare water to be a public good that is not subject to appropriation; and access to water to be a basic human right.
14. To protect the social groups that are most vulnerable and in situations of risk, guaranteeing the provision of drinking water for the greatest percentage of the population, as well as sanitation and the final disposal of wastewater, in coordination with regional and national Government entities.
15. To contribute to diminishing the vulnerability of water vis-à-vis local, regional and global threats, promoting the environmental education of the formal and informal population concerning the value of water, in its natural, socioeconomic and cultural aspects in the productive processes, as well as the development of their perception of environmental risks, and in this way achieve a new culture regarding the sustainable use of water; but, at the same time, guaranteeing the subsistence and feeding safety of the inhabitants of the localities implicated.
16. To create, consolidate and strengthen the environmental institutional structure of the municipality – with a focus on ecosystems, in a participatory fashion and with social equity – so that it is responsible for the sustainable management of water, with a focus on the ecosystem that considers the care, conservation and sustainable use of the land and the forest as an indispensable condition for the protection and conservation of water; strengthening and promoting the education of municipal human resources and of citizens as essential pillars in the search for solutions to the problem of water.
17. To promote national and international municipal associations, brotherhood among municipalities, as an instrument of the exchange of experiences and knowledge regarding integral water management and the surveillance of its application. In this context, to create a Network of Environmentally Sustainable Municipalities – LAMAS Network -, as well as the Best Practices Bank, in the municipalities of Latin America, among other environmental issues.
18. To support the legislative initiatives before the National Congresses so as to achieve reforms oriented to the decentralization of water management at the local level.
19. To promote the creation of permanent structures for the shared administration of border and trans-border hydrographic watersheds and develop joint strategies among the municipalities for the sustainable management of river basins that take into account the use and protection of the hydro-regulating forest fringes, land use, control of the disposal of mining, farming and animal husbandry, industrial and domestic waste.
20. To fix economic, financial and legal mechanisms that facilitate integral water management, starting with the fulfillment of the international commitments taken on for the transfer of capital with preferential conditions and technologies to the local Governments of the countries in development for the acquisition of equipment and accessories that will permit creating and improving the efficiency and use of the distribution networks, drainage and treatment plants.
21. To develop mechanisms to facilitate the participation of citizens and civil society organizations in the creation and execution of water policies and laws, on the basis of a joint participation agreement, with a multiple-sector approach.
22. To develop a Social Communications Program with an international, national and local reach that may contribute to the creation of a public opinion that is well-informed and a citizen awareness of the rights and responsibilities of the different public, private, academic and community actors.
23. To consider the condoning of the external debt of the countries that are less developed as a source of financing so as to contribute to solving the problem of the deterioration or inexistence of water distribution networks, drainage and treatment plants, among other needs, that these countries have, for their administration by the local Governments.
24. The excellent organization undertaken by the municipality of Ciudad Valles, San Luis Potosí, Mexico, is acknowledged, headed by the Mayor, Mr. Jorge Terán Juárez, in the celebration of this forum and the crystallization of this Declaration.

Local actions details:

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Region:	Americas		
Name of Local Action:	HUMEDAR - I, Low cost innovative technology to clean waste water in developing countries.		
Framework theme:	Water Supply and Sanitation for All		
Crosscutting perspectives:	Application of Science, Technology and Knowledge		

Type of Organization: National and local governments, authorities and associations; Professional associations and public and private knowledge and education centers; Civil society organizations

Description and location of the problem and activity as implemented

Absence of municipal waste water cleaning has limited the control of water contamination and public health in Latin America, the Caribbean, where only 14% of waste water produced is treated. Colombia has even worse levels of treatment of this kind of effluent, due to limited technology and resources to finance this kind of project, with the applicable increase in deterioration of national water bodies.

Impact of implemented activity (social, economical, environmental, etc.)

We were expecting to basically comply with the standards for contaminants discharged into water bodies regulation by Colombian law (Decree 1594/84), that is, remove of 80% of organic and suspended solids, however three months after scale treatment plants have gone into operation, we have obtained results that show the elimination efficiencies exceeding 94% in DBO5 and SS, 74% of nitrogen and up to four descending logarithmic units fecal coliforms. As an indirect impact we can mention the gradual but ongoing recovery of water bodies and their environmental esthetics which had been lost almost in the entire country, due to he endless discharge of untreated effluents.

Types of stakeholders involved

Several research centers and university extensions have been involved in the start up of treatment alternative. National Colombian University has contributed time and some limited resources to achieve more successful research, with regard to innovative projects the product of which was invested in the construction of scale models to perform actual experiments, such as support to attend different domestic and international events for dissemination and exposure. Antonio Nariño University has financed an actual scale research project to build a plant for its Usme facilities in Bogora City, where it has been able to study several phenomena and which has been used to streamline processes and establish kinds of species and features of dams that make efficient contaminant cleaning under the process under study. Subsequently with dissemination of awards obtained through domestic press interest from several municipal private industrial and some other population centers interest has been attracted, which currently demand explanation budgets and programs to their investments because they see in this alternative a realistic extension of University Research at the service of life quality and protection of nature in the country. The Ministry of the Environment Dwelling and Territorial Development has backed the project to be fostered as a sustainable alternative in the cleaning and control of contaminants, coming from urban waste water flows to be implemented in the entire domestic territory.

Means of stakeholder involvement and role they play(ed)

The National Colombian University participated at the initial stages of the research, contributing, limited resources for laboratory tests, and acquisition and manufacturing of plastic elements. Additionally, with the funds from the technological innovation award, the University has been able to follow up research in the laboratory to measure other process variables. The Antonio Nariño University has invested in the implementation of an actual scale project using this technology, allowing them to research and confirm on a larger scale the expectations that have been generated with the innovative project. The INEM's Professors Cooperative at Villavicencio en el Meta and Merecure Housing Association of the same partners, has invested in the construction of

two actual scale plants for their facilities and subsequently follow up cleaning processes. Results at this scale have exceeded expectations, both theirs and ours, with regard to clean effluent quality which is currently used without any restriction to grow fruit.

Facilities have been built both for some flower growing companies as well as for oil companies in a relatively small mix, although the results of which have confirmed the process's excellence and compliance with parameters of discharge of such companies with the pertinent environmental authority. Lastly, a high regional impact plant has been built for slaughtering livestock in the Caqueza Municipality, Cundinamarca Department, therefore creating great expectations with regard to its results to be implemented in many other parts where slaughterhouses constitute the main cause of contamination to water surrounding centers of population.

Long-term commitment and targets

The HUMEDAR – I Technology System, has a useful life exceeding 25 years, and its maintenance is restricted to cutting and clipping plants or micropyles and the purge of sludge every 5 years, using a system of valves connected to the structure.

Environmental corporations are keen to promote implementation of these

systems within control and quality of life improvement programs at each basin in the country. The potential of this system cannot only be restricted to Colombia, therefore, the rights have been assigned to the National Colombian University who as a public Colombian Institution may support, free of cost, dissemination thereof and start up the system at international level. International agreements may be made through the Department of the Environment so that these ideas may be used in developing countries, without any restrictions and under our technical supervision.

Originality and Innovative Ideas

Biotechnology fundamentals have been applied in the handling of bio-film for cleaning waste water using fixed film systems attached to tin systems with organic charge. Industrial design in the construction of molds and supporting plastic elements for the riverbed and all international experience in the waste water treatment field. Technology transfer is based on the dissemination of a feasible system for small and medium communities in developing countries that may only have access to treatment of their effluents by major investment. There only current alternative is a simple, low-cost friendly system that is simple to operate with the consequent improvement in environmental conditions within their territory, without requiring large extensions of land that up to now it is required to have, in order to reach treated effluent quality standards. Internationally these projects have been presented in Panama and Peru as part of innovative technology forums and symposia through FUNIBER, a Barcelona University Foundation who has fostered such conferences, because it is a clean technology with major perspective in the region.

Costs involved

Current costs of artificial damp technology of the HUMEDAR - I, are variable depending on the population served. As it is established as a scale economy, a smaller population (50 or 100 inhabitants) higher costs per head, and if the population is higher (5000 inhabitants or equivalent), the smaller the cost per head, investment for construction around US$150/25 years – inhabitant, is translated at an actual cost of US$4/inhabitant per year in very small communities, which is translated to an actual cost of US$4/inhabitants per year in the higher density sites. Current investment costs have been covered by each community, no national support program has been launched to finance mass cleaning projects. Although the policy is in place, there are no particular funds destined to mass implementation programs in relation to these technologies, because up until now they have been very expensive, or municipalities are not capable of preparing them appropriately, or designs are not successful or technologies have not been sustainable in our context.

Lessons learned that you would propose to present at the 4th World Water Forum

As the treatment and cleaning systems in Asia, Africa and Latin America and the Caribbean are extremely poor, except for a few countries. Therefore, international references show that it is a subject which is pending in most of the world. In addition to good technology, long term financial and economic sustainability is required, plus qualities that may allow very poor populations suffering from limited education to be able to reach achieve this change of discharge standards. The way to disseminate these low-cost, feasible and sustainable technologies with minimum technological requirements or personnel requirements, would be true international or multilateral agreements at government level, international cooperation and to be presented and disseminated so that it may be known, discussed and improved upon in subsequent domestic and international research. We have been asked by Sweden, Germany, and the United States, to adopt studies with these technologies in their own countries, because they foresee huge expectations in their own countries. It is NOT using nothing that has not been already studied. It is only a good integration of different elements that improve and make more useful knowledge and practice of engineering a waste water treatment engineering perhaps the greatest weakness of countries under development to reach are improved their morbility, statistics and life quality in this new century.

Local actions details:

ID	LA0778
First name	Juan Manuel
Last name	Vigueras Cortés
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Scope of the action:	District
Region:	Americas
Name of Local Action:	Technological innovation on the domestic waste waters in rural dwellings that do not have drain.
Framework theme:	Water Supply and Sanitation for All
Crosscutting perspectives:	Application of Science, Technology and Knowledge
Type of Organization:	Professional associations and public and private knowledge and education centers; International and intergovernmental institutions.

Description and location of the problem and activity as implemented

In the rural communities of our nation, and in most countries, there is deficiency in the environmental sanitation scope, which includes issues as drainage, water in quantity and quality, proper disposal of excreta, and comprehensive garbage management which are essential for the communities' development. Although there has been progress in terms of coverage, there are still great disparity areas.

To solve these problems regarding waste-waters a technological innovation for waste-water treatment, purification, and reuse with biomass production was created. The system involves treating sewage in an anaerobic reactor (thirty-day residence time); waste-waters are poured into a sedimentator. Afterwards, the effluents mix at both tanks' outflows, and are discharged into a waterproof filter, where the excess of nutrients elimination is carried out, this nutrients are removed by phytoremediation by means of a hydroponic gardening in order to produce biomass such as flowers or vegetables. The water surplus is recovered in the end of the filter and it is reused for foliage irrigation.

Impact of implemented activity (social, economical, environmental, etc.)

The social impacts achieved on the users were many, some of the most outstanding are life quality improvement, given that in the beginning the users used rustic latrines and did not have shower, and the water from bathroom services, laundry and dishes was thrown to the backyard.

Regarding the economical impact, training on prototype construction revolved around two people, who were hired by the Under-Ministry of La Michilía's Biosphere Reserve for the creation of the prototype in other communities.

In terms of environmental impact, it represents a friendly option, since it eliminates all gray water pools that provoke unpleasant odors, source of infection, sites of proliferation of harmful fauna and the visual pollution. The fact that these sites are totally eliminated gives the houses another more decent and neat image which makes users proud.

Types of stakeholders involved

1. The Interdisciplinary Center of Research for Regional Integral Development, CIIDIR IPN UNIDAD DURANGO, where we researchers in charge of the project work.
2. The Technical Underministry of La Michíla's Biosphere Reserve of CONANP-SEMARNAT, as an institution that participates in, promotes and uses the developed technology.
3. User in the San Juan de Mochis community, Municipality of Suchil, Dgo. , Mr. Luis Carrillo and Mrs. Soledad Hernández.
4. The work group was made up by:
   Master in Engineering. Juan Manuel Vigueras Cortés, project's manager and coordinator. Stakeholders: Dr. Ignacio Villanueva Fierro, Master in Science. Guadalupe Vicencio de la Rosa. and Master in Science. Gildardo Orea Lara

Means of stakeholder involvement and role they play(ed)

1. The Interdisciplinary Center of Research for Regional Integral Development, CIIDIR IPN UNIDAD DURANGO, provided its laboratory infrastructure, vehicle fleet, and the researchers' salaries.
2. The Technical Under Ministry of La Michíla's Biosphere Reserve of CONANP-SEMARNAT, as a participating and promoting institution provided the shelter located in the community of El Nuevo Alemán, Municipality of Suchil, Dgo.; office stationary, and accessories for the printer, as well as partial economical support for the impression of the construction manual about the prototype. Occasionally, it provided vehicles, gasoline, and drivers for the transportation to the study site.
3. The users collaborated with their vehicles and their work to carry sand and gravel for the filter's construction, in addition to: plot excavation, refilling and tuning of both module's the filter; labor force for the prototype's construction, the fencing in to protect the filter and the agricultural practices in the crops during the entire experimentation phase.

Long-term commitment and targets

The commitment made with the users established that by the end of the project, the facilities would under their control and they would continue with the flowers' and vegetables' growing, as well as informing the members of the communities about this technological innovation by inviting them or visiting the site, telling them about the advantages or disadvantages this research provided them with. Currently both qualified people are hired by the community's members to build the module, as occurred in Luis Echeverría community, located in the buffing area of La Michilía's Biosphere Reserve. Regarding its propagation, a prototype's construction material and three-page leaflets are being created. Other means of communication for the outcomes are the publication of scientific articles in national and international magazines; providing technical talks, conferences, and consultancies. One of the plans to continue with the treatment system's application is to test other environmental conditions that allow the system to be carried out in more efficient manner.

Originality and Innovative Ideas

The technological innovation is based on the theoretical concepts of bioengineering of waste-waters anaerobic treatment processes, applying hydraulic residence time concepts, and knowledge on biological processes and unitary operations, resulting in a plant's prototype for waste-waters' treatment, purification, and reuse at domestic level, named PROTRADER, that may be patented. Environmental biotechnical concepts were also applied regarding the nutrient's surplus elimination processes in a waterproof filter, since during the assessment it was necessary to quantify the physico-chemical and microbiological parameters, and to determine these contaminants' removal efficiency. In this stage, the phytoremediation concepts are applied. The agricultural biotechnology knowledge was applied when evaluating the response of the flowers' and vegetables' crops, which were planted on the superficial layer of the filter using the hydroponics technique.

Costs involved

The research costs were founded by the Regional System of Research Francisco Villa, SIVILLA-CONACYT, with an amount of $118 050.00. The Under Ministry of La Michilía's Biosphere Reserve of CONANP-SEMARNAT, participated with $7575.00 and the users participated in kina with an estimated amount of $20 000.00. The CIIDIRIPN UNIDAD DURANGO did not contribute with the costs because its mean target is the research applied to the sectors that require them.

Lessons learned that you would propose to present at the 4th World Water Forum

- It is an environmentally friendly option, since it prevents visual, water, soil and air pollution.
- It is socially accepted technology since it improves the life quality of the users and their neighbors.
- It involves the use of rustic latrines, provided the land conditions are favorable to use them.
- Taking advantage of the treated water nutritional characteristics, biomass is obtained (ornamental forage and/or garden plants) as a secondary element, which proves that the organic matter mineralization was duly carried out within the system.
- The discharge effluents observe the NOM-001-SEMARNAT-1996 and NOM-003-SEMARNAT-1997, therefore the reuse for growing plants is guaranteed, especially because it is a hydroponic growing system.
- It complies with the universal philosophy of the efficient use of water and is targeted at reducing environmental risks related to diarrheal diseases, and eliminating the environmental pollution impacts, which are fundamental precepts perused by the Health World Organization (HWO).

Local actions details:

ID	LA0149
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Scope of the action:	Country
Region:	Americas
Name of Local Action:	Biodiversity Conservation in the Sierra Gorda Biosphere Reserve
Framework theme:	Water Supply and Sanitation for All
Crosscutting perspectives:	New Models for Financing Local Water Initiatives; Capacity-building and Social Learning: Targeting, Monitoring and Implementation Knowledge.
Type of Organization:	Civil society organizations; National and local governments, authorities and associated.

Description and location of the problem and activity as implemented

The Sierra Gorda Biosphere Reserve is located in the north of the Sate of Querétaro, covering almost 33% of the State's surface and being part of the Sierra Madre Oriental mountain range. Hydrologically speaking, it is part of the Pánuco river. Decades of wrong economical development through agricultural and mining activities in the mountains of pure forest and population expansion objectives, have provoked a severe environmental impact on some of its main basins, which is translated into large deforested areas in particular in the Escanela and Ayutla rivers' basin areas and the beginning of erosive processes, pollution, proliferation of garbage dumps, as well as the extinction of species. This represents lower groundwater recharge and spring and current discharges which is becoming a consequential problem during the ebb tide season for many communities and many main villages of the mountain range. Seeking to remedy these problems, since 1989, the Sierra Gorda Ecological Group started reforestation works, the establishment of forest plantation with trade purposes, protection and retention of soils through works such as wire-wrapped dams, filters, ditches, parapets, contour planting, etc...., as well as a complete program of extensive environmental education.

Impact of implemented activity (social, economical, environmental, etc.)

- Jobs have been created by the carrying out of reforestation works, their managements, and contention works, given that most of them have been performed with PET's (Temporary Job Program) resources.
- Forest plantations are a real productive option for local producers.

- The Environmental Education has reached an average of 15,000 children from the age of 17, as well as parents and teachers, which represents a change of perception and management regarding the resources of a large number of people.
- Currently, a network of 71 recyclable material gathering communitarian centers and a regional center.
- Facing the public opinion's and environmental authorities' pressure, the local city councils have built 3 wastewater treatment plants that will be operating before the end of the year, and relocated 2 garbage dumps in gullies to proper sites with adequate management.
- In critical areas due to their erosion and groundwater recharge, large soil retention and protection works have been undertaken, with the owners' consent and the owners themselves worked in the construction.

Types of stakeholders involved

- Civil society organizations: Bosque Sustentable A.C.; Grupo Ecológico Sierra Gorda I.A.P.; Hoya del Hielo A.C.
- International foundations and organizations: Gonzalo Río Arronte Foundation; Roberto Ruiz Obregón Foundation; Forest Trends; Katoomba Group; Ashoka Foundation; Schwab Foundation.
- Federal Offices: SEMARNAT INI INE; CONANP USEBEQ; CONAFOR CECADESU; CONABIO INMUJERES; SEDESOL CONACULTA; FONAES UAQ.
- International Organizations: Japan International Cooperation Agency; Global Environmental Facility (GEF); United Nation's Development Program

Means of stakeholder involvement and role they play(ed)

In the direct administration, the local UNDP representation, National Commission of Natural Protected Areas of SEMARNAT and their Reserve Office, the Sierra Gorda Ecological Group, and its associate NGO Bosque Sustentable A.C.. Likewise, federal government offices are involved, such as SEDESOL, FONAES, INI, INMUJERES, CONAFOR, CONACULTA, and INDESOL, as governmental authorities that provide resources that allow support by means of infrastructure, equipment, living conditions improvement for the communities, as well as direct support to producers. Among the international agencies and authorities, the Japan International Cooperation Agency (JICA) stands out due to its current support to a project in progress in the semi-desert of the reserve; however, in the past we have interacted with agencies such as the US Fish and Wildlife Service, US Forest Service, USAID and the embassies of various countries (Japan, Netherlands, Canada, British Council, Australia).We are also receiving support from national and foreign foundations for the development of a great variety of projects; for instance, the Gonzalo Río Arronte Foundation, (integral restoration of basins), Roberto Ruiz Obregón Foundation (land plot purchase for the next offices' building), Fondo Mexicano para la Conservación de la Naturaleza A.C.(Environmental education and forest fire prevention), Nacional Monte de Piedad, North American Commission for Environmental Cooperation, Forest Trends, American Forests, among many others, as well as corporations as CANON Mexico, Cervecería Cuauhtémoc-Moctezuma, Cummins S. De R.L. de C.V., DeAcero, S.A. De C.V., Hewlett Packard Latin America, Shell Mexico S.A. de C.V., and BASF of Mexico, S.A. de C.V. These supports have been translated into barbed wire for forest protection and carpenter shop equipment for forest producers.

Long-term commitment and targets

By the end of the project (2007), a large base for natural resources' protection, sanitation, and conservation will have been obtained, by means of strategies, new projects, and action lines that can make conservation be an incentive for new local owners through mechanisms such as the environmental services' payment, the ecoturism operation, productive projects, etc...., instead of being an economical burden for them.

Originality and Innovative Ideas

Ideas like the hydrological environmental services' payment or the rent for the conservation are novel, and have been well accepted by the local owners and their benefits and apportionment are large. While the hydrological recharge is increased and preserved, the habitat for priority species, for example the jaguar or the chivizcoyo (bearded wood-partridge), since they are flag species it also protects many other species. Likewise, environmental educational programs' development, design and implementation; solid wastes management; productive diversification ideas; the operation of a training center for the sustainability; or the network of private reserves are original concepts that make our experience one of a kind.

Costs involved

In 2000, the GEF full size "Protection of the Biodiversity in the Sierra Gorda Biosphere Reserve" project was approved due to the negotiations of GES and the Reserve Office with the amount of 6.5 million dollars for seven years and administrated by the local representation of the United Nation's Development Program in a co-management experience of a ANP between the Federal Government and the local initiative, through the Sierra Gorda Ecological Group, and the allied NGOs such as Hoya del Hielo A.C., and Bosque Sustentable A.C.

The achieved results will be added for the enormous counterpart founds for this project (on the order of 3 per 1), that will enable us to foster new projects. This is obviously reflected in the high costs (about 28 million dollars) required for conservation and protection in protected natural areas where 638 villages are located.

Lessons learned that you would propose to present at the 4th World Water Forum

- Without the participation of the communities and the inhabitants of the area in the natural resources' conservation, sanitation, and protection activities with a basin approach, it is impossible to carry out major actions that allow us to make a real difference in their management.
  - The inter-institutional coordination among the three government levels and the civil society initiatives must be possible and productive, since it allows boosting the actions' scope and impact.
- New ideas regarding conservation such as paying for the hydrological environmental services or the rent of plots for forest and jungle conservation, have proven to be an efficient strategy for conservation and involve a large number of owners and large water productive surfaces.
- The purchase of land plots with conservation purposes is an effective measure to preserve and perpetuate areas that have a particular biological value and are threatened by productive activities.
- The participation of civil society organizations in conservation projects is critical and essential.
- Environmental education is irreplaceable as an instrument to change habits, priorities, and attitudes among local communities.

Local actions details:

ID	LA0425
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Organization	Municipal region of Colón, Querétaro.
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Gender	Male
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Scope of the action:	City
Region:	Americas
Name of Local Action:	Integral Sanitation of Río Colón.
Framework theme:	Water Supply and Sanitation for All
Crosscutting perspectives:	Capacity-building and Social Learning
Type of Organization:	National and local governments, authorities and associated

Description and location of the problem and activity as implemented

Río Colón crosses the municipal head in a little more of 3 km, being currently the city's sewer, where feces at open air, thousand tons of garbage and scrap, as well as discharges of free and clandestine drainages, are mixed with scarce waters of the springs, making us think that its recovery is impossible. The city's served waters, that currently flow by collectors built nearly over 15 years ago in the river bed, are obstructed and broken by the roots and garbage, generating an infection source for the complete city. These waters are usually employed to irrigate leguminous and vegetables.

- The main difficulties for this project's execution, is the sparse social consciousness about this problem, fundamentally in riverside people, in addition to the deficient urban cadastre and the null physical delimitation of the federal zone, that has permitted its invasion, so the implementing the project requires a meticulous political and social work. Within the social claims underlies the region's abandon by the authorities, due to unidentified government levels, and increasing unlawful conducts in the zone. Within the project, that has a 2.3 km development, we now perform sanitation and urban integration labors with a 600 m length from its

origin. Domiciliary drainage and collectors system has been built in the zone that bears the city's growth, as well as the emitter that will carry them out to the P.T.A.R. future location, external to the urban area, for which a terrain has been donated by the municipal government, where State and Federal authorities will begin its construction.

Impact of implemented activity (social, economical, environmental, etc.)

With the commencement of these actions, the entire population has begun to understand the meaning of this social and urban investment that will allow them to recover the city's former dignity, repentantly depredated by ignorance and negligence. All along the riverside the dwellers had begun to put into practice various agricultural, commercial and servicing activities that will provide the residents with new employment forms for a dignified existence. The project's development has applied special care in conserving riverside's traditional flora, in planting of trees, as sabines, which find in this place an excellent land for growing, as well as promoting the earth and water fauna that previously existed there. The project's geographic scope is in a local level, but due to similarities with many other towns in the region, where population and material resources are analogous, it's a logic thought that this sanitation action can be repeated.

Types of stakeholders involved

Due to the linkage among the three government levels, this project's execution had required previous actions related to exclude the river spot by means of signing a loan agreement for the area administration, authorization for executing hydraulic, redirection and environmental impact works, etc., that are supported by numerous authorities, as the implementation and operation of these type of projects need the joint action of diverse economical sectors, as well as public and private entities that will be directly or indirectly beneficiated. Enunciatively, the main players of this project are the following:

- Municipal Government: Municipal Presidency, Council.
- State Government: S.E.D.E.S.U, S.E.D.U.O.P. Y S.E.D.E.A.
- Federal Government: through S.E.M.A.R.N.A.T., C.N.A.

Means of stakeholder involvement and role they play(ed)

The main contribution for carrying out this project has been the perception of municipal authorities, trienniums 2000–2003 and 2003–2006 to consider Río Colón as an urban problem due to its existing conditions, and as one of the major development options for municipal integration. This result is due to the studies performed, that analyzed the current problems and design a series of gradual steps that will surely derive in practical solutions involving social participation, while creating a new awareness of hygiene, health and natural resources preservation through education of new generations se that will have behaviors of habitat esteem and definitely withdraw the indifference and destruction so common in our times.

It's remarkable the care and respect shown by most riverside dwellers in the works performance; the support given to municipal authorities that is evident in the meetings made between authorities and farmers for discussing the benefits derived from the project, and the demands for speeding the works with enthusiastic social interest. As well, the project is visited by diverse civil associations and boards of citizen participation that generally give positive comments for this building effort.

Long-term commitment and targets

Because the river's complex problems were aged and severe, the consciousness and urgency of beginning its urban rescue and sanitation, the authority decided, after analyzing feasible solutions, to implement an integral solution scheme; nevertheless, due to economical limitations it should be performed gradually, so various stages have been completed and due to social acceptance, we expect that the population itself will be the one that demand its continuance to the municipal government.

When a governmental action achieves positive events in cooperation with society for a specific population group, the continuance of work is predictable, having a clear example in urban developments, where road designation usually is evidence of the amplification concept.

Originality and Innovative Ideas

It's possible to think that innovation in this project resides in the municipal character it has, as its offered solution resolves the problems of the whole municipal region itself, providing its dwellers with better life conditions as well as granting opportunities for an ordered and sustained growth with full respect for traditional activities, while stimulating and updating them. The linkage between the various engineering disciplines and the conservationists' criteria is often impossible, due to the apparently contradictory nature of its contents. Nevertheless, this project seeks concurrent application of both to achieve the desirable harmony between nature respect and economical and social growth. It's commonly heard that projects intending to solve some water supply problems are discarded due to environmental criteria; yet many projects for ecological enhancement cannot be performed because they apparently have no engineering possibilities.

Costs involved

The estimated cost of this project is $36'000,000 pesos, at current prices. Costs reduction was achieved through rationale in its execution; supported by budget resources from Municipal, State and Federal governments.

Lessons learned that you would propose to present at the 4th World Water Forum

This action is taking place in Colon's municipal area, and would represent a viable answer for other cities in the country, due to its integral resolution of health, education and social welfare aspects, with joint involvement of the population itself an the local authorities. This kind of problems are commonly repeated all along the country, therefore a project that offers a sustainable growth, encouraging a close linkage between agricultural, industrial, servicing, craftsmanship, commercial and touristy activities, as well as sportive and cultural events that honor and improve the local way of living.

In relation with the possibility of hauling this type of project to other zones to a greater extent, we consider that the major ingredient for achieving this enhancement would be the conjunction of evident need and local authorities perception and willpower for its implementation.

WATER MANAGEMENT FOR FOOD AND THE ENVIRONMENT

Local actions details:	
ID	LA0509
First name Jorge	Last name Sosa
Organization	Central Board for Water and Sanitation of Chihuahua State
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Gender	Male
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Scope of the action:	City
Region:	Americas
Name of Local Action:	Demineralization Treatment System for Potable Water in some locations of Chihuahua State.
Framework theme:	Water Management for Food and the Environment
Crosscutting perspectives:	Application of Science, Technology and Knowledge

Name and types of the implementing organization(s): Central Board for Water and Sanitation of Chihuahua State: National and local governments, authorities and associated

Description and location of the problem and activity as implemented:

In Chihuahua State the changes exposed in water qualitative characteristics are consequence of the excessive salt due to the existing unbalance between the natural aquifers recharge and the extraction of underground water. This situation has been influenced by rain lack typical of desert regions, particularly aggravated by the long drought in the region during last years.

Recently we have detected numerous communities whose current supply sources are deteriorated in relation with arsenic, fluoride, dissolved salts and other undesirable components concentration, exceeding the norms.

The search of new sources with adequate quality was unsuccessful, so we decided to apply a treatment in situ to the water supplied for people's use. Therefore we installed small plants of Reverse Osmosis for treatment of the water segment destined exclusively for users ingestion.

Impact of implemented activity (social, economical, environmental, etc.)
Up to date we have established 87 plants of Reverse Osmosis in the State; 57 plants with a capacity of 5,000 liters per day; 2 plants of 10,000 L/day; 15 plants with 2000 L/day, and the rest with capacities from 1,000 to 400 L/day.

This action had benefited a population of approximately 53,042 dwellers of mountain highland towns and arid soil zones, located in 23 among the 67 state municipals.

The economical input to these populations has been significant, as they are provided with potable water for their ingestion at much lower prices than those of bottling commercial companies.

Types of stakeholders involved
The accomplishments were fully an intelligent decision of the Central Board for Water and Sanitation for granting a rational solution the problem of the deterioration of water in those regions. The Water Committees of small towns, joined with the Rural and Municipal Boards, are responsible of supervising the correct operation. Central Board technical personnel provide regular support by checking the plants to assure a proper functioning and supply necessary maintenance.

Means of stakeholder involvement and role they play(ed): The Water Quality Department was liable for designing a low cost solution to supply potable water, within norm compliance, for those populations with accelerated deterioration in their source detected by their strong tendency to high concentration of aforesaid contaminants.

The first plants began working with equipment providers support approximately two years ago.

The experience in the operation of these plants allowed modifying several factors that were included in the second and third generation of such plants. Moreover, the use of solar panels permitted the setting up of Reverse Osmosis plants in places lacking electric energy supply.

Long-term commitment and targets: Nowadays the installation of additional 106 plants is programmed, intending to be built and operating in year 2006. W consider that Chihuahua State, due to its geo-hydrological nature, will continue demanding these solutions, so in the medium term we foresee a horizon with a higher number of Reverse Osmosis units, and perhaps also another type of specific plants for removing other contaminants by different processes. The Research and Development efforts are focused upon this purpose.

Originality and Innovative Ideas: Investigations and detailed surveillance of operating plants leads us to enhancements in methods and/or processes for larger operation cycles before the scheduled maintenance, assuring a longer membranes life.

Costs involved
The approximate cost of this type of plant is roughly $ 200,000.
The applied resources were from the Normal State Investment (INE)

Lessons learned that you would propose to present at the 4th World Water Forum
Experiences derived form installation of Reverse Osmosis plants to assure potable water for ingestion of a specific population allow us to confirm that it is a low investment solution for a world that is suffering climatic changes derived from the orchard effect, in addition to devastation of woods and human groups that contribute to water scarcity and contamination.

Our professional conclusion is to recommend simple operations with con small plants, not looking for processing huge water volumes, but aiming to install a higher number of unities to ease community dwellers utilization.

Presently we have several plants in the same community, and due to these service plants people are no longer forced to walk large distances for their water supply, as well as avoiding crowds and rows in a larger unit.

Local actions details:

ID	LA0563
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Scope of the action:	Basin
Region:	Americas
Name of Local Action:	Ecological Recovery and Social Participation in the micro basin El Porvenir, Santiago de Anaya, Hidalgo, México
Framework theme:	Water Management for Food and the Environment

Crosscutting perspectives: New Models for Financing Local Water Initiatives
Name and types of the implementing organization(s): Community El Porvenir, Municipal of Santiago de Anaya, Hidalgo, México: Civil society organization

Description and location of the problem and activity as implemented:
The micro basin "El Porvenir" is found in Hidalgo's arid zone, Municipal of Santiago de Anaya, where its harsh weather contributes to environmental deterioration, poverty, migration, water scarcity and low agricultural and forestal production. The objectives and actions were focused to stop and overturn the devastation processes of natural resources by encouraging social organization and involvement in the three government levels in order to generate a protection, conservation and enhancement model for environmental care that would be transferred.

The present work is inscribed in this context, whose design and instrumentation was linked to the Sustainable Regional Growth Program (PRODERS) for Valle del Mezquital; was reinforced with resources support from diverse federal, state and municipal programs, and defined through an integration strategy of the environmental, productive and social aspects.

Impact of implemented activity (social, economical, environmental, etc.):
As a result of the micro basin's works we can observe an environmental enhancement, passing from infertile areas with serious desertification processes, to current natural restoration of local flora and fauna, numerous species reforestation (forestal, pulque and tequila maguey, nopal tunero and xoconoxtle, etc.), water collection through 250,000 micro basins to assist aquifer's recharge, runoff control and blocked water pipes detection, reintroduction of deer, as well as numerous bird, rabbit and dove types, cactuses diversity, among others.

The goat number has diminished. The micro basin is presently an eco touristy zone, with small incomes that are reinvested in several works. As well, the habitat is recovered for adequate reproduction of three types of deer and is registered as a Unity for Handle and Profit of Wild Life (UMA).

Production of xoconoxtle, nopal tunero, maguey worms and chinicuiles has been achieved; these products are traded in small scale and profits are reinvested for farm conservation; the products that are not sold are consumed by the residents, helping to expand their food possibilities.

The building of filtering dams for blocked water pipes control has resulted in humidity upholding and soil conservation, being of great benefit for corn, bean and field-bean planting.

Types of stakeholders involved
With PRODERS resources as "seed capital" we set off recovery of damaged areas due to over shepherding, building protective fences; sowing native plants (maguey and nopal), as well as reforestation. Additionally, this program received resources from the National Reforestation Program (PRONARE) and the Temporary Employment Program (PET); afterwards we obtained support from CONAFOR, SEDESOL, CONAZA, SEDESO y the Municipal Presidency.

Regarding investigation issues, we have the valuable cooperation from the following institutions: Colegio de Post-graduados de Chapingo, Universidad Autónoma del Estado de Hidalgo, INIFAP y Universidad Autónoma de Chapingo, remarkably in works related to vegetation development in extremely dehydrated areas.

Means of stakeholder involvement and role they play(ed)
Besides emphasizing involvement from residents, it is necessary to point out that participation was defined through community meetings, with assistance of the municipal delegate as authority, where dwellers discuss and decide the

activities that will be done in the micro basin, based in a document created by them (Community Development Program).

Long-term commitment and targets
The process of community management, after 6 years of work, has been reinforced and now is efficiently consolidated. This means that the results had encouraged community members to continue working and searching for financial sources on behalf of other projects. For example, they now intend to develop an aquifer infrastructure for bath resorts.

Originality and Innovative Ideas: For community dwellers, living in a region with adverse climate conditions, scarce water and vegetation as well as infertile soil were a challenge for pursuing welfare. Thus, obtaining the aforementioned results allows us to qualify the model as unique and innovative. Nevertheless, the most remarkable is the organization and excellent work performed by the area residents. Throughout time they have been witnesses and authors of significant survival efforts in a harsh environment, from which they have been able to extract nurture, home and development possibilities.

Costs involved: The management has allowed to gather institutional supports of $1`150,000.00 during 1998-2004 work period. Likewise, we estimate that community members had contributed with hand labor and raw materials for a rough amount of $750,000.00, totaling an investment of $ 1'900,000.00, accounting near 40% of communitarian bestow. The government financial sources are several: SEMARNAT, CONAFOR, SEDESOL, SEDESO, CONAZA, Municipal Presidency, FIRCO, among others.

Lessons learned that you would propose to present at the 4th World Water Forum
In the micro basin "El Porvenir" we can observe an integral management model that comprises natural resources as well as social and government participation, feasible of duplication in zones or states with similar conditions; just as it can also be applied to other homeland regions, or even other countries.

The model has allowed strengthening of inter-institutional performance, as well as consistent collection and combination of resources and technical assistance.

The social organization and involvement has been essential for succeed in having more than 300 ha worked with various procedures for protection, conservation, sustainable profit of natural resources and eco-tourism.

The project was widely adopted by community members as shown with their respect and support for its implementation.

The model demonstrates the possibility of recovering seriously depleted areas, and points out that collection of rain water in of extreme dry zones for productive purposes is feasible.

Local actions details:

ID	LA0041
First name Valeria	Last name Fuentealba Matamala
Organization	Education Ministry
Country	Chile
Gender	Female
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Scope of the action:	Country
Region:	Americas
Name of Local Action:	National System for Environmental Certification of Educational Institutions
Framework theme:	Water Management for Food and the Environment

Crosscutting perspectives: New Models for Financing Local Water Initiatives; Institutional Development and Political Processes; Capacity-building and Social Learning; Application of Science, Technology and Knowledge; Targeting, Monitoring and Implementation Knowledge.

Name and types of the implementing organization(s): Education Ministry: National and local governments, authorities and associated; National Environmental Commission: National and local governments, authorities and associated; Sustainable Development Council: Civil society organization.

Description and location of the problem and activity as implemented: Within the challenge of promoting a cultural change for sustainability, it's essential to form environmental responsible citizens with new values, behaviors and attitudes with respect to their habitat.

The National System for Environmental Certification of Educational Institutions (SNCAE), develops supplementary action lines for to reinforce environmental teaching, territory and water resources care and protection, as well as creation of social nets for local ecological management.

Impact of implemented activity (social, economical, environmental, etc.)
Generate educational institutions integrated with local activities, responsible for the environmental impact their actions might cause in their habitat (works in natural basins, aquifer exploitation, intervention in swamps and others), contributing to enhance the local environmental management.

Types of stakeholders involved: Schools and Colleges in Chile; Education Ministry; National Environmental Commission; UNESCO; Sustainable Development Council; Forestal National Corporation.

Means of stakeholder involvement and role they play(ed)
Up to date we have more than 100 certified schools and 90 more in process of certification.

Long-term commitment and targets
The Environmental Certification System establishes ecological standards that measure the presence of environmental factors in three sections of the educational effort: Pedagogical, School Management and Relations with Habitat.

The SNCAE intends that significant local themes take up their place in the curriculum and immerse the education community, so the boys and girls learn and appreciate the proximity, and then what is beyond.

Originality and Innovative Ideas
Because the Environmental Certification System establishes ecological standards that measure the presence of environmental factors in the aforesaid sections of the educational effort, particularly in water administration it represents a powerful tool for Water Resources Management, as the educational institution must be responsible of efficient use and rationale of their resources, designing the corresponding policies and practices.

Costs involved
Year 2002: USD 100.000 from the nation's budget.
Year 2003: USD 135.000 from the nation's budget.
Year 2004: USD 95.000 from the nation's budget.
Year 2005: USD 97.000 from the nation's budget.
These investments are without including the costs for professionals, which are 14 for Mineduc and 14 for Conama.

Lessons learned that you would propose to present at the 4th World Water Forum
This is an interesting initiative that can be partly or totally duplicated in Latin America, and represents a good opportunity of influencing in the education of future generations and decision makers on subjects related to water management.

Local actions details:

ID	LA1176
First name Karla Marlene	Last name Castro Molina
Organization	Project: Integral Management of Basins Associated to the Hydrographic Complex "Barra de Santiago–El Imposible" (BASIM) World Union for Nature (UICN)
Country	El Salvador
Gender	Female
Email	karla.castro@iucn.org
Scope of the action:	Basin
Region:	Americas
Name of Local Action:	Efficient use of water in orchard productive system by men and women, Tamasha Community, San Francisco Menéndez, Ahuachapán
Framework theme:	Water Management for Food and the Environment
Crosscutting perspectives:	New Models for Financing Local Water Initiatives; Capacity-building and Social Learning; Application of Science, Technology and Knowledge

Name and types of the implementing organization(s): Tamasha Community: Civil society organization; Project BASIM UICN: International and intergovernmental institution

Description and location of the problem and activity as implemented
In the hydrographic region of Cara Sucia–San Pedro Belén, we performed a study about the gender relations in the use and handling of water in the rural population of Ahuachapán Sur. The results illustrate the situation of men and women users of the water distribution systems existing in the territory, as well as their active involvement in their respective water communitarian managements. This allowed to establish equity in water use and quality of the product served to the community and confirmed that accessibility to water has diminished women's labor day; it also determined men and women's roles related to water use for their respective functions

Impact of implemented activity (social, economical, environmental, etc.)
Most of the population is made up by small farmers (men and women), the number of families and dwellers by gender is of 106 families, 567 residents (274 women and 287 men); the community lacks a potable water system, currently their supply is from springs or artisan wells that have turbid waters.

The workgroup is formed by 12 families, with six women and six men as home chief, under an orchard production system; in the first sow they grew tomatoes, using a dipping irrigating system by gravity.

For implementing the dipping irrigating system we have reinforcing the efficient water use, a rationalized chemical and fertilizer application, carrying out a learning process on production technology and management.

Types of stakeholders involved: Winrock Internacional in El Salvador; Tamasha Community; San Francisco Menéndez; Project BASIM UICN; Technoserve from El Salvador.

Means of stakeholder involvement and role they play(ed)
Winrock with technical assistance for orchard design and materials employed;
Project BASIM UICN supported with building materials and irrigation system;
Technoserve with technical support in the planting cycle;
The community with hand labor for building and maintenance of the orchard

Long-term commitment and targets
The first purpose is to promote the involvement of other institutions, as ONG and ONGS, for reinforcing the local capacities for managing the Tamasha community development focusing gender equity. The second objective is training the residents so they would be able to administer the orchard themselves, generating possibilities of future trading in local markets as well as national and international markets afterward

Originality and Innovative Ideas
It's the first time that these men and women perform this type of productive activity and y make decisions impartiality, demonstrating an efficient water use derived from a new technology and gender equity application in their community.

Costs involved
The cost of the orchard was US $ 8,500.00, including funding from WINROCK, Technoserve, Project BASIM UICN, community contributions and CENTA

Lessons learned that you would propose to present at the 4th World Water Forum
The initial proposal of the orchard was only for the women in the Tamasha community, but due to their own initiative also men, teenagers and children were included in this learning process. This was much rewarding, being the first time in the community that people perform this combined, being able to make decisions free of prejudice.

One problem arose due to the turbid water that tend to block the irrigating system pipes with mud, requiring a filter in the tank; in the following production two filters were necessary and a protective barrier was built for achieving, reducing the jamming, the irrigating system was also modified.

One significant lesson is the integration of men, women and youngsters in the development of a productive activity with an efficient water use for sharing it with their own community and others, fostering their local capacities.

Local actions details:

ID	LA0465
First name José de Jesús	Last name Moreno Ruiz
Organization	Electricity Federal Commission, Center Occident Division
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Scope of the action:	City
Region:	Americas
Name of Local Action:	Energy Tariff 9N
Framework theme:	Water Management for Food and the Environment
Crosscutting perspectives:	New Models for Financing Local Water Initiatives
Type of Organization:	National and local governments, authorities and associated

Description and location of the problem and activity as implemented
Irrigating during night is one recommendation done to agricultural producers for reducing the electric energy costs derived from the water extraction en from subsoil, as this measure require less water amount to irrigate the same surface, than would be necessary if the activity is performed during day hours. This water savings allow correspondent electric energy savings. Established in August 8, 2003 the "9N Night tariff for water pumping service for agricultural irrigation in low or medium tension", the norm is published in August 3, 2005 in the Federation's Official Journal, authorizing the change in electric energy supply and sale tariffs, so 9N determines:
TARIFF 9-N (TARIFF OF NIGHT PROMOTION FOR WATER PUMPING FOR AGRICULTURAL IRRIGATION)

This night tariff would apply to the electric energy employed for operating water pumping equipment for agricultural irrigation by productive subjects inscribed in the roll of grants of agricultural energetic, up to the Energetic Quota defined by the Agriculture, Livestock, Rural Development, Fishing and Food Secretary. The stimulus for irrigating during night hours would be reflected in the cost by Kwh of energy consumed in the periods:

- Year 2005, day $0.34, night $0.17
- Year 2005, day $0.36, night $0.18
- The energy exceeding the energetic quota will be billed at normal prices.

The habit of irrigating during day hours and the lack of concession titles issued by the Water National Commission are major obstacles faced by the Electricity Federal Commission for achieving that users demand their inscription in the tariff 9N. The tariff's application is in the complete Mexican territory. Herewith are the data of the Center Occident Division of the Electricity Federal Commission, which comprises the states of Michoacán, Colima, small parts of Guerrero and Jalisco. The energy night use has benefits for the National Electric System management due to demand moving upon hours of more economic issuance.

Impact of implemented activity (social, economical, environmental, etc.)

One expectation when this tariff was implemented was to turn the energy demand to night hours and to reduce the Kwh consumption using a smaller water amount for irrigating he same soil surface, attaining a loss for evaporated water proportional to the region's temperature. Up to May 2005, la the Center Occident Division had 7,337 users contracted in the Agricultural Irrigation tariff and 1,814 (24.7%) among them have chosen the night tariff option.

The reduction in consumption per user is obtained mainly because of the night tariff, observing how in the years 2003 and 2005 the Kwh increased in the tariff 9N due to night irrigation. We estimate that energy consumption from January to May provided tariff 9N didn't exist, would be 2004 de 207,352,946 Kwh in 2004 and of 211,827,982 Kwh in 2005, representing savings of 10,537,987 Kwh in 2005. According to our statistical sampling of 58 pumping equipment in the region, we determined an average value of 3.8 m^3/Kwh for water extraction. The savings of 10,537,987 Kwh in the 2005 January-May period represent 40,037,301 m^3 of water and applied to the eight months that regularly require irrigation in the year, we obtain a total of 64,059,681 m^3 . Considering that a family house consumes 25 m^3 per month, the savings stand for the annual consumption of 213,532 homes. La The expectations of the Electricity Federal Commission, Center Occident Division, for tariff 9N, is that at least 90% of agricultural irrigation users decide to accept the benefits of this tariff, which would duplicate the estimated savings, representing the water annual consumption in the home of Morelia City, in Michoacán.

Types of stakeholders involved

Governmental Institutions: National Water Commission (CNA); Agriculture, Livestock, Rural Development, Fishing and Food Secretary (SAGARPA); Electricity Federal Commission (CFE).

Means of stakeholder involvement and role they play(ed)

- National Water Commission, through the regularization of beneficiaries and issuance of Concession Titles for national waters.
- Agriculture, Livestock, Rural Development, Fishing and Food Secretary, by the establishment of the energetic quota to the beneficiaries.
- Electricity Federal Commission, by means of tariff application and promoting the users inscription for having its benefits.

Long-term commitment and targets

The approval for tariff's change, in August 3, 2005, establishes a calculation method for the energetic quota that benefits the producers, encouraging them to use energy during more night hours. The tariff has been promoted among all the farmers with agricultural irrigation service, and presently the advantages of the tariff are still being endorsed, being an action of mutual benefit. Periodic meetings are hold by CNA-CFE and SAGARPA-CEF for solving whichever problem agricultural producers may have to attain tariff 9N.

Originality and Innovative Ideas

Costs involved

The annual cost for the Electricity Federal Commission, Center Occident Division, is 45,858,372 Kwh * $0.17/Kwh = $7 795,923.00. This amount is the cost that the agricultural irrigation user wouldn't pay if he employs night energy, $0.17/Kwh for May 2005. This is absorbed by the Federal Government through subsidization of the electric energy tariffs applied by the CFE.

Lessons learned that you would propose to present at the 4th World Water Forum

The tariff 9N is a mechanism that benefits the agricultural producer and the supply enterprise in the following aspects:

- Agricultural Producer
- Water savings
- Energy savings (Kwh)
- Economical savings ($)
- Reduced production costs
- Enhanced competition
- Increase or familiar and regional economy
- Supply enterprise
- Infrastructure disposition
- Lower electric energy production costs
- Reduced energy losses by managing demand
- Lower contamination due to Kwh savings

Local actions details:

ID	LA1100
First name Alberto	Last name Jiménez Merino
Organization	Rural Development Secretariat of Puebla's State Government
Country	Mexico
Gender	Male
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Scope of the action:	Basin
Region:	Americas
Name of Local Action:	Basin Management and Alimentary Soberanity
Framework theme:	Water Management for Food and the Environment
Crosscutting perspectives:	New Models for Financing Local Water Initiatives
Type of Organization:	National and local governments, authorities and associated

Description and location of the problem and activity as implemented

The State of Puebla covers a surface of approximately 33,902 km^2. The entire territory is located within four large hydrological regions, which are the following arranged according to extension they occupy in the State: RH18 Balsas River; RH27 Tuxpan-Nautla Rivers; RH28 Papaloapan River and RH26 Pánuco River. In the Sate of Puebla, there are innumerable micro basins that require a comprehensive management with rain water collection works, groundwater recharge, and ground and soil conservation works. Wind, water, and induced erosion lead to soil loss in a faster rate than it is formed; that is to say, a non-vegetated eroded area loses 76.0 tons per hectare yearly while the pasturelands and the forests form 2.19 tons per hectare yearly; therefore the deficit is 73.81 ton/ha/year. In regions such as the Mixteca, every year, it rains 6,000 M3/Ha average, 70 % evaporates, 17% infiltrates and the rest drains to the ocean. The available water is reducing by the minute for domestic and productive needs. The lack of vegetal cover stops rain water infiltration which is lower than 22% provoking the water-bearing strata destruction a meter a year. High building costs for regular water retention works. In Puebla, there are innumerable micro basins that require a comprehensive management with water and soil conservation works that allow increasing the watering place rate per head of cattle and favoring the underground water-bearing strata recharge. Since 2001, in Puebla, 1,064 works have been built or water and soil conservation actions have been undertaken in 671 towns with State and Federal founds. In 2004, the Nacional Comission of Arid Regions and the State's Government made an investment of $29,973 Mexican pesos for having water collecting and groundwater infiltration works built, and soil and water conservation actions were undertaken in 182 hectares of micro-basins in 15 municipalities of Puebla's Mixteca region.

Impact of implemented activity (social, economical, environmental, etc.)

The program's objective was to undertake water and soil conservation works and actions to reduce erosion, increase water availability, and improve living conditions of rural areas' residents and their families in a sustainable way so as to solve the problem from its roots. Obtaining higher productivity of the natural resources and their preservation according to the State's requirements, restoring degraded areas have the purpose to regulate the hydrological regime. Given the fact that in Puebla there are innumerable micro basins each one of which has particular characteristics, their management must be unique, they require a comprehensive management with water collecting works and, in order to favor underground water-bearing strata recharge, work for the conservation of water and soil, establish grasslands with high pasturage productive potential. In 2004, 43 water deposits were built with a volume of 51,000 M3, for collecting 348,000 M^3 of water yearly, 45 masonry dams, 131 wire-wrapped dams, 262 arranged stone dams, 183 hectares for planting Xoconoxtle, maguey, forage cactus, pitaya, aloe vera, and ash tree, 343 km of ditch decks, 8,700 M^3 of parcelling water deposits, 1,609 M3 of retaining walls, and 47.6 of fencing. The impacts obtained by this type of actions and works are the following: Direct Beneficiaries 6,312 inhabitants, Indirect Beneficiaries 36,254 inhabitants, Increase water availability in 54 communities located in 15 municipalities of the Mixteca Region, favoring 8,420 families, Water Infiltration and Collection through waterwheels and dams, Fertile Soil Retention, Temporary Water Mirrors for cattle's watering places. 90% of the works were built by non-specialized communitarian participation. Groundwater recharge actions unify efforts from the community inhabitants, increasing water availability and providing great productive development possibilities.

Types of stakeholders involved
Rural Development Secretariat of the State's Government, Secretariat of Agriculture, Cattle Raising, Rural Development, Fishing and Food and Arid Zone National Commission.

Means of stakeholder involvement and role they play(ed)
Secretariat of Agriculture, Cattle Raising, Rural Development, Fishing and Food invested 70 % of the total amount, the National Arid Zone Commission as technical agent and the State Government invested 30% of the total amount and as executers they invested 29,973,000 Mexican pesos for building 481 water collection and ground water infiltration Works, and soil conservation actions were undertaken in 182 hectares of micro-basins in 15 municipalities of the Mixteca Region. The following results were achieved: Retaining 8 billions of m3 of water, Retaining 227,000 tons of fertile soil silt, Assuring alimentary self-sufficiency of 192,000 families in 7,690 communities in four States of the Mixteca Region, and Benefiting 649,000 Mixteca families, Increasing water infiltration in order to recharge water springs and wells, Deceasing torrents and risks of the population by reducing water flow speed.

Long-term commitment and targets
Based on this experience, an application has been submitted to the Inter-American Development Bank requesting a loan for 500 millions of dollars for the REGIONAL PROGRAM OF WATER AND ALIMENTARY SECURITY FOR THE MIXTECA REGIONS (PUEBLA, OAXACA, GUERRERO Y MORELOS), by jeans of which it is planned to support 7,690 Mixteca communities through infrastructure work in order to retain soil and water, as well as the establishment of alimentary production modules in patios and small areas. By using the Micro-Basin concept, the soil and water conservation is fostered, establishing filtering wire-wrapped dams, artificial wells, ditching, and subsoil. Building an average of 14 works per community; mainly in those communities where the lack of water issue is limiting factor, and is perceived in its wells and water springs. In the mid-term, it is planed to complement the program with reforestation projects, grassland sowing, and productive projects, that require minimum water amounts, greenhouses, and QPM corn production with drip irrigation; fish raising and fattening. In is planed to support every year 200 communities in Guerrero, 50 in Morelos, 200 in Oaxaca, and 260 in Puebla, for the construction of this water and soil conservation works, and to train 50 producer per community to have a total of 35,500 producers about the alternatives regarding basin management. .Therefore, in 10 years there will be an investment for 5,705.9 billions of pesos in 7,690 villages.

Originality and Innovative Ideas
The Works performed based on the identification of the communities and their basins, with high rates of erosion, and where water exploitation takes place decreasing the water level of the wells, or decreasing the springs' volume of flows, as well as identifying communities willing to participate in the program. The micro-basins test was carried out choosing compact areas and planning the actions in a descending order in order to achieve the desire impact. Committees were made up so as to perform and define agreements and contributions. Based on this information, a work construction and action execution program was created. In this execution processes, producers were trained on how to carry out works and actions, so that they can continue in another micro basin using the same actions.

Costs involved
Secretariat of Agriculture, Cattle Rasing, Rural Development, Fishing and Food invested 70% of the total amount, and the State Government invested 30% of the total amount as executers made an investment of 29,973,000 Mexican pesos.

Lessons learned that you would propose to present at the 4th World Water Forum
- Because it allows to stabilize almost completely the bottom of the watercourse, reducing the water speed.
- Because it increases water availability for the population, agricultural activities, and cattle raising.
- Because it offers productive possibilities such as agricultural production with drill irrigation, production of vegetables in greenhouses and aquaculture.
- It improves jobs' and income possibilities for the families.
- It provides support by increasing the agricultural and livestock productivity and reducing the labor force expulsion.
- Based on the abovementioned and given that most of the Mexican populations present these same conditions or similar problems, it is possible to perform these actions in other States of the nation or in other countries.

Local actions details:

ID	LA1617
First name Daniel	Last name Estrada
Organization	Gaia
Country	Mexico
Gender	Male
Email	daniel@gaia.org.mx
Scope of the action:	Basin
Region:	Americas
Name of Local Action:	Cleaning Earth Arteries
Framework theme:	Water Management for Food and the Environment
Crosscutting perspectives:	Institutional Development and Political Processes; Capacity-building and Social Learning.
Type of Organization:	Civil society organizations; National and local governments, authorities and associated; Professional associations and public and private knowledge and education centers.

Description and location of the problem and activity as implemented
The project was originated as a program to clean a small river area: the area near the village. Later on, it became a task of making citizenry aware of the need to keep the region's rivers clean. Originally the tasks were focused on picking up the garbage form the river, and then need to get the population involved in the process of keeping rivers clean was obvious. The work site was originally the Santa Ana Jilotzingo river in the Sate of Mexico. The same work has been carried out in other region's communities and the project is planed to be implemented in every community crossed by rivers that lead to the Guadalupe Lake. The actions have been performed along with cleaning, students' work, signposting, and information campaigns for the population.

Impact of implemented activity (social, economical, environmental, etc.)
The actions were focused on educating the young population about the importance of keeping the river clean. Environmental education classes were given and cleaning programs were organized where the school students were involved. International camps were also carried out all over the world where volunteers from many countries helped with the sanitation works. In the short-term, 20 tons of garbage were removed from the river. In the mid-term, the government was involved in order to continue with campaigns to increase public awareness, and education. In the long-term, the perception of the people about the river is changed. These were local actions, but it is planed to reproduce them at a basin level, and then at State level.

Types of stakeholders involved
In these actions, the following bodies were involved: Jilotzingo's Government, ITESM-CEM, UVM Lomas Verdes, CETIS 41, Thomas Jefferson Institute (with students of the Social Service Faculty), foreign volunteers (by means of links with UNESCO), national volunteers, Gaia.

Means of stakeholder involvement and role they play(ed)
- Students and teacher of local schools (Emilio Chuayffet Chemor and the Albert Einstein University): Collaborated on cleaning campaigns and talks with students.
- Jilotzingo's Government: Provided material resources (transport, personnel, security, gloves, and sacks), it also served as a link of communication with schools and other public services.
- Inhabitants of Jilotzingo and near by municipalities/delegations: Contributed with voluntary work in cleaning campaigns. More than 500 people collaborated this way.
- International Volunteers: International citizens have participated in 2 workcamp-type camps in order to collaborate with the cleaning and public awareness awakening campaigns. Youngsters from France, Spain, United Kingdom, and United States have voluntarily collaborated with this project's tasks execution.
- Gaia: Coordinated participants and was in charged of the logistics of the project.

Long-term commitment and targets

From 2000 to the present days, actions to eliminate wastes coming from human activities have been performed in the Jilotzingo's rivers. On the one hand, a large amount of wastes has been removed, and on the other hand, the population has been awaken to the importance of not throwing garbage in order to keep the river clean. There are no commitments with the participating actors, but it is planed to have:

- Contact with more universities so that their students do their social service in the project.
- Collaboration with universalities to monitor the river conditions as part of research projects.
- New international camps.
- Training course for teachers so as to awaken students to the situation, and cleaning campaigns with the students.
- Agreement with the army to carry out cleaning campaigns.

Originality and Innovative Ideas

The project's innovation dos not relay on the actions per se, since the cleaning of the river is not a new concept. The innovation is the idea of cleaning the Earth's arteries, and not only collecting the garbage in the river. Likewise, getting high school students involved in the water bodies cleaning campaigns is not a common practice, and it is a core factor to the project. Cleaning actions do not require greater physical capacity than the one necessary to move around in or around the river's bank. No other material resources are needed than gloves, garbage bags, and plastic suits, when possible. There are instructions to clean rivers. A "Manual to Clean Rivers" has been Publisher with a summary of bio-regionalist articles; it was published by the Senate of the republic. The training on how to clean rivers may be given in a 20-minute talk.

Costs involved

The total of all costs involved should be clearly reported.
The project's founding was covered as follows:

- Material Resources: (gloves, sacks, transport of the collected wastes): Municipal Government.
- Logistics, training for students, informative material, planning, and management of the project: Gaia (through altruistic contributions and voluntary fees to foreign people)
- Work force (free): Social Service, national and international volunteers.

Lessons learned that you would propose to present at the 4th World Water Forum

- Getting children involved: Through the children, not only their habits may be changed but also their parents'. This way it s possible to work with present and future generations.
- Carrying out cleaning campaigns: The best way to achieve a real impact on the inhabitants is to have them take part in the river's cleaning works. Not only does the work of the population eliminate garbage from the water, but also makes people aware about how the garbage goes to the river and changes habits in order to prevent this from happening again.

Local actions details:

ID	LA1445
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Country	Mexico
Gender	Female
Email	ciudadana@prodigy.net.mx
Scope of the action:	Country
Region:	Americas
Name of Local Action:	The use of Federal Law of government Public Information Access in order to strengthen citizen's participation in the water: Chiapas' Case.
Framework theme:	Water Management for Food and the Environment
Crosscutting perspectives:	Institutional Development and Political Processes; Capacity-building and Social Learning
Type of Organization:	Civil society organizations

Description and location of the problem and activity as implemented

1. During 2004, a Wastewater Discharge and Treatment Plant were built. This plant would benefit 1,182 inhabitants of the Citalpa Ejido, municipality of Ocosingo, approximately 6 kilometers away from Lacanjá Tzeltal. The affected people was the population of the Lacanjá Ejido located downstreem the river Lacanjá due to the contamination found in the Lacanjá river, which provokes wastewaters flowing in the river, harming fish and aquatic animals; in addition, it affects the quality of the water used by humans not only in the Lacanjá Tzeltal ejido, but also in other communities named Nueva Palestina (20 km downstream from the project location) and the lacandona indigenous community named Lacanjá Chansayab (14 km downstream from the project), all of which are part of the Ocosingo Municipality. Therefore, it was requested the relocation of the Plant at a one-thousand-meter distance from the Lacanjá River, instead of 200 meters as had been planed. The lack of appropriate information, and consensus triggered discontent and disputes between both communities. The authorities would not give any requested information that could change the decision of having the sewage built as planed and in that site, or any arguments about performance of the laws, rules, and regulations regarding the construction of this type of infrastructure with the duly precautions taken.

   There is no procedure to treat conventionally basic pollutants or pathogenic and parasitic pollutants found in the wastewaters that are planed to be discharged either in the Lacanjá River or on the ground.
2. The pollution brought up by the operation of this wastewater "Treatment" Plant, according to the aforementioned, would have a great negative impact on the Lacanjá River's water quality. This water supplies the aforementioned communities, therefore SEMARNAT, through PROFEPA, must inform the Ministry of Health in this regard, and must deny any corresponding permission or authorization; however, this situation was not taken into consideration by the CNA, not observing article 124 of the LGEEPA.

Impact of implemented activity (social, economical, environmental, etc.)

Base don the access to information granted by the Federal Law of Governmental Public Information Access, we had the project stopped, and on December 15th, 2004, a meeting with the Leader of the Ejido Commission of Cintalapa, the President of the Surveillance Council, the municipal Agent, the President of the Sanitation Board on behalf of the CNA, and the CEAS staff was held, with the purpose of reaching agreements regarding the problems that may be caused by the construction and operation of the so-called treatment plant. During the meeting, many agreements were reached, and one of the was that on December 21st, 2004, entrance to the treatment plant would be temporally closed for three months while a better technical alternative was planed and built. Also, the CEAS and the CNA agreed to observe the regulations established by the PROFEPA and the SEMARNAT, with this purpose, the project would be subject to the authorities' approval.

Types of stakeholders involved

- Leader of the Ejido Commission of Cintalapa.
- President of the Surveillance Council.
- The Municipality.
- Sanitation Board.
- National Water Commission CNA.
- CEAS.
- Local communities of the Citalapa Ejido, Ocosingo Municipality, Lacanjá Ejido Communities.
- NGO

Means of stakeholder involvement and role they play(ed)

The NGO's acted as facilitators in order to access the necessary information, and to technically follow up the case, it is necessary to submit a denunciation before the Profepa, submit information applications, guide the communities, and provide them with legal counseling. The communities demand the situation and are the directed affected parties. This is a significant case because it reflects the authorities' urgent need to perform the applicable laws and have a better planning when carrying out their projects. The importance of the citizen participation and the communities' denunciation about the serious affectations they themselves and the environment suffer from is highlighted. Lastly, the relevance of the organized civil society in the facilitation of certain processes is mentioned.

Long-term commitment and targets
Constant citizen surveillance of these projects. The need to have sewage along with a water treatment plant, using the adequate technology for the region. The government promised not to create this sewage until there is a feasible alternative to implement it in compliance with the applicable laws.

Originality and Innovative Ideas
This case tries to illustrate the usefulness of the Federal Law of transparency and information access for the local communities' benefit, and to solve environmental problems that affect alienated communities. Using this legal instrument is increasingly being more important, but the society in general has not adopted this right to information access yet, therefore we believe it important to show the instruments available to contribute to a substantial change in the local communities.

Costs involved
Priceless

Lessons learned that you would propose to present at the 4th World Water Forum
- The importance of social denunciation.
- The importance of citizen participation.
- The importance of social mobilization in order to have results.
- The use of the Federal Law of Transparency and Information Access in Mexico.
- The importance of citizen surveillance for projects authorized by the government.
- The need to have access to information.
- The need to have laws on information access at national and State level to guarantee our right to be informed.

This citizen supervision experience regarding projects authorized by the government, is being replicated in 10 Latin-American countries to foster the use of their right to information and promote this right though laws or other means that guarantee this right.

RISK MANAGEMENT

Local actions details:

ID			LA0336
First name	Benito	Last name	Canales López
Organization			PALAU BIOQUIM, S.A. DE C.V.
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Gender			Male
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Scope of the action:			Country
Region:			Americas
Name of Local Action:			AGRICULTURE: - SAVINGS IN ROLLED IRRIGATION WATER.
Framework theme:			Risk Management

Crosscutting perspectives: Application of Science, Technology and Knowledge
Name and types of the implementing organization(s): PALAU BIOQUIM, S.A. DE C.V.: Enterprises and facilities that are either private managed as public-private partnerships

Description and location of the problem and activity as implemented
- Excessive irrigation water (wasted water) in the Irrigation Districts.
- Soils contamination and degradation in the Irrigation Districts.

The activity herewith studied, aims to enhance this practice through implementation of sustainable (rational) agriculture, including as support application of viable marine alga derivates (ALGAENZIMS), with the following purposes:
- Remove the plow (agriculture without farming).
- Avoid environmental contamination.
- Soils enhancement (recovery).
- Better efficiency from irrigation water.
- Water savings in rolled irrigation.
- Lower investment.
- Higher revenue.
- Establishment of sustainable and rational agriculture.
- In México, the action has been implemented to a certain extent, in the states of de Baja California Sur, Sinaloa, Jalisco, Michoacán, Chiapas, Morelos, Puebla, Estado de México, Hidalgo, Tlaxcala, San Luis Potosí, Tamaulipas, Nuevo León, Coahuila. Work is being done in other states.
- We have also activities in the republics of: Guatemala, El Salvador y Belize.

Impact of implemented activity (social, economical, environmental, etc.)
- Conventional agriculture: plow, drill plow, gang plow; excessive use of: irrigation water, fertilizers, agro-chemicals, amends, machine surpass, had degraded the soils, causing a null response in revenues, no matter which more practices of the same type are applied.
- Sustainable agriculture added to ALGAENZIMS, will be favorable for the father, the son, the grandson, etc.
- Higher revenues with lower investment are beneficial for the farmer, and the multiplied economic effect in commerce and industry will be helpful for many people. The ensuing social impact has not yet been measured due to the huge area where implementation has been completed (Mexico and part of Central America).

Types of stakeholders involved
Investigation Centers:
- Universidad Autónoma Agraria Antonio Narro (UAAAN), Saltillo, Coahuila, México.
- Universidad Autónoma de Coahuila (UAdeC), Saltillo, Coahuila, México.
- Centro de Investigación en Química Aplicada (CIQA), Saltillo, Coahuila, México.
- Universidad de Guadalajara (UadeG), Guadalajara, Jalisco, México.
- Universidad Nacional Autónoma de México (UNAM).
- Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM), Monterrey, Nuevo León, México.

Government Agencies.
- National Board of Science and Technology, México (CONACYT).
- Publishing Board of the State Government of Coahuila, México.

Private Sector.
- Palau Bioquim, S.A. de C.V.
- Users (farmers).

Means of stakeholder involvement and role they play(ed)
Encouragement of research institutions and users (farmers): to supply ALGAENZIMS, technology, follow up upon results.
The farmer: provides the parcels, water, fertilization and other planting stuff.
The resources are managed by the research institution, with follow up from Palau Bioquim and CONACYT (when applicable).
Are handled by the farmer, who owns the usufruct.

Long-term commitment and targets
- Agriculture by contract is an efficient tool for permanence of sustainable agriculture, including ALGAENZIMS.
  The positive results, after 17 years, had allowed continuity despite an extremely modest start. Lately, meetings with farmers organizations had been much useful, so will be preserved.
- If bad results are obtained a compromise is worthless. If harvest's results are good, agriculture by contract will continue. Of course the writing and record of a compromise helps.

Palau Bioquim, by way of persistency, has succeeded in extending this action through 17 years.

Originality and Innovative Ideas
ALGAENZIMS elaboration process was developed aiming to preserve marine alga microorganisms viable in the finished product, allowing them to propagate in the favorable setting where they are applied, enhancing their action.
– Water savings in rolled irrigation from 22% to 34%.

With ALGAENZIMS we were able to accomplish wadding of soil 41% more than with the plow.

Costs involved
Approximate total from year 1990 to year 2004: $1'606,000.00
Lessons learned that you would propose to present at the 4th World Water Forum

- Water savings in rolled irrigation.
- Soils enhancement – Recovery of depredated soils.
- Better productivity.
- Environmental improvement.

Local actions details:

ID			LA1056
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Scope of the action:			Country
Region:			Americas
Name of Local Action:			Restoration of Micro Basin of Río Blanco III
Framework theme:			Risk Management

Crosscutting perspectives: Capacity-building and Social Learning Name and types of the implementing organization(s): National Forestry Commission (CONAFOR): National and local governments, authorities and associated; Petróleos Mexicanos (PEMEX): Enterprises and facilities that are either private managed as public-private partnerships

Description and location of the problem and activity as implemented
In June 5, 2003, torrential rains were present in the Pico de Orizaba surroundings. Due to lack of vegetation covering caused by soil misuse, plunging was generated in the Río Chiquito with a flow of 300 m^3/sec, so the strong stream provoked serious floods in the urban zone, as well as the breakage and explosion of a PEMEX's propane duct. The results were human losses and numerous material and environmental damages.

Five days later of the so named "Barrancada Balastrera", on June 10, 2003, CONAFOR presented PEMEX a project for the recovery of micro basin of Río Blanco III through building works such as soils conservation, plants production and reforestation.

Impact of implemented activity (social, economical, environmental, etc
The planned activities will contribute to water collection of roughly 3,200 m^3/ha/year, allowing to gather in the whole area an estimated amount of 16.7 million m^3 of water/year, retaining approximately 30 ton/ha/year; that is 157,230 ton/year of soil in the micro basin, improving the ground drainage and guaranteeing the planting of the vegetal cover, reduction of earth slipping and floods, hence preventing disasters.

Types of stakeholders involved
The players involved in Río Blanco III micro basin project were CONAFOR, PEMEX, STATE GOVERNMENT AND MUNICIPALS., CONAFOR and PEMEX proposed the aforesaid project for Río Blanco III micro basin retrieval. Execution of the project was performed by CONAFOR, PEMEX and STATE GOVERNMENT, as well as its follow up and evaluation.

Means of stakeholder involvement and role they play(ed)
Aiming to prevent natural disasters, as experienced in 2003; general coordination teams of Regional Managements and Center Gulf Regional Administration from National Forestry Commission, in July 10, 2003 presented to PEMEX REFINACIÓN General Director and CONAFOR General Director, the retrieval project for Río Blanco III micro basin; within the collaboration agreement for recovery of depredated areas in the country.

Long-term commitment and targets
The aim is to perform soil conservation and reforestation works in 5,241 ha; as well as sowing 8.3 million plants.

Originality and Innovative Ideas
We accomplished an integral handling model for the basin; the works have been supervised by CONAFOR, state government, municipal presidencies and communitarian authorities' personnel. This model has been useful for training producers from other municipals in Veracruz and Puebla involved in the recovery of the National Park Pico de Orizaba.

Costs involved
As well with CONAFOR resources in years 2003 y 2004 we performed soils conservation works in 506 ha; reforested 490.5 ha; set up 130 ha with direct plow; cultivated 1,000,000 trees from coniferous seeds, for a total investment of $2.5 million pesos.

For year 2005 we have scheduled an investment of $1,173,450 and the production of 698,500 plants for reforesting.

PEMEX granted to State Government (SEDERE/Special Projects Unit) an initial amount of 10.5 MDP for support works. The aforesaid institution is responsible for coordinating actions under this resource.

Lessons learned that you would propose to present at the 4th World Water Forum
We learned to work in an inter-institutional coordination; within Federal, State and Municipal government levels; with direct investments in Río Blanco III micro basin. Moreover results were gained in productive conversion of farming areas to forestry ones, where producers in a 4 year period are already collecting wood in their plantations.

Local actions details:

ID			LA0660
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Organization			Manager of the Irrigation Module V-1 Chinitos Angostura, Sinaloa
Country			Mexico
Gender			Male
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Scope of the action:			District
Region:			Americas
Name of Local Action:			"ACTION PLAN FOR EFFICIENT HANDLING OF IRRIGATION WATER IN EMERGENCY SITUATIONS"
Framework theme:			Risk Management
Crosscutting perspectives:			Capacity-building and Social Learning

Name and types of the implementing organization(s): Civil Associations of Agriculture Producer Users from Sinaloa state, organized in Irrigation Modules (AUPA's): Civil society organization

Description and location of the problem and activity as implemented
Sinaloa state supports its economy mainly in agricultural activity, at such extent that it is considered as "Mexico's granary", being one of the foremost food providers. However, due to the drought suffered by the region from 1992 to 2003, the water volumes available in the storage dams were strongly reduced, reaching roughly 20% of their capacity, facing a serious problem to satisfy the irrigation water demands for a surface of 750, 000 ha, which is normally cultivated in the entity. Available low water amounts were merely enough for 50% of the plowing surface. Hence it was necessary to design an emergency plan that would guarantee increasing the plowing surface beyond 50%, in order to avoid or minimize the social conflict that was arousing amid farmers, involving different authorities.

Impact of implemented activity (social, economical, environmental, etc.)
Implementation of the Action Plan for Efficient Handling of Irrigation Water accomplished the plowing of more than 657,000 ha irrigated, thus reducing the economical losses estimated in 4,055 million pesos. As well social conflicts caused by soaring water demand were avoided, as all users had the same right to water usage, being national property, and were decided to exercise such right. Application of the Action Plan for Efficient Handling of Irrigation Water accomplished a production similar to any other year with enough water availability conditions, but most remarkably is that this culture was obtained using only 64% of the total volume historically employed for irrigating the same surface.

Types of stakeholders involved

The success of the Action Plan for Efficient Handling of Irrigation Water was possible due to active and enthusiastic participation of diverse state irrigation water users associations, supported by federal, state and municipal authorities.

The actions were coordinated by the National Water commission (CONAGUA) by means of technical personnel from various Irrigation Districts, besides directive and technical personnel of the Irrigation Modules (AUPA's) and Societies de of Limited Responsibility (S. R. L). Equally important were contributions from Sinaloa state government, SAGARPA, Produce Foundation, League of State Agricultural Communities and Associations, different Boards of Potable Water and Municipal authorities.

Means of stakeholder involvement and role they play(ed)

A Follow Up and Evaluation Committee was formed, responsible of discussing the Action Plan for Efficient Handling of Irrigation Water, and evaluating its technical and economical viability. Such committee was integrated by the aforementioned players.

Long-term commitment and targets

When the irrigation period was completed, we continue performing some general evaluation meetings with the presence of representatives from the federal, state and municipal government levels, as well as agricultural organizations, Irrigation Modules and S. R. L., drawing the following conclusions: renewed hydro-agricultural infrastructure must continue operating in future years; dams operation policies in each Irrigation District should consider a greater aquifers profit without affecting sustainability and, in general, repeat the actions performed in subsequent agricultural years, trying mostly to prevent growth in irrigation layers, and adjust the plowing plans aiming to avoid increase in corn farming surface.

Originality and Innovative Ideas

In this case, innovation was involvement of different entities, making for the first time an integral investment of financial and technical resources with the key objective of assuring irrigation of the plowed surface. Adequate political managing derived in the precise agreements that lead to success.

Costs involved

Development of aforesaid actions required the joint efforts and economical resources; hence the investments were as follows: National Water Commission $4 '200,000.00; Sinaloa State Government $5 '000,000.00; SAGARPA (Alliance for the camp) $10 '000,000.00; Irrigation Users Producers $5 '000,000.00; TOTAL $24 '200,000.00.

Afterward the CNA bought 59 pumps with a cost of $950,000.00, and supported Irrigation Districts with fiscal resources for time, vehicle loan and fuel payment for a total amount of $3 '128,000.00.

As well the Irrigation Users made additional investments of $37 '500,000.00.

Lessons learned that you would propose to present at the 4th World Water Forum

We succeeded in reducing 36% of the applied water volume, compared with historically volume applied in previous years with enough water availability in storage dams. It is known that in most Irrigation Districts in the country, efficiency in water general handling is below 50%, varying between 60 and 70% only for conduction and distribution. Agriculture is the sector that consumes more water (on a national scale, from the total water amount employed for various activities nearly 77% corresponds to agriculture), so enhancing efficiency in water handling will result in greater availability for other uses or more farming food.

Local actions details:

ID	LA0371
First name JUAN	Last name OLIVARES
Organization	IRRIGATION USERS ASSOCIATION LA PIEDAD AC
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Gender	Male
Email	jolivaresz@yahoo.com.mx
Scope of the action:	District
Region:	Americas
Name of Local Action:	ADOPTION OF LOW PRESSURE IRRIGATION SYSTEM IN "LA PIEDAD" MODULE
Framework theme:	Risk Management

Crosscutting perspectives: Application of Science, Technology and Knowledge
Name and types of the implementing organization(s): IRRIGATION USERS ASSOCIATION LA PIEDAD AC: Civil society organization; NATIONAL WATER COMMISSION: National and local governments, authorities and associated; AGRICULTURAL DEVELOPMENT SECRETARY: Professional associations and public and private knowledge and education centers

Description and location of the problem and activity as implemented

The Module is located in the central zone of the Irrigation District 087 "Rosario – Mezquite"; its influence area comprises Municipal of Pénjamo, in Guanajuato state, as well as Municipals of La Piedad, Numarán and Penjamillo in Michoacán state. The Module was transferred with 69.267 km of gullies, a road mesh formed by 180.630 km of length, and without a single irrigation channel. Water distribution was made through soil channels owned by the users, with 419 pumping plants and in some cases with re-pumping for irrigation of high areas operated with electrical equipment, diesel and "barqueñas" driven by tractor power installed in Río Lerma's riverside and gullies that discharge to the river and conduct water through long soil channels (up to 15 km) with elevated losses (a conduction efficiency of 75%), a very high operation cost and prejudice in parcels adjacent the channels due to "minaciones", hence limiting efficient plowing, farming labors and overlapping cultivation and harvest of Autumn-Winter cycle with Spring-Summer cycle with their respective production losses due to excessive humidity as well as constant users annoyance.

Facing this situation of high costs for renewing channels, maintenance, re-pumping, users irritation due to "minaciones" and low conduction efficiency, the users themselves, with information provided by the CNA and the IMTA through the Irrigation Module, decided to substitute the irrigation channels for a PVC pipeline that conducts the water from the riverside directly to the parcels.

Impact of implemented activity (social, economical, environmental, etc.)

With technical irrigation the users expected to solve the aforementioned problems: disparities in irrigation order by "minaciones" causing damage that was reflected in profits, delayed plowing or difficult harvesting, as well as irrigation channels conservation. All these problems were solved, and one remarkable additional benefit was obtained: water savings, as conduction efficiency was raised from 75% to 95%, resulting in savings of 9.91 million m^3 in the currently technified surface, with a total potential saving of 15.76 million m^3; as well, the irrigation is adjusted and reflected in a greater improved surface, as shown in the following chart in accordance with the performed plowing. These actions and their results are an example for other users, to the extent that currently we have approximately 9000-00 ha that have been technified and the aim is to accomplish 100% of the surface aggregated to the irrigation module.

Types of stakeholders involved

These actions had complete involvement from the CNA through the Irrigation District and the State government (mainly Guanajuato), who jointly managed the project's execution, a responsible of project design and finally the most important players, the users, that organized themselves and formed work teams, named representatives for records, took decisions regarding the project, supervised labors at all times and operated the equipment.

Means of stakeholder involvement and role they play(ed)

The technification of the irrigation area involved the following actors: users, CNA, state government and particular company.

Long-term commitment and targets Due to positive results, the module users decided to continue with techniques of low pressure systems until covering 100% of the surface. For accomplishing this aim, the administration board has requested technical and economic support from the CNA and the state governments of Guanajuato and Michoacán, as they have done before, expecting a combined donation of 60% to 75% of the work cost.

Originality and Innovative Ideas
For implementing the technification of this irrigation zone we required the integration of specialized hydraulic technicians specifically trained in efficient water use by low pressure irrigation, technicians from each participating institution and the users themselves.

Costs involved: The approximate costs for technified irrigation are $16 500.00 per ha, including pipeline, excavation, pump and engine, from which 50% to 75% was covered by federal and state resources, through several support programs.

Lessons learned that you would propose to present at the 4th World Water Forum

a) The starting point to accomplish changes is the integration of users in midst of a diversity of opinions, criteria and experiences; this is the most difficult conciliating factor.
b) Once the group for technified irrigation is formed, each person must be trained, not only representatives.
c) These actions may be implemented in other modules considering efficient ways for water savings and reduced costs through low pressure irrigation systems and perhaps high pressure ones.
d) It's highly convenient to integrate irrigation technification with other agricultural practices, as soils balancing and with other technologies, as direct plowing, aiming to have a more economic, organic and ecological production.

Local actions details:

ID	LA0658		
First name	Bárbara	Last name	Velasco Ulloa
Organization		Vegetal Sanity State Committee of Sonora	
Country		México	
Gender		Female	
Email		bvelasco@hmo.megared.net.mx	
Scope of the action:		District	
Region:		Americas	
Name of Local Action:		Installment of Collection Center for empty vessels that contained pesticides	
Framework theme:		Risk Management	
Crosscutting perspectives:		Targeting, Monitoring and Implementing Knowledge.	
Type of Organization:		Enterprises and facilities that are either private managed as public-private partnerships	

Description and location of the problem and activity as implemented
The constant pesticide usage in the agricultural sector has consequently generated great amounts of empty vessels that represent a contamination danger, both visual and environmental, as the final destiny of the pesticide vessels used in this sector is uncertain because there is no a elimination formal system. The function of the Collection Center is to collect the empty vessels, previously washed three times, for compacting and turning them to the AMIFAC, which will be responsible of its disposition. Up to date we have been working with the collection center in Hermosillo coast and installing other centers that will begin operating in November. One major problem is that the materials are scattered in the production units of the diverse agricultural zones, in addition to the lack of trained personal for separating different materials and its adequate treatment. However we are advancing in the established aims and the collection center that is operating has gathered approximately 9 tons, from which AMIFAC has sent the first shipment to several cement fabrics that use plastic as alternate combustible within their production process.

Impact of implemented activity (social, economical, environmental, etc.)
The state generates annually roughly 500,000 pesticide vessels, which stand as a risk source for environmental contamination and population's health. The implementation of the Collection Center in Hermosillo coast had resulted in various benefits, as accomplishment with official dispositions, ecological balance preservation, improved health and development, as well as achievements in integral systems of quality and safeness. From its opening, the center has collected approximately 9 tons of empty vessels, equivalent to assistance of 20 companies, and yet is much left to do. Part of the impact is that having a place to send the empty pesticide vessels and accomplish the food safeness programs will derive in the granting of recognition from national and foreign authorities in relation with application of agricultural and handling best practices. With these actions we intend to begin a process to protect the exportation of 281,600 tons of vegetable and fruit products in all the state, accounting for a value of 546.8 million dollars. At a state level, with the plan of installing and operating 6 collection centers, the first year would be receiving 70 tons of vessels that contained agricultural chemists for turning them to their final disposition. This will benefit 230 producers and increase the security and hygiene conditions for more than 20,000 farmer workers.

Types of stakeholders involved

- Agricultural Producers (Private Sector)
- Mexican Association of Fitosanitary Industry A.C. (Private Sector)
- Pesticide Distributors (Private Sector)
- Health Secretary (Government Institutions)
- Agriculture, Livestock, Rural Development, Fishing and Food Secretary (Government Institutions)
- Agriculture, Livestock, Hydraulic Resources, Fishing and Aquaculture Secretary (Government Institutions)
- Environment and Natural Resources Secretary (Government Institutions)
- Federal Government Institutions for Environmental Protection (Government Institutions)
- State Committee for Vegetal Sanity of Sonora (NGO)
- State Committee for phyto-pecaurian Sanity of Sonora (NGO)

Means of stakeholder involvement and role they play(ed)
The major players are the producers that pursue certification of their systems to achieve exportation of their products and require that the empty pesticide vessels are removed from their lands and sent to an authorized and accredited confinement. As well we have the necessary areas due to the desire of some of them to give some terrains in loan for installing the centers. Also anther entities, like the Environmental and Natural Resources Secretary granted the authorization for temporary storage (collection) of hazardous residues for servicing companies and finally the Municipal government that awards the land usage permission. The Health Secretary supports with distribution of the program and surveillance for accomplishing guidelines for health preservation. Pesticide distributors must promote the triple washing and collaborate with the transport of empty vessels to the collection center. The Federal Bureau for Environmental Protection facilitates distributors the process of temporary gathering. The AMIFAC (Mexican Association of the fitosanitary Industry, A.C.) is also involved in making up an agreement for reception and recycling of pesticide empty vessels. As well, the federal and state governments are economically supporting the project's development, promoting the program amongst the agriculture producers and supplying information about the zones with higher agricultural index. Obviously we had support from the State Committee for Vegetal Sanity and the State Committee for phyto-pecuarian Sanity of Sonora, who performed the project, management, installation and operation of the Collection Center. Hence, there is a serious involvement amongst the producers, pesticide distributors, Health, Agriculture and Environmental Secretaries, municipal and state governments and, finally, State Committee for Vegetal Sanity and State Committee for phyto-pecuarian Sanity of Sonora, whose joint work made this project possible.

Long-term commitment and targets
In order to construct and condition 6 reserve centers (200 m^2) at the specifications established by SEMARNAT, a material delivery, container classification and cap separation area is needed, together with storage of containers, their destruction or crushing, processed material warehouse and recycling container load area, acquiring and installing material and equipment (press, vehicles), training personnel, obtaining authorizations from regulatory entities to operate and ensure proper use of pesticides in the six main

agricultural areas of the State. Meetings have been held with technicians, producers, packers, with producers of horticultural products and federal, state and municipal authorities in relation to the availability of containers which contain pesticide. Agreements have been made with industry and the authorities to collect and eliminate containers which formerly had pesticides, and with the AMIFAC (Asociación Mexicana de la Industria Fitosanitaria, A.C.), to pick up all processed material and disposed of it at recycling sites or final confinement areas, engage constructor services to build or condition collection centers under required specifications, also giving training courses on the handling, treatment, and classification of containers which formerly had pesticides.

Originality and Innovative Ideas

The establishment of an Empty Pesticide Container Recollection Center is considered as innovative for the State of Sonora, as although other states in the republic have these facilities, Sonora did not have any center for the disposal of such containers, not withstanding the large number of farmers operating who generate this waste. The technology employed in the project is very simple, as it only requires a press to more easily handle and transfer empty containers.

Costs involved

For the installation of the collection center an approximate amount of $890,352.00 is required, including conditioning and/or construction expenses, electric power, press, strapping machine and operating personnel.

Lessons learned that you would propose to present at the 4th World Water Forum

Establishing a center to temporarily store empty pesticide containers and subsequently recycle them or use them as alternative fuel; not only reducing environmental contamination risks, as well as risks to workers' health, but also by reusing plastic in a safe manner, there is the opportunity of reducing exploitation of additional sources that may break the environmental balance and affect other areas of Mexico. On the other hand, from the point of view of current marketing schemes of food products, quality assurance programs are set up that involve the proper use and handling of pesticides. This makes it a demand of consumers who require a harmless product with high quality standards, an available implementing system and complying with requirements for proving that harmless foods are produced.

Local actions details:

ID	LA1397
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Scope of the action:	Basin
Region:	Americas
Name of Local Action:	Economic impact of underground water salinisation in production and domestic activities at in the coastal zone in the lower basin of the Paz River, El Salvador
Framework theme:	Risk Management
Crosscutting perspectives:	Application of Science, Technology and Knowledge.
Type of Organization:	National and local governments, authorities and associated; International and intergovernmental institutions

Description and location of the problem and activity as implemented

The Paz River basin is located in the south west of the country, has an approximate area of 261,799.2 hectares, 65.4% of it belongs to the Republic of Guatemala (171,054.7 ha) and 34.6% (90,744.5 ha) to the Republic of El Salvador. This makes this basin one of the most important bi-national basins in the region. In the last 50 years, the Paz River basin on the Salvadorian side has been affected in various ways: extreme climates events (tropical storms tore away mangrove on some areas –Garita Palmera and El Botoncillo- altering existing salinity levels. Recent trends in the international market of agriculture – farming (extensive green areas, cotton, sugar cane and banana) have had an important impact on the territorial transformation of the costal plain. Soil use shows that 10.2% of the basin is used properly, 51.9% of the area is used inappropriately, given limits of land use category, or is over used. For some years now, inhabitants have started to voice the difficulties of using water from wells for different purposes (home, farming and irrigation) several months a year. They complain because the water is salty. In a quick survey performed at the zone's wells, it was evident that they have suffered slight, moderate and even severe salinisation (solids dissolved in suspension and electric conductivity). Inappropriate use of soils has affected ecosystems and agro systems on the coast, but it is believed that its dynamics is not the main cause of change on costal aquifers in terms of its effect on salinisation process. It is believed that there are other more direct causes on this process, including the most important, that is the change of the flow of the Paz River, as perceived by the area's inhabitants. On the other hand, it is known that coastal aquifers are very vulnerable to contamination, due to lixiviation of agricultural or organic products deposited on the surface, but also in the face of salt intrusion processes, resulting in the imbalance between salty components and sweet water. This allows the area of contact to transfer to areas where sweet water used to be contaminating the aquifer. In addition to ecologic consequences and damage to ecosystems (which may be irreversible), there is the effect on production activities and home economies as sweet water may no longer be used for agriculture and home use.

Impact of implemented activity (social, economical, environmental, etc.)

The limit of availability and water quality for consumption and production has resulted in over exploitation of the aquifer (use of diesel pumps and tools to extract the largest amount of water from greater depths and opening new wells). The effect of salinisation is particularly felt by inhabitants of the costal area of the San Franciso Menéndez Municipality between El Zapote and Bola de Monte. Reduction in terms of gross production has been acute. the effect of which is not only a of the amounts produced, but also inhabitants have been obliged to change from less profitable activities to new activities; from agriculture to fishing, in such away that now there are many more fishermen. This could not be so serious if fishing had not diminished with the reproduction sites being eliminated (mangrove swamps at Garita Palmera and El Botoncillo). Some results showed that in terms of the loss of production activities in some homes, income from fishing has dropped to 50% according to local inhabitants. Furthermore, hardship (and risk) has increased in fishing by having to go farther, thus increasing operating costs. Also agricultural and cattle activities have suffered an increase in production costs, since investment has been required in the irrigation system, fuels and fertilizers, in comparison with production 20 year ago. The situation in homes is no less difficult, since every family at least has one well on their property and most (85.7%) depend on the costal aquifer for the supply of water to these wells. A total of 28 families have 52 wells and a high percentage (53.6%) uses pumps. Talking with family groups it was ascertained that they suffer supply problems during dry seasons (November – May) and 53.6% have water quality problems affected by salinity, in some events even odors and turbidity. However, only a little more than third buy water from private distributors and this water is used solely for cooking and drinking. The price of water is on average $0.01 per liter. This water is distributed by private marketers in barrels on back of loading trucks. Only on one occasion was water chlorination control was seen in the Barra de Santiago community and its concentration was much higher than acceptable levels.

Types of stakeholders involved

- Department of the Environment and National Resources, MERN.
- Integrated Basins Management Project Associated to Barra de Santiago Hydrolic Complex – El Imposible (BASIM).
- World Union in Favor of Nature (UICN)

Means of stakeholder involvement and role they play(ed)

- The Department of the Environment and Natural Resources provided integrated management guidelines in relation to ecosystems, and it supports initiatives for fostering economic assessment of natural resources.
- The Integrated Basin Management Project Associated to Barra de Santiago – El Imposible Hydrolic Comples (BASIM), the World Conservation Union (UICN), facilitates means to perform activities for compiling and systemizing information about salinisation indexes and other parameters,

such as depth and well flow, obtaining information about production activities and domestic activities.
- Local inhabitants of Colonia ISTA, Bola de Monte, El Tamarindo, Rancho San Marcos, Santa Teresa, El Porvenir, El Zapote, El Castaño, El Botoncillo, contributed with their experience.

Long-term commitment and targets

This study shall serve to encourage further research to establish the type of salinisation in the area, predicting economic costs that imply reduction of production, the home and, in general, deterioration of the quality of costal ecosystems. We are attempting to create management proposals and territorial order proposal to guide production development and to detain and, if possible, revert salinisation in the area under study.

Originality and Innovative Ideas

The economic issue is not usually deemed as relevant in water and natural resources management. This work aims to explain to homes and local producers that there are economic costs derived from damage to ecosystems, since their environmental services have been eliminated or harmed. The non-existence or deterioration of mangroves places at risk the future of fishing, also altering sweet water and salted water on natural balances. Loss of sweet water flows pressures remaining aquifers, leading to over exploitation and exhaustion, favoring conditions to increase salinisation processes.

Costs involved

US $9,500, contribution from the Department of the Environment and Natural Resources -MARN- and Integrated Basin Management Project Associated to Barra de Santiago – El Imposible (BASIM) Hydrolic Complex, the World Conservation Union (IUCN).

Lessons learned that you would propose to present at the 4th World Water Forum

- Visualization of social - environmental causes leading to salinisation is essential to change the conduct of producers and local inhabitants.
- Economically assess the impact from the salinisation process is essential to calculate the effect it has on a territory, but what is most important is to trace the path of these costs over the course of time.
- Inhabitants have some idea of the effect of the deviation of natural flow, but sometimes they can not understand that certain practices may lead to irremediable deterioration, not only of water, but of their land too.

Local actions details:

ID	LA0649		
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Scope of the action:	Country		
Region:	Americas		
Name of Local Action:	Adoption of underground drop irrigation system for grazing land at Comarca Lagunera.		
Framework theme:	Risk Management		
Crosscutting perspectives:	Application of Science, Technology and Knowledge.		

Type of Organization: Professional associations and public and private knowledge and education centers; Enterprises and facilities that are either private managed as public-private partnerships.

Description and location of the problem and activity as implemented

At Comarca Lagunera of Coahuila and Durango, over exploitation of aquifers and reduction of sowing surface in recent years has reduced availability of surface and underground water for agricultural use. This problem is very severe and government institutions, agro-industrial companies and the public must combine forces to reduce the problem. Exploitation of pasture of approximately 45,000 ha to sustain approximately 411,000 head of dairy cattle, annually demands an average of irrigating 1.8 m per hectare for alfalfa and 1.2 m for cattle corn. This means that per hectare sowed with these products, 18,000 and 12,000 square meters are required per cycle. If we take into account the agricultural cycles for corn, then the demand for this product is 24,000 m^3 per year. This creates the need of having to establish and research new irrigation methods, maximize production, and reduce the volume of water used. On this basis, an integral research and technology transfer project for underground irrigation systems for pasture at Comarca Lagunera was created in 2002. The project started at Beta Santa Mónica S.P.R. de R.L in 2002 with the establishing of a hectare of underground drop irrigation. This system basically consists of a series of pipes and hoses, known as bands, buried in the ground and sprinkling water in the area where the roots of the crop are found, avoiding excessive dampness and leaking of water to deeper levels. This feature makes the system ecologically sustainable because contamination of the freatic mantle is avoided. The ground remains practically dry, preventing weeds and crop diseases. Additionally, the direct soil evaporation process is reduced and irrigation efficiency is increased by up to 90%. Subsequently, in 2003, a demonstration module was established in on an area of two hectares in P.P El Cercado, located on the Torreón – San Pedro road Km. 7.5, with the prior agreement of the farmer, which gave us successful result, shown below.

Impact of implemented activity (social, economical, environmental, etc.)

Establishing this irrigation method was expected to at least reduce watering sheets of crops by 20% and increase yield by 30%, and generate dissemination and interest in this irrigation system.
Short term results:

- Technical. For the production of fodder, a 45 cm sheet producing 70 tons of pasture per hectare was used, representing a saving in water ranging from 30 to 50%, and production exceeding 25 tons per hectare with regard to regional measure. In the production of alfalfa during the year 2004 cycle, a 1.2 sheet was used, with a reduction of around 35% per cut and an average production of around 1700 kg of dry matter per cut. Spacing, depth and band expenses were established in function of the kind of soil and crop. Two masters' thesis on irrigation science were prepared. Two scientific articles that are in the arbitration process in magazines indexed to the National Science and Technology Board (CONACYT) have been written. Results have been presented at different domestic and international congresses. Three news bulletins have been published in one of the main newspapers of the region.
- Transfer. In August 2003, a demonstration event was carried out: "Adoption of an underground irrigation system for fodder ", with the attendance of technicians, producers and students. The event was backed by Trusts Established in Relation to Agriculture (FIRA). Experiences were shared regarding the operation and maintenance of the irrigation system. Beta Santa Mónica has established 150 ha with this irrigation system and there are other areas established that have not been taken into account. Producers are interested in adopting the system.
- Awards. Third place in the project within the "Efficient use of water and energy" event organized by Trusts Established with Results in the medium term:
- Preparing a technological package per crop.
- Observing behavior of the system regarding its durability and profitability.

Types of stakeholders involved

- Instituto Tecnológico Agropecuario N° 10
- Trusts Established in Relation to Agriculture (FIRA) Beta Santa Mónica S.P.R de R.L.
- "El Cercado" Small Property, owner Salvador Alvarez Díaz.

Means of stakeholder involvement and role they play(ed)

- Agricultural Technological Institute N° 10. José Alfredo Montemayor Trejo. Elaboration, Establishment and Follow up of project. Materials for irrigation system.
- Trust Established in Relation to Agriculture (FIRA), Unión de Crédito Industrial y Agropecuario de la Laguna, S.A de C.V and the Sociedad Mexicana de Administración Agropecuaria, A.C. Financing for demonstration of the irrigation module.
- Beta Santa Mónica S.P.R de R.L. company. Contribution of materials for the irrigation equipment, agricultural supplies and hands.
- "El Cercado" Small property owned by Salvador Álvarez Díaz. Agricultural supplies, machinery and farm hands.

Long-term commitment and targets

We are attempting to elaborate and obtain more agreements with producers in order to exchange and generate experiences to achieve the following goals:

- Establish a technological package per crop.
- Establish an underground irrigation system for transfer, training and research.
- Analyzing the sub-system's profitability and sustainability.

Originality and Innovative Ideas

In the development of this project, a high technology equipment currently available on the market was used. The system was fully automated for the programming of irrigation and the water volume applied to obtain watering sheet, was assessed by a volumetric gauge allow that provided an accuracy of 95%. Pasture production yields were obtained on a business scale, that is, was traditionally harvested as the producer and weighing (trucks of 12 ton approximately) was on the producer's scales.

Costs involved

Cost of the training module and transfer of underground irrigation system for pasture crops at Comarca Lagunera. Total $295,200
Financing sources.

- National Technological Education System Board (COSNET). Financial support 93,136.00
- Agricultural Technological Institute N° 10. Support for researcher and material resources for the system.
- Beta Santa Mónica S.R de R.L. Agricultural supplies and hands.
- Small property " El Cercado" Propietario Salvador Álvarez Díaz. Agricultural supplies and farm hands

Lessons learned that you would propose to present at the 4th World Water Forum

Experiences and results from the research acquired during the development of this project may be useful for its transfer to other regions, where the scarcity and deterioration of water quality are limiting factors in the agricultural development of the region, state or country. We are currently in California USA. Research has been performed using recycling water and preliminary results are satisfactory in relation to the absence of contamination of freatic levels and this is why some others defined it as an ecological irrigation system.

Local actions details:

ID	LA1116
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Scope of the action:	Country
Region:	Americas
Name of Local Action:	Collection and incineration of solid residues and oils, including toxic waste in cement ovens to reduce contamination of run off and the freatic mantle.
Framework theme:	Risk Management
Crosscutting perspectives:	Capacity-building and Social Learning; Application of Science, Technology and Knowledge; Targeting, Monitoring and Implementation Knowledge.
Type of Organization:	Enterprises and facilities that are either private managed as public-private partnerships

Description and location of the problem and activity as implemented

- Problem: The general population in urban or rural areas did not relate to contamination and failed to relate it with nature, because it does not affect their day-to-day life. However, modernity brought new technologies in cardboard, plastic, tires, vehicles, etc. which surprised inhabitants who did not know what to do with such waste following its use. They threw it on the land, in the water drainage, burn it in the open. With time, this behavior caused severe damage to their environment, nature and water. Cooperative Presence at Istmo: One of principals that governs every Cooperative organization is to oversee and improve environmental surroundings where work centers are found. On the other hand, La Cruz Azul, such as ESR (Empresa Socialmente Responsable), started up in 1994 a oil collection and used tire program, for them to be incinerated in its cement ovens within the geographical area of Istmo de Tehuantepec.
- As of this date, the radius of action has increased more than 400%, gathering tires and oil at the capital of the State of Oaxaca and in the State of Chiapas, with more than 800,000 inhabitants, Salina Cruz, Coatzacoalcos, etc. with more than 400,000 inhabitants, also collecting P.E.T. containers at municipalities such as El Barrio, Oaxaca, Matías Romero, Juchitán, Espinal, Tehuantepec, with a population of 300,000 inhabitants. Refinery waste is also are burned and waste from the petrochemical facilities of PEMEX, and the waste of carriers such as ADO, CRISTOBAL COLON, automobile agencies, bottlers such as Pepsi-Cola, and Grupo Modelo among others.

Impact of implemented activity (social, economical, environmental, etc.)

The initial results expected from this action have been exceeded in their entirety. It is highly satisfactory to have fostered and implemented these programs, as the following has been achieved:
Environmental Impact:

- Control of hazardous waste that contaminates aquifers and freatic mantles.
- Thermal destruction of tires, oil, polyethylene at high temperature, reducing the risk of burning at low temperature that generates particles harmful for humans, flora and fauna.
- Control of leakage in collection patios using membranes that prevent filtration into the ground this waste.
- Collecting, pressing, destruction and incineration of large volume of PET containers that obstruct drainage, leakage and natural rain that are already a source for recharging the aquifer mantle.
- Elimination of garbage collection areas on communities that used to be centers of infection provide a poor image, damage nature and everything else that goes with a clandestine garbage area.

Socioeconomic Impact:

- Direct and indirect employment generated for the collection, transportation and final disposal of waste.
- Reuse and use of waste in combustion, reducing burning of fossil fuels, such as fuel oil (normally used in these ovens).

Social Impact:

- Gradual modification change of modes of conduct, a new culture that cares about the environment.

Types of stakeholders involved

- Inhabitants, generators of waste and users of the project.
- La Cruz Azul Cooperative members.
- La Istmeña Cooperative.
- Public, Municipal, Federal (PROFEPA, SEMARNAT, SCT) and State Public Servants.
- Private and public companies

Means of stakeholder involvement and role they play(ed)

- Inhabitants, generators of residues and users of the project participating by classifying waste at their homes, work centers, private and public industry, etc.
- Members of La Cruz Azul Cooperative through its Facility General Management Optimization Management and Ecology Residency, granting assistant training, payment or freight incineration of waste in their ovens, financing administrative controls, financial engineering, assimilating the local contributions in kind, recording and reporting the general logistics of the project.
- La Istmeña Cooperative: Readapting its vehicles and operators to comply with standards for proper transportation of waste.
- Municipal Federal (PROFEPA, SEMARNAT, SCT) and State Public Servants participating by approving the project, allowing implementation thereof and performing campaigns and establishing standards.
- Private and public companies to execute cooperation agreements for the collection of waste.

Long-term commitment and targets
To attain an actual contribution to sustainability of the operation, new areas of this action are being annually assessed, to include new areas and new forms of waste residues in terms of reciprocity by different residue generation levels, as well as legal responsibility.

Originality and Innovative Ideas
Action performed is innovative in its operating scheme, implementation scheme and participation scheme. Technologies applied do not represent original conditions since cement mixers, particularly European ones, lead the way in this sense. Furthermore these technologies constitute difficulties hazardous or specialist learning, since its design and operation may represent a mode to watch, and if applicable, to improve it to seek duplicability and escalation. In the case of management, storing, selection and preparation for thermal destruction, this represents a high flow of labor, although with technology easy to use and apply. For oven incineration, it is only necessary to establish a method and standards to schedule incineration without affecting process and product quality. Implies; application of technology, knowledge and standards that are relative to Optimization and Production Management at cement mixing facilities.

Costs involved
Investment was made in production costs and the social services offered by La Cruz Azul Cooperative to the community, and to look after the environment. Financial engineering mechanisms covering this action are designed by Cooperativa La Cruz Azul, S.C.L. who has covered costs for such action.
As previously mentioned, the highest cost was for the transport of waste. Financial, regulatory and tax means and a number of resources is being sought in order to improve significantly and reduce the cost of this process.

Lessons learned that you would propose to present at the 4th World Water Forum
They may be duplicated as long as there are sufficient human, economic and technological resources. Escalation could be even higher, in accordance with the resource scale available. Participation of waste generators in this process, participation of local, regional and domestic authorities, private and public companies, has resulted in that 12 years from implementation of the project, the population has a good opinion of them. They have seen that such project has generated industrial, social, environmental, education and cultural order, motivating them to gradually have better and more involvement, gradually incorporating themselves into the project in order to integrally improve the environment and its surroundings.

Local actions details:

ID	LA1262		
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Scope of the action:	Basin		
Region:	Americas		
Name of Local Action:	Controlling invading species by harvesting for handicrafts		
Framework theme:	Implementing Integrated Water Resources Management (GIRH)		
Crosscutting perspectives:	Capacity-building and Social Learning; Targeting, Monitoring and Implementation Knowledge.		

Name and types of the implementing organization(s): Reserva Sanguaré: Civil society organization

Description and location of the problem and activity as implemented
The Sanguaré Reserve is located in the San Onofre municipality (Colombia) and it protects two large water bodies in the northern area of the Gulf of Morrosquillo. The water bodies supply nearby towns and to those on the San Bernardo Islands. Narrow-leaved cattail (Typha angustifolia) has progressively invaded water mirrors, increasing organic matter content and reducing their capacity. The Sanguaré Reserve commenced a program to rescue traditional handicrafts at the end of the 90s that included making baskets from narrow-leaved cattail. The permanent harvesting of this invading plant has reduced coverage of water bodies and, in turn, has become a source of additional income for the local community.

Impact of implemented activity (social, economical, environmental, etc.)
The program for making handicrafts from narrow-leaved cattail was implemented in order to control the growth of this invading species. Results have generally been positive, however, they have been influenced by variations in rainfall and the sale of products, depending on the tourist season. Families have incorporated the manufacturing of baskets into their day-to-day activities which gives them an additional source of income, also variable.

Types of stakeholders involved
Reserve Sanguaré (civil association).
La Sabana Community and the Universidad de Antioquia.

Means of stakeholder involvement and role they play(ed) Sanguaré Reserve:
had the initiative to set up the program, trained the community, owns the land where the water bodies are located, sells products at a local tourist center. La Sabana Community: manufactures handicrafts, harvests plants, informally sells products during the tourist season.
Universidad de Antioquia, Bioessay Laboratory: occasionally monitors quality of water bodies.

Long-term commitment and targets
The challenge of the program is to encourage the local population to keep making handicrafts. This motivation largely depends on marketing and selling products, which is not the main activity of the Sanguaré Reserve. Some approaches have been made to other non-profit organizations who may take on the role of traders.

Originality and Innovative Ideas: This is an innovative program in the sense that it represents a management strategy that incorporates the recovery of traditional activities, sustainable handling of resources, teamwork between various levels pf civil society and creating other options of income for local communities.

Costs involved
Higher costs were incurred during the first stage due to the training given. These expenses were not clearly differentiated from other activities within the reserve, therefore only an approximate cost has been given. It ahs not been expensive to keep the program going, in comparison with the reserve's expenses, the main cost being that of marketing and selling products. Community workshops (transportation of traditional craftsmen from other regions and of members of the community to a work center, meals and accommodation): US$300; Marketing (total for the period): US$1200

Lessons learned that you would propose to present at the 4th World Water Forum:
The greatest lesson learned has been that more knowledge is passed on, and more effectively, between members of the community, and not from third parties to members of the community. Progress is slow, however, as families find an additional source of income, other families will join the program, on a temporary basis at least. The control of the plant's growth in water bodies is evident, however this is not manifested in the physical-chemical features of the water itself.

Local actions details:

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Scope of the action:	Country
Region:	Americas
Name of Local Action:	EDUCATIONAL PROGRAM FOR SCHOOL CHILDREN ABOUT SUSTAINABLE MANAGEMENT OF WATER RESOURCES IN CHILE
Framework theme:	Implementing Integrated Water Resources Management (IWRM)

Crosscutting perspectives: New Models for Financing Local Water Initiatives; Institutional Development and Political Processes; Capacity-building and Social Learning; Application of Science, Technology and Knowledge; Targeting, Monitoring and Implementation Knowledge.

Name and types of the implementing organization(s): Governmental organisms: Chilean Directorate of Waters, Education Ministry, Foreign Affairs Ministry, Tourims Board: National and local governments, authorities and associated; Civil society through schools for children, adults and rural people: Enterprises and facilities that are either private managed as public-private partnerships; private and public water companies, several industries: Enterprises and facilities that are either private managed as public-private partnerships.

Description and location of the problem and activity as implemented:
Formal education, in its initial years, does not incorporate specific and tangible water subjects. This situation produces, either in the urban and rural sector, a separation between people and water resources, disabling to create social conscience on its vulnerability, fragility and importance for development.

The Chilean Directorate of Waters, DGA, considering that education and diffusion of water resources management is a concern of all: civil society, universities and academia, public and private sector, included in the National Water Policy, in 1999, action lines to allow the development educational programs and diffusion for people.

Impact of implemented activity (social, economical, environmental, etc.)
DGA developed in a first step, a pedagogical material for the formal education of girls & boys between 10 and 13 years old. The development of the contents of this material was done according to the plans and programs of the Ministry of Education, and it has the approval of the Environmental Education Team of that Secretariat. The material consists of four Guides for students and a Guide for educators. Nevertheless they were done for the formal education, due to the multiplicity of methodologies and the attractiveness of its design, it is possible use them at communitarian level and in the non formal education. This first stage considered the structuring of a Pilot Plan in order to evaluate the material. The project considered the elaboration of "Guides" for pupils and professors with topics on water and environment. In a partnership with the Ministry of Education, DGA created a Meteorological Network of schools where meteorological station were built, to be incorporated to the GLOBE Program (Ministry of Education is the country coordinator of the Globe Program).

Types of stakeholders involved
The educational material was worked at the rural level with teachers from 6 schools located in the rural areas in the Sixth Administrative Region of the country. This work was organized, planned and done in a joint action with the Ministry of Education, the National Commission of Irrigation (CNR) and DGA. Some educational material done by CNR was worked together with DGA material. The main idea involved in this activity was to checked the answer from rural areas in regard to the water resources issues and challenges.

Means of stakeholder involvement and role they play(ed)
It must be said that a fundamental aspect that allowed a proper design and implementation of Program was the possibility to create partnerships among other public agencies and ministries, private sector, CBO's and universities.

Long-term commitment and targets
Within the frame of IWRM, to invest in education and disemination is much cheaper than any other activitiy related with this process and results are outstanding. That is why efforts should be done to join education in any action related to IWRM: projects, programs, etc. To create a new Culture of Water depends more on the political will of those involved in this process than in investments and funds.

Originality and Innovative Ideas
It is important to note that the principles in which this program is inspired and that are contained in this educational program are oriented to create thinking people, able even to question themselves what is being teaching to them, that can visualize clearly the inconsistencies of some actions and the imbalance and bad consequences that they can cause, in the same way they must have understanding and sufficient knowledge to be able to influence with their opinion and their decision what will be the development of the surroundings in which they live, considering what is the best for all.

Costs involved
- Educational material for formal education: USD 135.000
- Teacher's capacity building and workshops based on the educational material: USD 1000
- Educational Lectures about Water Resources for School Children: USD 1000
- Field activities to teach school children the concept of Integral Water Cycle: USD 500
- Water Project Contests for young people about Water Resources: USD 10.000
- Schools Meteorological Network: USD 1000 per school
- Activities related to the International Year of Fresh Water during 2003: USD 3000
- Educational website: USD 500
- Work with Adults Schools: USD 500
- Work with Rural Teachers: USD 500
- Fairs and Exhibitions: USD 1000
- Any activity that aims to develop Water Culture: USD 1000

Lessons learned that you would propose to present at the 4th World Water Forum
Integrated Water Resources Management is much more than a process for the sustainability of the water sector. For many years the world has been talking about water resources as if they would be something that compete with other sectors. Water is not just only a sector anymore, is essential to everything that has to do with life and livelihood: health, environment, poverty reduction, housing, education, feeding security, natural hydrometerologic events (droughts and floods), land use, global warming, climate change, etc. Since water is the origin of life and the trigger of development, we have to think about it as a matter that is related with everything. Therefore, the old paradigm must be changed and we need to start to create a new "Culture of Water".

Integrated Water Resources Management (IWRM), considering as it bases the natural river basins and their resources, consists of harmonizing the uses water managing them in benefit of the society as a whole. It is a long term process due to the slowness of the mechanisms that take part in it. This management must be based on the participation of all the users sectors or stakeholders in a river basin.

Local actions details:

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Scope of the action	Country
Region:	Americas
Name of Local Action:	Preventing and Resolving Disputes-Getting Ahead of the Issues (the IJC model)

Framework theme: Implementing Integrated Water Resources Management (IWRM)

Crosscutting perspectives: Institutional Development and Political Processes; Capacity-building and Social Learning; Application of Science, Technology and Knowledge

Name and types of the implementing organization(s): International Joint Commission (Canada-United States): International and intergovernmental institution

Description and location of the problem and activity as implemented:
The potential for conflict arising from environmental challenges that confront countries around the world sharing watersheds for the most part is readily apparent, especially involving freshwater. The Boundary Waters Treaty (Treaty) of 1909 between the United States and Canada provides principles for using the waters along the shared 8,800 km boundary between the two countries. It also established the International Joint Commission (IJC) to help prevent and resolve water resource and environmental disputes between the two countries through processes that seek the common interest of both.

Impact of implemented activity (social, economical, environmental, etc.):
For almost 100 years the IJC has helped the two countries avoid or resolve environmental conflicts and to effectively address common environmental concerns along the shared 5,500-mile boundary. The IJC has dealt with over 120 cases involving a wide variety of complex water-related and air quality issues. In many of these matters, the IJC's work has freed the two governments from having to deal continually with problems that might otherwise have troubled their diplomatic relations. In other cases, the IJC has provided early warnings of issues that might have become sources of environmental conflict. The IJC focuses on utilizing technology and science in order to make the most informed objective decisions. The IJC's practice of establishing binational boards of experts, involving the public, and coordinating with other organizations provides a unique local and regional approach to international issues. The outcome of its work is usually a balancing of competing interests, including economic prosperity and environmental sustainability.

Types of stakeholders involved:
The IJC conducts its investigative, supervisory and surveillance activities through boards made up of qualified experts in both countries. Boards of control are appointed to report on compliance with IJC Orders of Approval, while study boards assist in advisory studies. Board members are selected and appointed by Commissioners to serve in their personal and professional capacity. They often are senior officials of state, provincial or federal agencies and are able to contribute financial and human resources to the work of the Commission. However, the agencies are in no way bound by the opinion of a board member.

Means of stakeholder involvement and role they play(ed):
In addition to pioneering restrictions on transboundary pollution long before environmental issues became a matter of concern, the Treaty also provided an important forum for those whose interests were affected to be heard significantly in advance of the time when public participation became a prerequisite for resource planning. Its terms were broad enough for other boundary problems besides water (e.g., air pollution) to be investigated. Since its establishment almost 100 years ago, the IJC has continued to emphasize stakeholder involvement although the methodology has become much more sophisticated with today's technologies.

Long-term commitment and targets:
Since the IJC's establishment in 1909, the two governments have requested, on more than 120 occasions, that the IJC consider "applications" for work on the boundary waters and undertake "References" on critical issues about which they disagree or on which they seek the advice of the Commission. The IJC currently supervises 17 boards of control, investigative and surveillance boards, task forces and accredited officers who operate from the Gulf of Maine to the Pacific Northwest. Boards and task forces are established with equal United States and Canadian membership. Like the Commission itself, members serve in their personal and professional capacities and do not represent the agencies and institutions from which they come.

Originality and Innovative Ideas:
The IJC's role of preventing and resolving transboundary environmental and water-resource disputes between the United States and Canada through a consensus-based process that seeks the common interest of both countries is unlike that of any other institution in the two countries and is the envy of many nations that share river basins.

Costs involved:
Despite the Commission's broad reach, its efficient operation through binational boards that act on an as-needed basis keeps its overall resource requirements relatively small. In accordance with the Commission's Rules of Procedure, the IJC has "permanent offices" (often referred to as "section offices") in Washington, D.C. and in Ottawa, Ontario and, pursuant to the Great Lakes Water Quality Agreement, a Great Lakes Regional Office in Windsor, Ontario.

Lessons learned that you would propose to present at the 4th World Water Forum:
As noted in the IJC's 1997 report, "The IJC and the 21st Century", the 1909 Boundary Waters Treaty established a framework for the way the Commission operates in the Great Lakes and elsewhere across the Canada – United States common border. Within this framework, the IJC has developed a process that has provided the basis for much of the success of the bilateral environmental relationship. This process is characterized by six main elements, which have become a fundamental part of the relationship between the parties in boundary areas.

Providing a Forum for Public Participation. Article XII of the Boundary Waters Treaty requires the Commission to assure that "all parties interested therein shall be given convenient opportunity to be heard". In practice the Commission has always emphasized the importance of public participation and advice.

Engagement of Local Governments. The Commission invites and facilitates the engagement of state, provincial and municipal governments and other authorities in transboundary environmental issues. At the same time the IJC brings binational and national resources and considerations to bear on the resolution of local and regional matters.

Joint Fact-finding. This is a cornerstone of Commission practice. The Commission recognizes that binational joint fact-finding builds an important and often essential foundation for the achievement of consensus in appropriate actions. Joint fact-finding normally takes place within the Commission's advisory and regulatory boards, whose members are drawn equally from both countries and who are recognized as having the range of expertise required to address an issue.

Objectivity and Independence. The authors of the Boundary Waters Treaty built into the Commission an expectation that its members would seek to find solutions in the common interests of the two nations. This allows board members to explore all options, which helps promote the development of novel solutions and consensus.

Flexibility. One of the most important features of the Commission's work has been the flexibility, inherent in its mandate and process, to be able to adapt to the circumstances of particular transboundary conditions.

Local actions details:

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Scope of the action:	City
Region:	Americas
Name of Local Action:	Aguaxaca
Framework theme:	Implementing Integrated Water Resources Management (IWRM)
Crosscutting perspectives:	New Models for Financing Local Water Initiatives; Institutional Development and Political Processes; Capacity-building and Social Learning; Application of Science, Technology and Knowledge
Type of Organization:	Civil society organizations

Description and location of the problem and activity as implemented

Water in the city of Oaxaca, Mexico is lacking in both quantity and quality. The current water collection and distribution system is inefficient. The treatment system for human waste is inadequate, allowing raw sewage to be released into the rivers. Moreover, the city is experiencing rapid population growth, and current zoning laws do not control development at the city limits. The resulting urbanization and uncontrolled deforestation of rural lands have degraded the watershed. As well, users pay 6 cents per cubic meter while it costs the city 30 cents per cubic meter to provide the water. Current government policies do not adequately address the city's water problems, and recently proposed policies focus more on infrastructure to bring water from distant watersheds than on the conservation of the city's watershed.

Through our strategy called "the plan," we assist communities to create new zoning plans and conservation projects. Also, it is our intention that Oaxaca create a comprehensive plan for water collection and distribution. In our strategy called "the tools," we conduct concrete activities to change user practices, prevent contamination, and avert deforestation. Our last strategy, "the voice," is to improve the education, participation, and responsibility of all water consumers. To do this we have developed a number of publications, videos, a weekly radio program, and press releases.

Impact of implemented activity (social, economical, environmental, etc.)

Following are some of our accomplishments since January 2004. We supported the creation and/or strengthening of 4 new plant nurseries in which 40,000 plants were produced, and we realized 2 restoration programs and motivated municipality reforestation activities resulting in the planting of 87,500 trees on 87.5 hectares of land. We held 43 workshops for the construction of fuel-efficient stoves and the use of solar ovens in 10 communities in which over 400 people participated, primarily women resulting in the construction of 110 fuel-efficient stoves and 20 solar ovens. In addition, we held 10 workshops to teach construction and use of composting toilets in 4 communities to which 60 people attended. Currently, 22 toilets are in use. Additionally, we installed 3 demonstration irrigation systems, and established a permaculture demonstration project.

Aside from the direct benefits of the concrete projects to the involved communities, all of the inhabitants in the watershed, 1/2 million people, indirectly benefit from the higher quality and quantity of water available. While the impact of these concrete activities is significant, long-term changes in the watershed will result from the negotiations realized in the small forums, the Oaxacan Forum on Water, newly created zoning plans, and the re-orientation of society's relationship with water.

Overall, we have met our goals as an organization although we exceeded in some areas and have been delayed in other areas. In our strategies "the tools" and "the voice", we produced more results than we intended. Yet, in our strategy "the table", we have found the collaboration process to be slower than we desired.

Types of stakeholders involved

Since initiating Aguaxaca in 2004 we have held 7 meetings of the Oaxaca Forum on Water, and we currently have 60 members who have signed on to the association. The following is a list of these organizations. A list with the original Spanish titles can be provided upon request. While these organizations are formally involved in the project, also involved are many community members who participate in our workshops and our projects.

12 Social and Civil Organizations, 5 Centers of Education and Research, 5 organizations of the Federal Government, 7 Organizations of the Oaxaca State Government, 12 Municipal Governments, and 11 Communities

Means of stakeholder involvement and role they play(ed)

Given the diversity of the stakeholders in our project, they are involved in several different ways. It would be difficult to describe how every single stakeholder participates since our projects are so varied. Another way stakeholders are involved is as participants in field projects. Community members participate in local training workshops on fuel-efficient stoves and ecological toilets. They also participate in pilot projects such as one we are currently realizing in San Pedro Nexicho, a rural mountain community with land in the watershed. We have forged partnerships with the Ashoka Foundation and AMANCO, a Latin American producer of irrigation systems, to provide affordable irrigation systems and greenhouses to farmers. At a broader level, in the Oaxacan Forum, stakeholders participate in a similar yet more complex way as those who participated in the Etla project. The conversations that take place in the forums ultimately shape the conservation plans that are enacted in the basin.

Long-term commitment and targets

While we have secured funds until 2008 for the project, we look to create the sustainability of Aguaxaca through the Oaxacan Forum on Water. We foresee many groups and institutions will share the initiative. Additionally, the idea of our proposed trust fund is to create a sustainable financial source for watershed conservation.

The goal of Aguaxaca is to contribute to the sustainability of the city water-wise.

We have found it particularly challenging to achieve collaboration between the 3 levels of government, the communities, and the private sector, especially during the elections and transition of government in the end of 2004. We have also learned that it is necessary to create equilibrium between research, cooperation and coordination, information dissemination, and concrete actions in communities. It is difficult to strike this balance when one project becomes particularly engaging, and we consistently step back to analyze our progress towards our overall goal.

Originality and Innovative Ideas

The innovativeness of our solution lies in our combination of certain strategies to address the problem.

We contribute in many ways to transferring technology to communities. Our permaculture/alternative technology demonstration project is a center for technology transfer. During its development, we have invited interested people to visit and/or work for the day, and in its completion we will hold workshops and tours. As well, we offer our administrative, collaborative, technical, and financial assistance to actualize new technical projects in communities as is the case in San Pedro Nexicho irrigation project.

Costs involved

The following table outlines the finances we receive for the project. Amounts are in US dollars.

Source Years 2003-04 Year 2005 Year 2006 Year 2007 Year 2008 TOTAL
National and International Foundations (1) $150,000 $150,000 $130,000 $110,000 $100,000 $640,000
Social Organizations and Communities $ 20,000 $ 20,000 $ 20,000 $ 20,000 $ 20,000 $100,000
Federal and State Governments and Municipalities (2) $ 20,000 $ 30,000 $ 45,000 $ 50,000 $ 55,000 $200,000
Direct Government Investment $ 20,000 $ 40,000 $ 50,000 $ 50,000 $ 65,000 $220,000
Contributions for Potable Water Service -- -- $ 20,000 $ 40,000 $ 60,000 $120,000
TOTAL $210, 000 $240,000 $260,00 $270,000 $300,000 $1,280,000

Lessons learned that you would propose to present at the 4th World Water Forum

Our five-fold strategy can be replicated in a variety of contexts. Our initiative takes place in a large watershed for a city of 1/2 million people. It could be certainly be scaled down for smaller watersheds or communities in rural areas. In fact, our model was transferred from another watershed management project we undertook for 11 years on the southern coast of Oaxaca on the Rio

Manialtepec. Our five-fold strategy of "the photo", "the table", "the plan", "the tools" and "the voice" is an element that could be easily reproduced by other organizations in other contexts. We have found this break-down particularly useful in guiding our simultaneous work and in maintaining a balance between several necessary activities. Other organizations could adopt the idea of addressing water problems from several different angles at the same time.

- Address the roots, not the symptoms of the problem.
- Assume an integrated approach.
- Use the simplest, low-cost solution possible for a complex problem.
- Involve all stakeholders despite political and logistical difficulties of bringing them together.
- Encourage the responsibility of the water users.

Local actions details:

ID	LA1462
First name Michaela	Last name Stickney
Organization	Lake Champlain Basin Program
Country	United States
Gender	Female
Email	michaela.stickney@state.vt.us
Scope of the action:	Basin
Region:	Americas
Name of Local Action:	Building Bridges, Fording Streams, Reaching Agreement in the Lake Champlain Basin: a citizen and science-based approach to inspire watershed improvement and protection
Framework theme:	Implementing Integrated Water Resources Management (IWRM)

Crosscutting perspectives: Institutional Development and Political Processes; Capacity-building and Social Learning; Targeting, Monitoring and Implementation Knowledge.

Type of Organization:
International and intergovernmental institutions; Enterprises and facilities that are either private managed as public-private partnerships; Professional associations and public and private knowledge and education centers.

Description and location of the problem and activity as implemented
Lake Champlain's vast watershed is shared among the U.S. states of Vermont, New York, and the Canadian province of Quebec. This vital lake possesses innumerable assets, and like many of North America's great waters, it suffers from intensifying water quality degradation pressures.

Lake Champlain Basin Program—a successful approach supporting progress & improved conditions

Difficulties arise when jointly managing waters shared by two countries and two states, given their vastly differing political and governmental systems. Transboundary relations among Vermont, New York, and Quebec are characterized by consensus reached through a continuous sequence of nonbinding, non regulatory environmental agreements. Since the historic 1988 Memorandum of Understanding on the Management of Lake Champlain, 15 additional agreements have been signed—nearly one per year. They range from joint declarations and watershed plans to phosphorus standards and toxic spill responses. They are renewable agreements bearing the support and participation of state, provincial, and federal agencies; local government; and businesses with a very strong citizen component.

Impact of implemented activity (social, economical, environmental, etc.)
Using an economic optimization procedure to determine the cost-effectiveness of strategies for attaining the in-lake phosphorus criteria, fair load reduction targets were developed. The procedure evaluated combinations of point and non point source reductions to attain in-lake criteria. Vermont and New York committed to reducing target loads by 25% every five years over 20 years.

By 2001, the Lake Champlain Basin Program (LCBP) estimated that phosphorus inputs to Lake Champlain were reduced by 38.8 mt/yr, far exceeding the first reduction goal of 15.8 mt/yr. They concluded that not all lake segments can reach loading targets by relying solely on existing programs. Because developed land generates three to six times more phosphorus per acre than other land uses, conversion of land use from agricultural to urban uses is offsetting some gains achieved to date.

Types of stakeholders involved
The listed stakeholders are highlights among the multiple, vital, and important stakeholders involved with the Lake Champlain Basin Program at federal, state, regional, and local levels: Citizens Advisory Committees of Vermont, New York, and Quebec; Lake Champlain Fish and Wildlife Management Cooperative (LCFWMC); Lake Champlain Ecosystem Team; Lake Champlain Research Consortium (LCRC); Corporacion Bassin Versant Baie Missisquoi ; Lake Champlain NGOs and Watershed Associations; Federal, Provincial, State, and regional resource management agencies.

Means of stakeholder involvement and role they play(ed)
The Lake Champlain Basin Program (LCBP) supports grassroots efforts through several annual competitive grant programs. Over 500 local projects have received more than $2.6 million in LCBP grants alone to reduce phosphorus, prevent the spread of aquatic nuisance species, improve public education and outreach, and attain other management goals. The diverse array of stewardship activities includes planting riparian buffers on eroding farm fields, cleaning up the lakeshore and local rivers, and removing aquatic nuisance species. Landowner education is essential to spread the word about lake-friendly practices. Many local businesses have changed their practices on behalf of the Lake. For example, about 25 marina operators recently attended workshops about hazardous material spill prevention.

Long-term commitment and targets
The Lake Champlain Basin Programs long-term commitments span several key areas. For example, the original 20-year timeline to reduce phosphorus loading to Lake Champlain will be compressed by 7 years to 2009, the 400th anniversary of explorer Samuel de Champlain's arrival to the Lake (if funding is secured). The signatures of the Governors of Vermont and New York and Premier of Quebec signify the strong and long-term commitment to restore the waters of Lake Champlain. The Governor of Vermont's Clean and Clear Action Plan for Lake Champlain will help fund important watershed initiatives identified by the LCBP and help raise the estimated $139 million needed to implement the Lake Champlain Phosphorus TMDL.

Originality and Innovative Ideas
Overview—strengths and successes
The LCBP offers something new and original that works and can be passed on to other basins as a success story. Being a neutral party and by having the participation of scientists, policymakers, citizens, and resource managers on its Steering Committee and multiple advisory committees, the LCBP is able to transcend litigation, elections, and regulation to offer a truly integrated, neutral dialogue to solve hard to solve problems. Being able to "rub elbows" during regular, meaningful meetings allows for higher levels of engagement and cooperation among committee members regarding difficult to solve environmental problems.

The success of the LCBP is rooted in the maintenance of partnerships and collaborations, a multiple stakeholder approach, sharing of information with the public, and basing management decisions on good science. Successful implementation of the management plan is achieved by developing many partnerships among natural resource agencies, citizens, and other lake and watershed stakeholders throughout the Basin. Since its inception, the LCBP has evolved into an internationally recognized natural resource management initiative characterized by inter-jurisdictional management, and the enhancement of the stewardship role of local leaders, and strong partnerships. Transboundary relations are guided by a sequence of nonbinding, non regulatory consensus-based agreements. This incremental approach has enhanced cooperation and trust among the partners.

Costs involved

- From 1991-2005, Vermont has spent over $28 million dollars. During the same period, New York spent over $10 million dollars. From 1991-1998, Québec invested over $13 million.
- Approximately $9.6 million was applied to controlling non point sources of phosphorus in the Vermont portion of the Basin between 1996 and 2001. About 58% of the funds came from the US federal government (United States Department of Agriculture—Natural Resource Conservation Service), 22% from Vermont, and 20% from farmers. New York has committed over $15 million. Québec spent nearly $1.8 million, representing 70% of the total project costs that were shared by farmers.

- The USEPA generally provides $1-2 million annually.
- The US Army Corps of Engineers (USACE) generally provides about $400 thousand dollars annually.
- The US Geological Survey spends $400-500 thousand annually.
- The USDA NRCS has spent about $300 thousand dollars annually since 2001.
- The National Oceanic and Atmospheric Administration (NOAA) has provided $150 thousand annually. The NOAA also contributes approximately $150 thousand annually for the Lake Champlain Sea Grant program.

Lessons learned that you would propose to present at the 4th World Water Forum

- A consensual policy style versus an adversarial style of management resulted in reliable and evolving commitments by Vermont, New York, and Quebec—nearly one agreement has been signed each year among two or three of the jurisdictions which continually reaffirms the commitment among the three jurisdictions.
- Less regulation and renewable, flexible agreements resulted in substantial financial commitments by Vermont, New York, and Quebec—the three jurisdictions have invested millions of dollars, primarily to reduce point source phosphorus and cleanup hazardous waste dumps, but also for aquatic nuisance species control and spread prevention and water quality monitoring.
- Political will supports sustainability of the Lake Champlain Basin Program and compliance with its operating principles—the signatures of the Governors of Vermont and New York and the Premier of Quebec give the Opportunities for Action management plan serious clout.
- "Leapfrogging" or developing agreements incrementally in steps keeps agreements linked and looking forward.

Local actions details:

ID	LA0521
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Organization	Mexican Institute of Water Technology
Country	Mexico
Gender	Male
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Scope of the action:	Basin
Region:	Americas
Name of Local Action:	Appropriate Technologies for Water Supply and Sanitation in the Pátzcuaro Lake Basin (Mexico) Environmental Recovery Program
Framework theme:	Water Supply and Sanitation for All
Crosscutting perspectives:	Application of Science, Technology and Knowledge

Name and types of the implementing organization(s): Mexican Institute of Water Technology: Professional associations and public and private knowledge and education centres; State Government of Michoacán and Municipal Governments of Pátzcuaro, Quiroga, Tzintzuntzan and Erongarícuaro: National and local governments, authorities and associated; Gonzalo Río Arronte Foundation: Civil society organizations

Description and location of the problem and activity as implemented:
The Pátzcuaro Lake basin has undergone significant environmental degradation during recent years, due to untreated wastewater discharges, unsustainable agricultural practices that have produced soil erosion, endangerement of endemic species, significant decrease in productivity in local fisheries, and so forth. The Mexican Institute of Water Technology convinced a private foundation (The Gonzalo Rio Arronte Foundation) to sponsor actions to achieve the environmental recovery of the basin. The Institute also convinced the State Government of Michoacán (the state where the basin is located) and the Municipal Governments of Pátzcuaro, Quiroga, Tzintzuntzan and Erongarícuaro (the towns surrounding the lake), to devote financial resources to the recovery of the basin. Thus an interinstitutional agreement was signed and the Pátzcuaro Lake Basin Environmental Recovery Program was initiated.

Impact of implemented activity (social, economical, environmental, etc.)
The conditions before implementation were deplorable. A significant improvement is noticeable only two and a half years after the Program started. Thousands of people have improved their living conditions, be it because they are having increased food production, and secure access to water and to sanitation, or because their environment has improved and thus public health problems and water borne diseases have decreased.

Types of stakeholders involved
In addition to the organizations listed above, local population, local nongovernmental organizations have actively participated, as well as the Regional Center for Education in Sustainable Development, local farmers, local fishermen, and so forth.

Means of stakeholder involvement and role they play(ed)
The local population and organizations have been involved from the inception of the Program. This has been a bottom-up process, which has given the Program legitimacy. All the relevant stakeholders have participated since the strategic program of the Environmental Recovery Program was drafted. The resources have been devoted to the actions that were prioritized in the strategic program, with the agreement of the stakeholders, thus making their use efficient and effective.

Long-term commitment and targets
The Foundation has a long-term commitment to the Program. The Federal, State and local governments are binded to fulfill the obligations established in the agreements they have signed. Appropriate technology development and transfer is one of the well established programs at the Mexican Institute of Water Technology. The approach to the Program has been one of capacity building to insure sustainability. A set of indicators has been developed to monitor Program performance. Progress is communicated to the basin population through the media.

Originality and Innovative Ideas
Many technologies applied in the Program are either new or improved versions of existing technology. The experience of applying them has helped in their optimization. The development of new technologies has most definitely been a contribution to know-how. Every technology used has been effectively transferred to the final users.

Costs involved
The Foundation provides an overall independent supervision to insure that resources are wisely and efficiently used. The sources of financing are multiple: the Foundation, the State Government, the four municipal governments, the Ministry of the Environment, the National Water Commission, the National Forestry Commission, and the Mexican Institute of Water Technology.

Lessons learned that you would propose to present at the 4th World Water Forum:
One of the innovative characters of the project is to engage a great number of organizations and individuals that have either provided funding, expertise, workforce or all of them. The sucess of the Program has been in no small measure to the fact that a shared vision was adopted and the process has been a bottom-up one. The sucess of the Program will certainly be an inspiration to establish similar programs in other environmentally degraged basins, thus making it replicable in other parts of Mexico and the world.

Local actions details:

ID	LA0455
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Organization	Cesade
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Scope of the action:	Country
Region:	Americas
Name of Local Action:	The impressive results through the large-scale application of the rope pump at family and community level, Cesade, Nicaragua
Framework theme:	Water Supply and Sanitation for All
Crosscutting perspectives:	Application of Science, Technology and Knowledge

Name and types of the implementing organization(s):
Cesade: Civil society organization; Practica Foundation: Professional associations and public and private knowledge and education centres

Description and location of the problem and activity as implemented
The problem: Poverty in Nicaragua amounts to 65% and occurs most frequently on farms up to 7 ha. The presence of a well on properties in this range raises income by as much as 33%, whilst the use of a hand rope pump raises this once again by an average of 18%, thus increasing income with more than 50%.

Activity: Increase access to water at family level by means of wide scale dissemination of Smart-Tech (proven low cost water technologies such as manually drilled wells, rope pumps and micro irrigation).

Impact of implemented activity (social, economical, environmental, etc.)
Given the right conditions, including access to a market, a well with a hand pump and a micro irrigation system with emphasis on patio development (home plot development) can be a lasting solution to poverty. Investments in well and hand pump can be paid back within a year provided that the technology is appropriate and for the prevailing conditions.

Types of stakeholders involved:
Rural families, Small holders, women, single mothers in Nicaragua; Knowledge organisations such as the Dutch Practica foundation; Organisations specialized in marketing aspects such as IDE; NGOs in Nicaragua such as Cesade, knowledge institutions such as INTA , Faitan a.o.

Means of stakeholder involvement and role they play(ed)
Role of Stakeholder/ user involvement: Awareness raising, demonstrations and micro-credits. Training and assistance in making wells, installation of pumps and irrigation system.

Resources used: Initial payment of 10 to 50% of cost by the users. Micro credit of traditional locally used loan system "ir a medias". The investor get 50% of the benefit. The investor takes the risk if there is no or little benefit.

Long-term commitment and targets:
At family level, it has been demonstrated that water systems will be taken care of since it is a source of income. At business level there is a "profit based sustainability". Enterprises in drilling, producing and selling pumps make a profit. This is a drive to continue after project funding stops (providing there has been a market created).

Originality and Innovative Ideas

1) Innovation in technology makes it affordable for low income, repairable and easy to produce locally.
2) The approach to first aim at the (lower) middle class with sufficient purchasing power, then try for the poor. An initial "donor-driven" approach proved to be essential; 20 years ago the rope pump was unknown; Local demand only started after there w as a critical mass for acceptance; only after adoption by the medium and large farmers, i.e. with 2,000 rope pumps operating in the field for watering cattle, NGOs got interest for community water supply. Because of its low cost Also smallholders and rural families got interested in the rope pump.
3) The focus on family level is innovative too: more than communal supply, water at family level will generate income which will lead to the economic development at short term and thus to earlier investment in piped water supply at long term. (of course possibilities to provide water at family level are restricted to certain areas but with the new and cheaper options for wells and rainwater storage many families will have opportunities to install their own system)

Costs involved:
Users are trained to maintain their own pump. Low interest credits. Some projects also subsidize system.

Lessons learned that you would propose to present at the 4th World Water Forum
Of the millions of people that live in poverty or without safe water, around 70% live in rural areas. To improve their situation modern Appropriate Technologies are essential.

"Hi-Tech" such as central water supply and irrigation schemes often failed in developing countries because they were too expensive and / or too complicated for the local situation. "Lo-Tech" or so called Appropriate Technologies (AT) also often failed because they were not efficient, not adapted to the user needs, or had a "stone age" image. Another reason was the lack of the involvement of the local private enterprises in production, sales and maintenance. When the projects finished, the activities often stopped because skills in quality control, marketing, bookkeeping and management were not developed.

Safe drinking water is essential for health, but access to "plenty" of water increases income, especially for rural families. A communal pump "just" provides drinking water but a family pump can generate money trough animal husbandry or small-scale irrigation. Surveys in Nicaragua indicate that poor families in possession of a well generate twice as much income than families without a well and a US$ 60 hand pump for domestic purposes, generates US$ 220 extra income per year. Widespread application of low cost irrigation systems for small farmers can double food production and reduce poverty. To be sustainable, the introduction of new options has to go hand in hand with education on water conservation, marketing and agricultural aspects.

- Without appropriate technology no economic development in rural areas.
- Technologies that failed in developing countries were generally "inappropriate".
- Development programmes should not try to adapt people to the technology but to adapt technology to the people.
- Repairability and low cost are essential for success. Also with AT, success depends on training and user involvement and participation.
- Technologies should be introduced with the "ladder approach" (step by step). Small scale options face fewer problems than large scale options since users can manage the systems themselves.
- Small-scale options are essential to reach the water related MDGs since over 75% of the target group lives in rural areas where piped systems are not (yet) an option. To reach the Poverty MDG in rural areas, investing in family water systems may be more efficient than communal systems(where technically possible).
- Involvement of local private sector is essential for long term sustainability.
- The development and dissemination of AT is not simple. Modern AT has a huge potential to improve access to safe water and reduce poverty.

Local actions details:

ID	LA0925
First name Camille	Last name Dow Baker
Organization	Centre for Affordable Water and Sanitation Technology (CAWST)
Country	Canada
Gender	Female
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Scope of the action:	Country
Region:	Americas
Name of Local Action:	Household Water Treatment Technology Transfer in Haiti – a Case Study of a Replicable Program
Framework theme:	Water Supply and Sanitation for All
Crosscutting perspectives:	Capacity-building and Social Learning; Application of Science, Technology and Knowledge

Type of Organization:
Civil society organizations; Enterprises and facilities that are either private managed as public-private partnerships; Professional associations and public and private knowledge and education centers.

Description and location of the problem and activity as implemented
Over 2 million Haitian people lack access to clean water and over 5 million to adequate sanitation. CAWST developed a unique Technology Transfer Model in Haiti that builds the capacity of organizations at a grassroots level to meet their own needs for water and sanitation. This model has been successfully replicated in other parts of the world, enabling CAWST to make a significant contribution towards the Millennium Development Goals (MDGs). The Model has brought household water treatment (HWT) technologies to the poor on a large scale, by focusing on education, training, technical consulting and network-building among communities around the world. CAWST's global impact started in 2001 with the local application of the Model in Gonaives, Haiti.

Impact of implemented activity (social, economical, environmental, etc.)

- impacted 500,000 people in 36 countries with improved water
- trained 700 people and 50 organizations that are now implementing independent community-based programs; and
- equipped 175 in-country community-based organizations to work with these implementing organizations.
- 20 Haitian organizations have acquired practical, hands-on knowledge of HWT and sanitation implementation.
- CAWST's training, has developed a local micro-business for filter production, trained 75 filter technicians across the country and empowered them with skills to start-up their own business. The program also involved local welders who produced the mold for the filters.
- Haiti is 95% deforested. CAWST has encouraged the use of alternatives to boiling the water through HWT technologies like the BSF

Types of stakeholders involved

- local non-governmental organizations (NGOs), including Clean Water for Haiti, Committee Protos en Haiti and the Haitian Water Alliance;
- the local Hospital Albert Schweitzer (HAS)
- governmental agencies including System National d'Eau Potable (SNEP), Centrale Autonome Metropolitaine dEau Potable (CAMEP), Poste Communautaire d'Hygiène et d'Eau Potable (POCHEP), Division d'Hygiène Publique (DHP), and Ministries of Planning, Environment, Agriculture and Health;
- funders, including Funds for Economic and Social Assistance and Wild Rose Foundation of Alberta, Canada;
- universities and research centers including the University of Victoria (involved in research project – BRAVO) and Mount Royal College (involved in curriculum development) in Canada
- international organizations including the Pan American Health Organization (PAHO)/ World Health Organization (WHO)
- private sector, mainly Petro-Canada multinational corporation who has funded the development of training materials

Means of stakeholder involvement and role they play(ed)

CAWST's Technology Transfer Model promotes a shared responsibility, engaging various local resources in the development, delivery and implementation of technology transfer programs:

- Wildrose Foundation of Alberta – a government agency, sponsored HWT seminars
- researchers provide the scientific base for the effectiveness and efficiency of HWT technologies, contributing to the acceptance of these technologies among various stakeholders (University of Victoria worked in partnership with CAWST to test the field performance of the BSFs through Project BRAVO)
- corporations assure financial and/or professional support to HWT technology transfer
- local micro-businesses produce hardware and contribute to the sustainability of programs by ensuring there is a steady supply of the BioSand Filters.

Long-term commitment and targets

From the outset, CAWST's Technology Transfer Model has built on long-term sustainability practices, encouraging and motivating all involved stakeholders to act accordingly.

SOCIAL SUSTAINABILITY, CAWST:

- enables continuous provision of professional services through building grassroots capacity. Haitian organizations - Clean Water for Haiti, Hospital Albert Schweitzer - implement independently to bring clean water to their communities in need. CWH, as a local trainer, works to transfer the knowledge to all the problematic areas of Haiti; PAIDEH is also preparing to become a local trainer. Eleven other engaged organizations are planning to implement HWT programs. CAWST is analyzing data from Project BRAVO to improve the technology transfer and the follow-up process.
- openly shares knowledge and training materials.
- recognizes differences in cultural processes by facilitating community collaboration in evaluating the appropriate technologies, and developing culturally-aware training materials (available already in 5 languages, including Haitian Creole) and techniques used during the workshops.
- promotes techniques to build technologies of consistent quality and facilitates continuous improvement to suit the in-country environment as appropriate. Haiti is a very mountainous land with terrible or non-existent roads, therefore a lighter filter was designed with CWH that is already produced and used in other countries such as Honduras and Brazil.

Originality and Innovative Ideas

- CAWST's unique business model and innovative Technology Transfer Model – developed in Haiti and replicated around the world – fill a critical gap in the water and sanitation service-delivery to the poor, so far impacting 500,000 people with clean water worldwide.

Costs involved

CAWST's costs involved in this local action were:

- US$ 24,312 (2 HWT Seminars 2003)
- US$ 88,000 (Project BRAVO research study – 2005 Jan-July, including 4 workshops: Community Steward, Program Organizer, Trainer and Product Manufacturer)

Lessons learned that you would propose to present at the 4th World Water Forum

CAWST's approach to training and education empowers grassroots organizations to independently develop community water and sanitation programs. This non-prescriptive approach is adaptable to meet the needs of diverse communities and the pace at which implementation occurs is driven entirely by the community. Some organizations become local trainers, building the capacity of others and generating a multiplier effect. This train-the-trainer approach has the potential to reach millions of the world's poor. So far, it has resulted in 500,000 people in 36 countries with improved water.

CAWST's Technology Transfer Model has enabled a multiplicity of projects to be implemented simultaneously around the world. Several organizations have replicated the Model and scaled it up to national and regional levels, demonstrating that the approach is applicable and effective across a variety of countries and cultures.

Local actions details:

ID	LA0636
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Organization	Instituto Nacional de Ecología
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Gender	Female
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Scope of the action:	Country
Region:	Americas
Name of Local Action:	Use of electric tariff as an implicit price for water
Framework theme:	Water Management for Food and the Environment
Crosscutting perspectives:	Institutional Development and Political Processes
Type of Organization:	National and local governments, authorities and associated.

Description and location of the problem and activity as implemented

One of Mexico's most troubling environmental problems is the non sustainable management and use of surface and ground water. As a result of various policy interventions that lead to mismanagement of the resource, ground and surface water stocks and sources are being polluted and depleted. One of such policies is the subsidy for the agriculture sector that charges a zero price for the water, but also gives a considerable subsidy to the electricity which is being used to extract water from underground. The cost of producing electricity in Mexico is on average 1.44 pesos per kilowatt-hour (kw/h). The fee for a farmer benefited by a concession is 22 cents per kw/h (Tarifa 09-CU), which corresponds to a subsidy of 85%. The night fee, the tarifa 09N (between 10 pm and 8 am) was 14 cents per kwh in 2002 and today is 17 cents per kwh. With the latter, only 9.7% of the costs of generation and transmission are actually recovered. According to data registered by the Federal Electricity Commission for 2002 and 2003, the number of users benefiting from "tarifa 09" is 96,164. Only 55 thousand users hold a concession to extract water while 41 thousand do not. Altogether they receive an annual subsidy of approximately 684 millions of USD or 7,327 millions of pesos via Tarifa 09. The activity being proposed here is the decoupling of the subsidy. In other words, the same amount that Federal Electric Commission is spending

in providing the service without charging for it, must be given to the farmers, but the electric bill must include all the costs of providing for such kilowatts. According to the study of the National Institute of Ecology, the result is that as farmers face the real price then they make a better use of electricity is promoted as well as lower pumping of water and they have incentives to acquire more efficient irrigation technology. The obstacles being faced by the measure are: fear from changing from status quo of the groups currently having the subsidy, such as the Farmers National Confederation (Confederación Nacional Campesina). This and other groups of interest might be lobbying during the approval of the budget to maintain the subsidy as it is today. The results from this exercise is that aquifers will have approximately 15% less extraction than they do today; but even more, the sector will have subsidies that will allow the farmers to invest the resources in more productive activities such as buying grains, better technologies or else.

Impact of implemented activity (social, economical, environmental, etc.)

The expected result according to the economic studies is that at least water extraction will be lowered in 15% in the short run. In the long run, as better technology is implemented and as some farmers even have a rotation to other crops, then water pumping will be reduced even more. The impact of such a measure will be mainly observed in those aquifers that are being overexploited at higher rates. However, if actually the subsidy is decoupled, then, farmers will have the same amount of aid which may be used to pay the electric bill, or else to be invested in more productive factors of production; then the measure, will indeed be beneficial for the environment and for the agriculture sector.

Types of stakeholders involved

1. Federal Electric Commission (Comisión Federal de Electricidad). The institution in charge of providing and charging for electricity for agriculture.
2. Secretariat of Energy (Secretaría de Energía). The ministry in charge of the coordinating the energy sector.
3. Ministry of Finance (Secretaría de Hacienda y Crédito Público). The ministry in charge of presenting the budget to Congress every year, also participates in the tariffs commission who determines the electric tariffs.
4. Congress (Congreso de la Unión). Deputies and Senators who approve the budget every year and are able to modify and create new laws.
5. Revision committee of SHCP, Energy, CFE (Federal Electric Commission) and LyFC (Light and Force of the Center).
6. Irrigation farmers

Means of stakeholder involvement and role they play(ed)

- STEP 1) Scientists evaluate the impacts in the economy and the .environment. NGOs or the Environment sector makes a new fee proposal to the executive board of the CFE
- STEP 2) Executive Board of CFE, Approves the proposal and presents it to Secretariat of Energy
- STEP 3) Secretariat of Energy, Approves the proposal and presents it to Secretariat of Finance
- STEP 4) Secretariat of Finance, Approves the proposal and issues it in the Diario Oficial de la Federación and 2 nationwide distributed newspapers.
- STEP 5) The issue might be discussed in Congress when the budget is presented

Long-term commitment and targets

The great advantage of economic instruments is that the incentives created by adjusting the prices are for long term investments. The fact that the user of water experiences no cost from using it, generates a distortion in the sense that water is used more than needed. Same happens with electricity, since the kilowatts are cheaper than what they cost, then electricity is used inefficiently. As more farmers face the correct price signals then technology changes are promoted and those crops that apparently were financially successful will be changed for crops less intensive in water. This will give further than a 15% reduction.

Originality and Innovative Ideas

Decoupling subsidies is by no means a new idea. It is the suggestion of international organisms who are concerned with Trade practices. However, nowadays, those subsidies which are harmful for the environment must be modified not only for the distortion they generate into the economy, but for the harm they cause to the ecosystems.

Costs involved

The total of all costs involved should be clearly reported. The costs involved in decoupling a subsidy are determined by the policy of giving the subsidy away. Basically there are four alternatives: alternative #1, the average subsidy is refunded to each farmer, alternative #2: the subsidy is refunded according to what has been consumed historically, alternative #3: the subsidy is refunded only to concession holders and alternative #4: the subsidy is refunded as a payment per hectare. The fourth alternative might be the most costly, and it depends whether if the payment is provided by the Ministry of Agriculture or the Federal Electric Commission. Still, the costs are minimal compared with the amount of the transaction which is 685 million dollars.

Lessons learned that you would propose to present at the 4th World Water Forum

This action deals with the non sustainable use of water in general in agriculture, a sector that consumes nearly 80% of the available freshwater of Mexico. The non sustainable use of water in irrigation is fostered by the direct subsidy to this resource and from the indirect subsidy to electric power used for pumping groundwater. The paper analyzes the likely impact of a possible increase in the price of electric power used for agricultural water pumping (from 0.31 to 0.61 pesos). The econometric framework entails a linear model that yields a price elasticity of demand for water of -0.15 (i.e., water demand falls by 15% when price rises 100%). An implication of this model is that if the electricity subsidy to pump water is substituted by an equivalent income transfer to the farmers, groundwater extraction would be reduced by 3,234 million cubic meters while irrigated farmland area would increase. Other countries are dealing with the same over-extraction of aquifers partially due to inadequate subsidies to the agriculture sector. This initiative will certainly prove to be a successful step toward the decoupling of harmful subsidies. Nevertheless, the political negotiation procedure is an art work, the way NGO's, Environment Authority and Scientists cope with the refusal to change status quo will determine the success of the measure. The context in every country will certainly be different, but it depends on the strength and awareness of society as a whole to push for these measures to become a reality.

Local actions details:

ID	LA1145
First name David	Last name Barkin
Organization	Universidad Autónoma Metropolitana
Country	Mexico
Gender	Male
Email	barkin@correo.xoc.uam.mx
Scope of the action:	Basin
Region:	Americas
Name of Local Action:	Innovando para Fortalecer la Tradición
Framework theme:	Water Management for Food and the Environment
Crosscutting perspectives:	Capacity-building and Social Learning; Application of Science, Technology and Knowledge.
Type of Organization:	Civil society organizations; Professional associations and public and private knowledge and education centers.

Description and location of the problem and activity as implemented

Non-commercial grade avocados were being dumped in local ravines, preventing water from permeating the volcanic rock to recharge aquifer in mountainous region of west-central Mexico (commercial center: Uruapan); as a result almost one-third of irrigated land in nearby irrigation district (Tierra Caliente in Michoacan) had to be withdrawn from production. Medical and cross-cultural research demonstrated that: 1) the avocados "washed" bad (LDL) cholesterol from the body while concentrating the 'good' (HDL) substance; and 2) that the same effect was observed in pigs. By implementing a program to reinvigorate the back-yard animal husbandry tradition in the indigenous communities that are part of the avocado growing region, indigenous women would be able to produce a product (low-fat pork) that could be sold at a substantial premium (30%) over market prices while eliminating the problems occasioned by the uncontrolled dumping of waste products. Opposition from indigenous graduates (male) of veterinary programs was faced head on by the women, who argued that this would help them to reintroduce and strengthen their back yard economy. They recognized that the risks were small, because

the meat could always be sold at market prices and production costs would be lower. Opposition also came from local political leaders and spouses who correctly understood that this program would empower the participants and reduce the scope for abusive social and political practices.

Impact of implemented activity (social, economical, environmental, etc.)

The project was designed to introduce a relatively small innovation – in the diet of the pigs– in conditions that would end the dumping of the waste avocado in the ravines. The concept involved a commitment to focus on a declining sector of the peasant economy that had always been essential in assuring the viability of the community economy. By making back year fattening of pigs profitable, it would also create incentives to actively end the practice of dumping non-commercial grade fruit. In the initial stages, the most difficult problem was the marketing of the meat, since the local merchants were unwilling to assume any risks and access to other commercial channels was virtually non-existent. After several years of production, word of mouth has spread and regional demand for the product now probably exceeds the production capabilities, since volume is limited by the availability of waste avocado. The women – about 125 were involved initially– have assumed important social and economic roles in their communities and have demonstrated the possibility of selling high quality products at a premium in regional markets. They have also been able to assume leadership roles in their communities

A broad consciousness of the environmental damage from dumping of agricultural wastes has led to a public demand for and an end to the practice, an effect that has noticeable impacts throughout the region. There has also been a gradual recuperation of irrigated areas in the nearby region, perhaps as much as 5,000 hectares five years after the commencement of the project

Types of stakeholders involved

The original research into the effects of the avocados, based on testimony from local farm hands in the indigenous region was conducted in the (public) "Hospital Civil" by an unusual medical doctor who was willing to pay attention to the complaints of local workers. He developed a clinic to treat arteriosclerosis. A researcher from a national university (Universidad Autónoma Metropolitana-UAM) who had done work on the decline of back yard farming and had studied the dynamics of aquifer recharge to supply the irrigation developed the practical connections with the practice of dumping waste avocados and several of his students developed the connections with the local indigenous population. The efforts to achieve acceptance of the project were conducted by women leaders from the local communities, who were searching for ways to develop new mechanisms to strengthen their own communities and family economies. This process had emerged from workshops conducted by the graduate students from the UAM and regional universities. Of particular note, is the role taken by the spouses of the ethic group's leaders, explicitly rejecting the wholesale dismissal of the project by the "experts" and arguing for the need to emphasize innovation within traditional production processes rather than introducing new systems.

Means of stakeholder involvement and role they play(ed)

The project is especially notable for the explicit collaboration between university students and researchers and indigenous women. The university team obtained financial support from the national science foundation (CONACYT) and the participation of local universities and high schools. The internal discussions about the project's validity were conducted almost entirely by the producers themselves and their supporters within the community. Financing for the fattening of the pigs and transport of the avocados was arranged by the producers themselves.

Long-term commitment and targets

The innovation has taken on a life of its own. Even during the period when they are not marketing their "low-fat pork" the women involved identify themselves with the social and political efforts that it involved. They are now looking for outside help to develop a systematic marketing strategy, although it is also clear that production is tightly restricted by the lack of more supplies of non-commercial grade fruit, as international demand continues to expand, and new byproducts (e.g., guacamole) are being produced. Just as important, however, are the side benefits of an expanding group of women conscious of their contribution to the local economy and environmental protection.

Originality and Innovative Ideas

The approach of looking for innovative products that can taken advantage of a market niche and create such an opportunity in a framework of creating new opportunities and improving environmental and material conditions while strengthening community has been widely commented upon by groups far removed from the avocado growing region. As a result of this project, the research team is now embarked on a similar, but much more ambitious, effort to produce "Omega 3 enriched" eggs by feeding laying hens a modified diet including an herb rich in this valuable nutritional building block. The current project has the added advantage of being able to encourage the installation of small-scale (anaerobic) water treatment plants in periurban communities to provide suitable water (both in quantity and quality) for producing the feed needed for the hens. This combination of ingredients has the added advantage of being able to expand for beyond the scope of the original project, since the design includes mechanisms for generating the water needed to assure year round production of the feed required in the process. This project design also makes it much more evident that a suitable design can encourage new approaches to water conservation and protection of water quality as part of a broader program for the sustainable management of regional resources.

Costs involved

The original research on the effects of the avocados on humans and then on pigs was financed by the Hospital Civil, the Veterinary Faculty of the Michoacán University and the CONACYT. The first pilot production program was also financed in this way. All subsequent production and marketing was paid for by the women in the communities.

Lessons learned that you would propose to present at the 4th World Water Forum

The most important general lesson that can be gleaned from this experience –and the subsequent design of the egg project– is the value of attempting to design productive innovations that can be integrated into existing community (social and productive) structures. The experience gathered from using treated waste water as a productive input to create employment and new quality products is particularly notable; the benefits are evident when we evaluate the process of combining this process with the environmental and social benefits from reducing untreated effluents along with their social and economic costs and the collective conscious raising involved

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Local actions details:

ID	LA0547
First name Jerry	Last name Lopez
Organization	Chalchiutlicue Environmental Project
Country	United States
Gender	Male
Email	jerrylopez1988@yahoo.com
Scope of the action:	District
Region:	Americas
Name of Local Action:	Chalchiutlicue Environmental Project and Celebration
Framework theme:	Water Management for Food and the Environment

Crosscutting perspectives:

New Models for Financing Local Water Initiatives; Institutional Development and Political Processes; Capacity-building and Social Learning; Application of Science, Technology and Knowledge; Targeting, Monitoring and Implementation Knowledge.

Type of Organization:

Civil society organizations; Professional associations and public and private knowledge and education centers.

Description and location of the problem and activity as implemented

The system on which the Chalchiutlicue Project is seeking to effect change is the multi-faceted system of environmental advocacy that is currently engaged in environmental information acquisition, compilation, dissemination and presentation in the state of Minnesota, focused particularly on the Twin Cities Metro Region. Who has access to and the ability to analyze environmental information is who has the power to protect themselves and

their communities from the dangers that environmental contamination has and their potential to wreak havoc on human ecosystems. Research has shown that, in Minnesota, environmental contamination is most likely to negatively impact communities of color, and conversely, that communities of color are most likely to receive little to no information about the presence of, dangers of, or effects of the environmental contaminants that are impacting their communities. We are seeking to change the current system of environmental information dissemination by organizing the Indigenous and Latino community to become environmental advocates, educators and to exert pressure on local, municipal and state environmental agencies for a long-term, systematic inclusion of multilingual, culturally responsive mechanisms for disseminating environmental information from environmental agencies to local community groups, agencies, and individuals.

Impact of implemented activity (social, economical, environmental, etc.)

This project has social, economic and environmental impacts which have yet to be measured. We brought the commerce of an interstate, international 3 day cultural celebration in honor of the water to South Minneapolis, an impoverished urban zone, and raised grassroots funding to hire one staff person to coordinate the multitude of volunteer hours that go into the project annually. Short term effects are related to community empowerment and creating an awareness of the environmental issues that affect the water in our area, including lead, mercury, arsenic and unregulated contaminants. The main challenge is to lift the veil of apathy that dominates the Latino people in our area when it comes to environmentalism (it is often viewed as a "white" thing). The impact is targeted at the local Minnesota region, but has already been international, as our celebration and website have both received visitors/ participants from Canada and Mexico. Many indirect impacts have also yet to be measured, including the number of school projects that are now being undertaken on water issues and environmentalism by indigenous and Latino students.

Types of stakeholders involved

Primary Collaborators:

- Chalchiutlicue Environmental Project Committee. Organizing, Planning and Advisory Committee, Community Based, 100% Indigenous composed.
- Clase Ocelotl. Collaborating Partner, Community Based Educational Organization, 100% Indigenous and Latino composed
- Danza Mexica Cuauhtemoc. Community Based Education and Culture Organization.
- 27 Participating Organizations (assist with leveraging resources, personnel, vehicles, water, space, printing, advertisement, distribution of materials, compilation of materials, food, sundries, other types of support)

Means of stakeholder involvement and role they play(ed)

Primary Collaborators:

- Chalchiutlicue Environmental Project Committee. compile materials that are cultural specific and eliminates the language barrier, and to improve the accessibility of these materials to the Spanish speaking population by using grass roots methods, the internet, and collaborations. In addition to accomplishing these basic steps of making information available, we will also set forth on accomplishing our primary goals of increasing Latinos' direct involvement in waste and toxicity reduction practices by doing some grass roots one-on-one organizing in the Latino community - used many volunteer hours of community experts.
- Clase Ocelotl. Co-coordinate, organize and implement school curriculum, teachings and community celebration. Build awareness and participation in the Indigenous and Latino communities. Provide cultural expertise. - collaborated with involvement of many youth in water, environmental and social justice curriculum components.
- Danza Mexica Cuauhtemoc. Co-coordinate, organize and implement school curriculum, teachings and community celebration. Build awareness and participation in the Latino and Latino Immigrant communities. Lead traditional Aztec cultural Celebration.
- 27 Participating Organizations (Each participated in moulding the project design and implementation, as well as assist throughout each stage of the project with leveraging resources, personnel, vehicles, water, space, printing, advertisement, distribution of materials, compilation of materials, food, sundries, other types of support).

Long-term commitment and targets

Danza Mexica Cuauhtémoc has been operating as a completely volunteer based, self sufficient, non-funded grassroots organization for over ten years, and is currently in the process of legally incorporating as a 501(c)3 non-profit organization called Ce Tempchcalli, and will also file for tax exempt status with the State of Minnesota. During this infrastructural development stage, Danza Mexica Cuauhtémoc has a fiscal agent, Philips Powderhorn Cultural Wellness Center, who will be responsible for the day-to-day financial management of the grant. Danza Mexica will retain full responsibility for the overall management of all areas of the grant, including implementation, reporting and financial aspects. We recently received a $10,000 Community Power grant that will pay for a portion of the position we are creating to do EJ work in the Chicano Latino and Latino Immigrant community. With the Headwaters grant we will be able to hire this person 1/2 time (20 hours per week) to work specifically on Environmental issues as spelled out in this grant. We have applied for a General Mills grant to support the second annual Chalchiutlicue Environmental Presentation and Community Celebration in Honor of the Water. We will continue to seek funding to support the Chalchiutlicue Environmental Project as well as to build the capacity to develop the administrative infrastructure of our grassroots organization and widen our volunteer base.

Originality and Innovative Ideas

This is one of the first times that a Latino/ Indigenous cultural celebration has been used together with the political environmental focus to raise awareness and leverage our human skills building and advocacy assets in order to solve the problem of low participation of Latino and Indigenous peoples in volunteer water protection activities such as household waste and toxicity reduction, water quality monitoring, and political environmental advocacy. Danza Mexica Cuauhtemoc has been effecting change in our local, regional and national Latino communities for over 12 years by mobilizing Latino adults, youth, children and elders to become self-motivated, politically aware, educated and active organizers among peer, family and community networks.

Costs involved

- Core volunteers working on this project as of today: 67

List of Project Funders:

1. (Last year): Green Guardian Community Power; The Minneapolis Foundation; Headwaters Foundation for Justice.
2. (This year): Headwaters Foundation for Justice (pending); General Mills Celebrating Community of Color (pending); Community Power (pending).

Lessons learned that you would propose to present at the 4th World Water Forum

- Community based cultural, political, environmental presentations that take place in a traditional cultural venue or event, but also encourage community action, activism and advocacy, as well as engagement in skills and knowledge building on a continual basis.
- This is a fairly simple model which could be adapted in any indigenous community, urban or rural.
- Although our focus is environmentalism and water, the focus can be widened to include a different local context, or related global issues such as global warming, sea temperatures, sea levels, air pollution, atmospheric phenomena such as the ozone layer, the effects of increased UV on ecosystems, the possibilities are endless but the model can be the same, or tailored to fit local circumstances.
- Although we are just starting out, already, this initiative has been extremely effective, exciting and inspiring for all who have worked on it, attended, participated or observed on each level of the implementation.

Local actions details:

ID	LA1361
First name Víctor	Last name Anzaldo Trujillo
Organization	Development Finance Forum
Country	Mexico
Gender	Male
Email	raulhdez@laneta.apc.org
Scope of the action:	Basin
Region:	Americas
Name of Local Action:	Lessons learned on livelihoods improvements through innovative interventions to regenerate the natural resources base capital as a condition of possibility to reduce hydric, food and economic vulnerabilities all of which will reduce ecologic risk.
Framework theme:	Risk Management

Crosscutting perspectives: New Models for Financing Local Water Initiatives; Capacity-building and Social Learning; Application of Science, Technology and Knowledge; Targeting, Monitoring and Implementation Knowledge.

Name and types of the implementing organization(s):
Development Finance Forum: International and intergovernmental institutions
Description and location of the problem and activity as implemented

From the beginning it was clear that the main problem facing the Region's residents is a lack of water. While the Southern Region is particularly affected by this problem, water availability throughout most of Mexico – and for that matter worldwide – is becoming one of the main environmental problems facing humankind. The problem is not only to get enough potable water to meet people's needs, but to find sustainable technologies that will preserve aquifers and also provide access to water on an equitable basis for the different sectors of the population

The main goal of the Ecological Regeneration Program is to help low-income people living in the rural areas of southern Mexico by:

Improving the availability of potable water; Constructing small-scale irrigation facilities for agriculture; Raising the level of sanitation in the region's villages; And conserving fragile soils and improving agricultural productivity (and thus raising rural household incomes) through the use of better, more appropriate agricultural production practices.

Impact of implemented activity (social, economical, environmental, etc
Since 1988, the project has served a total of 164 villages located in 33 tributary watersheds covering 8,000 square kilometers.

- The Ecological Regeneration Program has served a total of 176 thousand inhabitants of the Southern Region up to December 2004.
- 1,423 waterworks have been carried out, implementing 34 types of technologies. · Through the course of the program of ecological regeneration we have consolidated a veritable panoply of available technologies that can be flexibly adapted to the exact conditions of each site, which tend to be highly variable.

As a product these watershed regeneration activities The project has had a tremendous impact by transforming dry ravines into watercourses that flow permanently throughout the year, thus bringing numerous benefits to the families that live and produce along their courses.

Types of stakeholders involved
7 Civil development organizations; 9 Funding organizations; 5 Government organizations; Local government and organizations; Municipal authorities; Agrarian authorities; Local Committees; Women and peasant organizations.

Means of stakeholder involvement and role they play(ed)
The municipal and local authorities are responsible for advancement of the program in their own village, promoting and organizing peoples participation in several tasks. Beneficiary families will provide volunteer hand labor to contribute to the waterworks construction.

The project has been able to establish permanent collaboration programs with several high level institutions in water related fields, which reinforce the capacity of the internal team with their input. The Ministry of Environment and Natural Resources (SEMARNAT) has been involved in activities related to the conservation of natural resources. In the past it has granted a relevant support to the Ecological Regeneration Program. They have invested public funds in soil and water conservation projects and educational activities.

Long-term commitment and targets
During the search for this model, practices that contribute to its genuine sustainability are generated and validated: technologies applied that contribute to regenerating the ecology; modalities of human interaction that propitiate greater social equality; financial outflows that propitiate economic viability; and instruments of communication that foster the cultural development of participating towns and people.

Originality and Innovative Ideas
The task of regenerating watersheds synthesizes this entire mode of operation: beginning with the identification of water scarcity as the "axis" problem and ongoing research done with the goal of resolving it. The major components of the Program involve: I) the study of watersheds; II) the promotion of villages participation; III) the identification and implementation of appropriate technologies for enhancing the availability of potable water and small irrigation, and; IV) the education of people in safe and sustainable use of water.

Costs involved
From 1992 to date, The project has been able to attract a total investment of US 13'000, 000, which has represented a major benefit for regional development in this neglected indigenous area. These resources are a combination of public, private and social contribution.

Lessons learned that you would propose to present at the 4th World Water Forum

- Social justice: This value implies adopting the perspective of the most disadvantaged people, sectors and towns and confronting the problems that affect them.
- Personal commitment: The project fosters and articulates a strong commitment with the towns and their inhabitants, both at the level of the individuals that participate and at the level of the operations of our institutional programs.
- Integrated, interdisciplinary work: The complex causality of the problems encountered demands an interdisciplinary focus capable of understanding and dealing with the principle milieus involved.
- Efficient resource management: To assure the sustainability of the process and of the people and institutions that drive it, special attention is devoted to the efficient and efficacious management of available resources —human, material, financial— through the design and implementation of suitable administrative and accounting controls.
- Strengthening local capacities and training participants: The actions initiated under the auspices of these programs are planned in such a way that they generate and reinforce local instances of operation.
- Incorporating local participants as members of the development promotion team: Our long-term vision recognizes the need to rapidly increase the operating capacities of participants in the regional process, in lieu of importing outside personnel to the site to carry out required tasks.

Local actions details:

ID	LA0060
First name Maria-Angelica	Last name Alegria
Organization	Gender and Water Alliance
Country	Chile
Gender	Female
Email	maria.alegria@moptt.gov.cl
Scope of the action:	Country
Region:	Americas
Name of Local Action:	Hurricane Mitch: Women's Needs and Contributions
Framework theme:	Risk Management

Crosscutting perspectives: New Models for Financing Local Water Initiatives; Institutional Development and Political Processes; Capacity-building and Social Learning; Application of Science, Technology and Knowledge; Targeting, Monitoring and Implementation Knowledge.
Type of Organization: International and intergovernmental institutions; National and local governments, authorities and associated; Civil society organizations

Description and location of the problem and activity as implemented

This example is based on a report prepared by the Women in Development Program Unit and the Sustainable Development Department of the Inter-American Development Bank. This paper, examines evidence from post-Mitch Central America and disasters in other parts of the world to identify the ways disasters affect women and to highlight women's participation in prevention, relief, rehabilitation, and reconstruction efforts. It attempts to fill a void in the knowledge regarding people's responses to disasters in the region, by exploring the gender dimension and providing general guidelines for integrating a gender perspective in effective disaster management. Hurricane Mitch hit Central America in October 1998. The effects of Mitch varied significantly across countries, and therefore there are regional trends, needs and responses. The bottom line of this action is that the active participation of women in reconstruction is necessary for the transformation of the region.

Impact of implemented activity (social, economical, environmental, etc.)

The Response to the Disaster:

In Central America, as in disasters elsewhere, peoples involvement was central in the first moments after the disaster and continues to be critical during reconstruction. Gender differences molded the nature of peoples response to Mitch. Male tasks were more visible and heroic during the emergency. They went on search and rescue missions and transported the wounded. Women, instead, were involved in less visible tasks that were the extension of their domestic roles, such as food preparation and distribution, and care of the wounded. Although less visible and consequently, perhaps less valued, women undertook myriad tasks that were critical for the recovery of families and communities. They had an especially important role in the shelters, not only providing food, but also establishing and running them. In Honduras, a third of the shelters were run by women, and this figure rose to 42% in the capital. Women are also playing a leading role in housing construction and reconstruction. Women are being favored as beneficiaries of housing property titles in El Salvador and Nicaragua in recognition of their stake in home ownership. This is not the case in Guatemala and Honduras, where criteria benefit previous owners. The nature and range of women's contributions in the recovery phase suggest that more full and equal utilization of their experiences and resources by the institutions engaged in reconstruction could increase the speed and effectiveness of these efforts and set a solid basis for disaster prevention.

Types of stakeholders involved

List the names and types of stakeholders involved (international organizations, private sector, governmental agencies, research centers, NGOs, etc.)

- Municipalities
- Inter American Development Bank
- Community based organizations
- Women organizations

Means of stakeholder involvement and role they play(ed)

La Masica: Good Practices in Emergency Preparedness.

The municipality of La Masica in Honduras, with a mostly rural population of 24,336 people, stands out in the aftermath of Mitch because, unlike other municipalities in the northern Atlantida Department, it reported no deaths. This outcome can be directly attributed to a process of community emergency preparedness that began about six months prior to the disaster, as a pilot of the project FEMID, launched by CEPREDENAC, the Central America disaster prevention agency, with support of the German agency GTZ. The pilot project involved the establishment of networks of local organizations in charge of risk and disaster management, coordinated through the Municipality and the Municipal Emergency Commission (CO-DEM). Networks were trained in the geographical mapping of hazards and an early warning system, and undertook an assessment of vulnerabilities differentiated by gender.

Long-term commitment and targets

- First, disasters tend to duplicate existing vulnerabilities.
- Second, disasters tend to exacerbate gender differences.
- Third, the active participation of women increases the effectiveness of prevention, disaster relief, reconstruction and transformation.
- Fourth, events that occur before, during and after disasters offer fertile ground for change in gender relations.

These important opportunities are unlikely to present themselves in later phases.

Originality and Innovative Ideas

1. Strengthening the economic opportunities of women.
2. Building women's leadership.

Costs involved

Some projects approved by IADB with gender opportunities and focus:

- GUATEMALA. Municipal development municipal USD 80 million. Complementary Program for the reconstruction after disasters USD 50 millions
- HONDURAS. Investment in water supply and sanitation USD 30 millions. Housing Program Post Mitch Hurricane USD 2 millions. Support to productive sector and small entrepreneurs USD 13 millions.
- NICARAGUA. Housing Program USD 30 millions. Social Network Program USD 11 millions. Reform Program for secondary school USD 30 millions. Water supply and sanitation Project USD 100 millions. Road network reconstruction after Mitch USD 3 millions.
- REGIONAL PROJECTS. Mycroenterprises recovery Program for Central America USD 12 millions. Disasters mitigation in Central America USD 2,5 millions.

Lessons learned that you would propose to present at the 4th World Water Forum

1. Include basic disaster prevention and preparedness in country development plans, incorporating a gender perspective from the start.
2. Produce long-term gains by incorporating development and gender perspectives into emergency relief.
3. Aim for balance between rehabilitation and reconstruction of physical infrastructure, and the recovery and development of social and community infrastructure where women play critical roles.
4. Design and support specific initiatives that respond to women's needs and strengthen their contributions. Provide jobs and income-earning opportunities for women who lost their jobs because of the disaster.
5. Promote community participation and decentralization in disaster preparedness and recovery efforts. Decentralization in the allocation of budgets for disaster recovery programs and community participation improves crisis responses, promotes transparency and efficiency in the use of resources and accelerates reconstruction and a return to normalcy after a crisis. Local stakeholders, including community organizations, should feel a sense of ownership of the disaster reduction activities. As the La Masica experience shows, emergency preparedness starts with community activities. Community-rooted development is the basis of disaster preparedness and ensures continuity from short-term responses to long-term development goals.
6. Favor the reconstruction of rural areas. Because rural areas are proportionally poorer, the focus of sustainable growth should be diversified rural production. At the same time, efforts should be made to protect the rural ecology and take into account the central role women play in rural production and conservation.
7. Integrate a gender perspective in disaster preparedness and recovery plans and initiatives. The first step in integrating a gender perspective into disaster preparedness is to collect information disaggregated by sex. As the case of Mitch showed, the lack of sex disaggregated statistics in emergency relief hampered the response to women's needs and left a significant void in knowledge about the gender-differentiated impacts of the disaster. Define indicators to measure progress in achieving the integration of gender considerations; allocate budget resources if appropriate; and establish monitoring and evaluation mechanisms to measure success in mainstreaming gender concerns.

EXAMPLES OF LOCAL ACTIONS
presented during the preparatory process in Mexico

As part of the preparatory process, 32 events called "Towards the World Water Forum" were held in Mexico. This process took place between September and October, 2005, in 31 states of the Federation, as well as in the Federal District.

Representatives of several institutions and organizations, both of the public and private sectors associated with the water sector in each State participated actively in these important meetings.

One of the characteristics of the events was that they were focused on presenting different successful local experiences and actions related with water.

A total of 250 local actions were presented.

These experiences and actions were registered by their authors on the Web page of the 4th World Water Forum so that they could be shared with the different countries of the world. In this part of the document we present 11 of these local actions.

Action:
"Water efficient management, based on the integral reduction of losses"

Problem: **The distribution of irrigation water in an alternative manner and its purchase from water trucks was the way in which the inhabitants of the city Martínez de la Torre, Veracruz got their supply of water.**

Activities performed: The program "Water efficient management, based on the integral reduction of losses" is based on the principle that it is not possible to ask the population to take care of water resources when the people responsible to provide the service let go leaks that represent the daily loss of important volumes of water.

The application of the program has led to the recovery of volumes of water no accounted for different concepts such as: visible leaks, non-visible leaks, absence of consumption metering devices, fraudulent consumptions, clandestine consumptions, leaks in schools and in parks and gardens irrigation, among others. Its implementation cost amounted to 300 thousand pesos.

Results obtained: The water service is provided in a continuous manner during 24 hours, the volumes recovered have made it possible to extend the service coverage and the rates increments are less than 3% a year.

The above results have contributed to allow the Operating Organization to have healthy finances and to become subject to obtain financial credits for its consolidation.

This program has been let known to more than 400 municipalities of the country through invitation made to several authorities.

Action proposed by:
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Action: **Water Ecoefficient Use and Zero discharge**

Problem: The average consumption ratio in the international market is 7 m^3 water per carbon black ton[52]. In 1992, the company NHUMO S.A. de C.V., located in the state of Tamaulipas, was consuming almost twice as much water per ton. In addition, this company used bad quality water and its effluents were discharging to the sea.

Activities performed: The treatment of used water in the process was changed from ionic exchange to reverse osmosis treatment, going on with the selection of low flow stopcocks, air cooling, the proper selection of materials for pipes and equipment,preventive maintenance and elimination of all leaks and spills, as well as water recycling.

The next step was the process and services effluents treatment, representing about 10% of the water used equivalent to 89 thousand m^3/per year.

Results obtained: The consumption ratio went down from 13.1 m^3/ton to 6.5m^3/ton, thus the water extraction from the Lagoon, from where the plant gets it water supply, decreased in a 50 percent allowing to have available 780 thousand m^3/per year.

Likewise, it was possible to separate sludges, which were used to make shoe soles.

In addition, the costs for sea effluent management were eliminated. Hundred percent of waste water is reused in the black carbon process and green zones irrigation.

The economic savings achieved with the actions performed are estimated in 540 thousand US dollars a year.

Action presented by:
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Action: Water Forever (This Action was also selected by the Evaluation Committee of the Regional Committee of the Americas)

Problem: In the Mixteca region, which extends to the states of Puebla and Oaxaca, there is a severe problem of water shortage.

Activities performed:
In 1980 was started a process of regional sustainable development promoted by Alternativas y Procesos de Participación Social A. C. in benefit of the people of the region. In 1986, the results of an investigation led to the conclusion that the solution would be the regeneration of ravines and basins. During 1988 was started a great project for rain water catchment, which required an intensive work of social organization of the population benefited. The project consisted in a gabion dam and an earth dam to store the water of a ravine.

Since that experience, the program "Water Forever" has continued its work without ever stopping and has extended its actions to 164 locations of the region, in 31 tributary basins.

It also formed the first museum specialized in water of the country, which shows the elements to facilitate a better understanding of the problem and the alternatives available to solve it.

Results obtained:
There is a sound capacity of institutional action that allows to benefit 170,000 inhabitants of 60 municipalities of the states of Puebla and Oaxaca.

It has been possible to change dry ravines into watercourses where water constantly flows throughout the year.

From 1992 to 2004, the Program was able to attract to the region a total amount of $13 million dollars. In the last three years it has raised funds for about 2.5 million a year.

Action presented by:
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Action: Use and exploitation of "lees[53]" (vinaza) wastewaters

Problem: The lees discharge produced in the sugar mill process of the Ingenio El Carmen S.A. de C.V., in the state of Veracruz, polluted the Rio Blanco sub-basin.

Activities performed:
The Ingenio built a neutralization, cooling and storage system for lees, to apply it as fertilizer in sugar cane fields and also as raw material in an anaerobic reactor of the company Kimberly & Clark for biogas generation, which is used in steam generators.

Besides, two tank type units were acquired for the transportation of lees to the two points of disposal (sugar cane fields and Kimberly Clark)

The cost of the action by the Ingenio was of 3.8 million pesos, covering the construction of dikes and tanks, the coating of tanks, the acquisition of two truck tractors, the expenses for the neutralization of lees and the operation and maintenance of the truck tractors from 2001 to 2005.

Results obtained:
The lees application in sugar cane fields has allowed to increment by a 30% the sugar cane production.
There was an increment of more than 100% of the biogas generation producing 4,800m^3/day for the consumption of the steam generators of Kimberly & Clark.

The application of lees has increased in sugar cane fields and it has been requested to sow other type of fields.

Likewise, it resulted in a reduction of the pollution of the Rio Blanco sub-basin which belongs to the Rio Papaloapan basin.

Action presented by:
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Ingenio El Carmen S.A. de C.V.
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Action: The Morelos Children Summit for the Environment (CIMMA for its Spanish acronyms)

Problem: In the state of Morelos there was no alternative for elementary school students (6 to 12 years old) to put into practice the water culture and environmental education projects.

Activities performed:
The environmental project of Morelos includes education and dissemination as a fundamental part to change the generation gap attitude regarding Water and Environment.

The Morelos Chil
of Morelos activities related to water catchment, desinfection and saving, management of organic and inorganic residues, start vegetable gardens (with compost), and the separation of paper and cardboard.

Results obtained: In the 2003 and 2004 processes, 800 teachers have been trained who have passed their knowledge to 200 thousand students. In addition, 300 environmental projects have been developed in the same number of school centers.

In the 2004 event
exchange of experience
and adopting for their own community the environmental options required.

Action presented by:
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Action: **"Financing Plan for the Construction of the Picachos Project"**

Problem: Agricultural pro
the Picachos storage dam and the irrigation infrastructure, which represented investments that amount to 2.572 billion pesos.

Considering the shortage of economic resources, the challenge consisted of finding and implementing innovating financial plans of participation to carry out the project works.

Activities performed: Considering the extent of the investments required, the basic principle established was that the project were financed by the Federal, State, and Municipal governments, and by the beneficiaries as well.

For this to be poss
agricultural producers of the zone, and the Municipal Water and Sewage Board, achieving its acceptance and obtaining the commitment of contribution of economic resources.

The Picachos
(COBALPRE).

To be subject of credit,
system. Each of them contributed economic resources in cash to establish the liquid guaranty required from them.

Results obtained:
The c , generate electric
power, and irrigate 22,500 hectares.

This project will help incre
type. Besides, it will contribute to generate more employment in the region.

Action presented by:
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Action: **State Plan of Drinkable Water and Sanitation for the State of Nuevo León.**

Problem: Ensure the drinkable water supply to more than 3.5 million inhabitants of the city of Monterrey.

Characteristics of the action:
Within the project to supply water to the inhabitants of the city of Monterrey in the State of Nuevo León, 5 options were assessed, concluding that the most feasible action consisted of making it possible to exchange water with quality for human consumption for treated water for agricultural activities.

For this option to be possible the construction was required of the El Cuchillo dam, with capacity of 1,790 hm^3, the Cuchillo Monterrey aqueduct for a flow of 6 m^3/s and 91 km length, the pumping stations to overcome 490 meters of slope, the wastewater treatment plants with capacity of 8 m^3/s, and the improvement of the drinkable water and sewage infrastructure of the city of Monterrey. The investment made amounted to 721 million U.S. dollars.

Results obtained:
Among the direct impact, the increase of water availability in 5 m^3/s and the flow purification from 6 to 12 m3/sec stand out.

Among the indirect impact, the increase in the economic development of the city of Monterrey, the reduction in health risks and environmental impact on the aquatic ecosystems caused by the disposal of untreated wastewaters, can be mentioned.

Action presented by:
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Action: **Stabilization of the aquifer of Valle de Santo Domingo, B.C.S.**

Problem: The aquifer of Valle de Santo Domingo was being overexploited and the quality of its water degraded.

Activities performed: Several actions were carried out, distributed in the following four blocks:

1. Regulation: Reduction of water supplies, publication of the aquifer regulation, imposition of economic sanctions and reduction of water volumes, and updating of the regulation of the irrigation District.
2. Organization: Transfer of the Irrigation District to users and creation of Technical Groundwater Committees
3. Awareness: Training technicians and producers about good water management and change of the farming pattern, as well as meetings with farming users to create awareness.
4. Infrastructure: Irrigation modernization, reconditioning of the pumping equipment, supply and installation of volumetric meters, metering of monthly extractions and annual monitoring of the static levels and water quality.

Results obtained:
Hydrological balance was achieved in the 2003-2004 agricultural cycle, which has been maintained in the 2004-2005 cycle. The annual extraction volumes have decreased from 453 million m3 (1991) to 154 million m3 (2005).

Action presented by:
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Action: **Environmental Recovery of the Guaymas Bay**

Problem: Untreated wastewaters were discharged directly to the Guaymas Bay, affecting its ecosystem and the tourist service providers.

Activities performed:
A program and action plan were executed with a total investment in the works of 119 million pesos. Among the works performed, the following can be mentioned: the construction of the "Buenos Aires" oxidation lagoon, the rehabilitation of the "Guaymas Norte" oxidation lagoon and pumping pits, the construction of rainwater conduction lines and drainage, as well as the rehabilitation of the outfall by gravity.

Two silt removal equipments were also acquired and cleaning tasks were carried out all along the coastline.

On the other hand, the blue coast scenic seafront was built, where more than one kilometer of beaches inside the bay was rehabilitated.

Results obtained: As of June 2004, there have been no untreated waste discharges. In the sampling conducted in the month of July of 2005, in 27 sampling stations predominant values under 3 coliforms / 100 ml were obtained. In other two stations, the values seen were of 40 coliforms / 100 ml, lower than those established in the ecological standard.

The tourist activity has been reactivated within the bay. Therefore, a nautical scale is being built within the scope of the Sea of Cortes project, with initial investment of 120 million pesos.

What has been seen is that the communities of marine organisms are returning to the bay, finding large schools of sardines and fish of different species.

Action presented by:
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Action: **"Social participation and management in the recovery of the Aquifer of the Central Valleys of Oaxaca, Mex." (This Action was also selected by the Evaluation Committee of the Regional Committee of the Americas)**

Problem: The depression of the aquifer in the Valley of Oaxaca has resulted in production cost increases in the agricultural sector and reduction of its production and productivity levels. The region also faces serious deforestation and river and spring contamination problems.

Activities performed: In 2002, a dissemination process of the basin and aquifer problems was launched, through participative meetings. Three planning workshops were also held, which resulted in a Work Plan. For its implementation, the Ground Water Technical Committee (COTAS, for its acronym in Spanish) was established, made up by water users.

Among the actions conducted, the following can be mentioned: technology conversion of 1470 has, the construction of 6 sanitary drainage systems and 4 wastewater treatment plants, the construction 62,000 sq. m. of greenhouse, 180,000 trees were planted and 13 rainwater dikes were built in 9 microbasins. Likewise, 702 users were trained, thus favoring exchange of experiences and technical visits.

The cost of the actions performed amounted to 129.5 million pesos, and the cost reduction was derived from the participation of the users in task performance.

Results obtained:
Irrigation efficiency increase from 40 to 70 %, favoring the recovery of the aquifer thanks to the savings of 23 million m^3.
Tomato production increased to 70 ton/ha in open field, and to 280 ton/ha in greenhouses per year. Each greenhouse hectare generates 9 permanent jobs, 27 temporary jobs, and net revenues of 500,000 pesos annually.

Action presented by:
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Action: **"Sustainable Development Program of the Cóndiro–Canales Mountain Range, Jalisco, Mexico"**

Problem: The Cóndiro-Canales Mountain Range is a forest zone of 10,700 hectares, located between the municipalities of Ocotlán, La Barca and Atotonilco, in the Chapala Lake basin.

In this zone, the water recharge cycle was disrupted, mainly caused by the trees lost to the clearance made to use the forestry soil in agricultural activities. This has resulted in the reduction of the water recharge capacity and the well level depression in the zone, which have lowered their level from 5 to 40 meters depth in the last 35 years. Likewise, less water availability has been observed in the springs, whose permanence went down from 10 to 6 months in average. There is also soil loss that causes silt accumulation in the dams that take advantage of the basin runoffs.

Activities performed:
To solve this situation, in October 2001, a forest rehabilitation, conservation, and diversified management process was created, through the enhancement of capacities and organization of 11 communities. In the first stage, a participative diagnosis of the problem was made and solution priorities were established, and short, medium and long-term goals were defined for their implementation.

The program cost is defined every year, in accordance with the goals to be reached. Thus, in 2005, 400 thousand pesos were invested.

Results obtained: To the year 2005, 450 hectares have been reforested with native species, achieving 70% survival; soil conservation works in 700 hectares; mistletoe pest control in 1,500 hectares. Besides, organization works and productive training workshops were organized (biofertilizers, medicinal plants, "pitayo" and cactus growing, ecotourism, community nursery), among others.

Likewise, permanent work groups have been established in 9 common land areas and 50 specific projects have been developed, in accordance with the needs of the locations. Working tables have been established with the town halls involved, including a Table of Common Lands and Villages of the Cóndiro-Canal
conducted have been
mountain range to the payment polygon for environmental services, preparation of a Geographic Information System, 6 governing plans for production and conservation, among others.

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ANNEX 5
main water-related technical and financing organizations in the region

There are many water-related technical and financing organizations in the Americas, some with national scope and some with a regional or sub regional coverage. The following table lists in alphabetical order, only some of the well-known organizations with a regional or sub regional reach.

No.	ORGANIZATION	OBJECTIVES	ASSISTANCE
1	Andean Development Corporation (CAF)	Financing sustainable development and promoting integration in the Andean region	Technical Assistance and Financing
2	Border Environment Cooperation Commission (BEEC)	Identifies, supports, evaluates and certifies sustainable environmental infrastructure projects through broad public participation, to improve the quality of life of the people of the U.S.-Mexico border region.	Technical Assistance
3	Canadian International Development Agency (CIDA)	Aid for development worldwide	Technical Assistance and Financing
4	CARE	Worldwide reduction of poverty.	Technical Assistance and Financing for water supply, sanitation and development in the region
5	Caribbean Community and Common Market (CARICOM)	Caribbean forum for social and economic development in the Caribbean	Technical Assistance in Natural Resources, Environment and Development in the Caribbean
6	Caribbean Development Bank (CDB)	Financing sustainable development in the Caribbean	Technical Assistance and Financing
7	Central American Bank of Economic Integration (CABEI)	Financing development in the Central American region	Technical Assistance and Financing
8	Eastern Caribbean Central Bank (ECCB)	To actively promote the economic development of the Participating Governments.	Technical Assistance and Financing in Public Education and Community Outreach
9	Danish International Development Agency (DANIDA)	Reducing poverty in developing countries trough promoting: women's participation, environmental conservation, democracy and observation of human rights.	Technical Cooperation and Small and Local Project Financing
10	Economic Commission for Latin America and the Caribbean (ECLAC)	Contributing to economic development in Latin America and the Caribbean	Technical Assistance in Natural Resources and Economic Issues
11	General Secretariat of Central American Integration System/ Central American Commission on Environment and Development (SGSICA/CCAD)	Cooperation in water resources and environment in Central America	Technical Assistance
12	German Development Agency (GTZ)	Aid for development worldwide	Technical Assistance and Financing
13	Global Environmental Facility (GEF)	Financing globally relevant environmental programs	Technical Assistance and Financing
14	Global Water Partnership (GWP)	Fostering IWRM worldwide	Technical Assistance
15	Global Water Partnership Central America: Belize / Costa Rica El Salvador / Guatemala Honduras / Nicaragua	Fostering IWRM in Central America	Technical Assistance
16	Global Water Partnership South America: Chile Paraguay / Peru / Uruguay	Fostering IWRM in South America	Technical Assistance

HEADQUARTERS	CONTACT	TELEPHONE	E-MAIL AND WEBPAGE
Venezuela With country offices	Enrique García Rodríguez, Executive President	(58212) 209-2111	lnfocaf@caf.com www.caf.com
Ciudad Juarez, Chihuahua, Mexico	Fernando Macias, General manager	(52-656-688-4600	fmacias@cocef.org http://www.cocef.org/ingles.php
Canada	Robert Greenhill, President	1-800-230-6349	lnfo@acdi-cida.gc.ca www.acdi-cida.gc.ca
USA With country offices	Peter D. Bell, President	1-800-521-2273	info@care.org www.care.org
Guyana	Edwin W. Carrington, Secretary General	592-222-0001-75	info@caricom.org www.caricom.org
Barbados	Compton Bourne, President	(246)431-1600	info@caribank.org www.caribank.org
Honduras	Harry E. Brautigam, President	(504) 240-2243	relex@bcie.org www.bcie.org
St. Kitts	Sir K Dwight Venner, Governor	(869) 465-2537	info@eccb-centralbank.org www.eccb-centralbank.org
Denmark		(45 33) 92 00 00	um@um.dk http://www.um.dk
Chile Subregional offices in Mexico and Trinidad and Tobago Country office	José Luis Machinea, Executive Secretary	(56-2) 210-2000	secepal@eclac.cl www.eclac.cl
El Salvador	Marco Antonio González Pastora, Executive Secretary	(503)2248-8800	magonzalez@sgsica.org www.ccad.ws
Germany	Bernd Eisenblätter and Wolfgang Schmitt, Managing Directors	49 6196 79-0	info@gtz.de www.gtz.de
USA	Leonard Good, CEO & Chairman	(202) 473-0508	secretariat@TheGEF.org www.gefweb.org
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Chile	María Elena Zúñiga, Regional contact	56 2 2102164	gwpsamtac@eclac.cl www.gwpsamtac.org

No.	ORGANIZATION	OBJECTIVES	ASSISTANCE
17	Inter-American Development Bank (IDB)	Financing development in Latin America and the Caribbean	Technical Assistance and Financing
18	International Network of Basin Organizations	Promote integrated water resources management at the level of river basins	Technical Cooperation and Information Services
19	International Water Office (OIEAU)	Aid for water development worldwide	Technical Assistance and Financing
20	Japan International Cooperation Agency (JICA)	Aid for development worldwide	Technical Assistance and Financing
21	Latin American Energy Organization (OLADE)	Cooperation in the energy sector in Latin America	Technical Assistance
22	National Aeronautics and Space Administration (NASA)	Cooperation for remote sensing imagery worldwide	Technical Assistance
23	National Oceanic and Atmospheric Administration (NOAA)	Cooperation in climate and weather in the region	Technical Assistance
24	National Water Commission of Mexico (CONAGUA)	Manage and preserve the water resources of Mexico	Cooperation in Water Resources Management
25	North American Development Bank (NADB)	Addressing environmental issues in the USA-Mexico border	Technical Assistance and Financing in USA-Mexico border under NAFTA
26	Organization of American States (OAS)	The Americas regional forum for social and economic development and environment	Technical Assistance in Natural Resources
27	Organization of Eastern Caribbean States (OECS)	Eastern Caribbean Forum for social and economic development	Technical Assistance in Natural Resources and environment
28	Pan American Health Organization (PAHO)	Cooperation in water supply, sanitation and health issues in Latin America	Technical Assistance
29	Spanish Agency for International Cooperation (AECI)	Cooperation for international development	Technical Assistance and Financing
30	Swedish International Development Cooperation Agency (SIDA)	Promote the idea of “international development cooperation” to replace the one-sided giving indicated by the term “assistance.”	Technical Cooperation and Project Funding
31	The World Bank	Financing development worldwide	Technical Assistance and Financing
32	The World Conservation Union (IUCN)	To conserve the integrity and diversity of nature, ensuring that any use of natural resources is equitable and ecologically sustainable.	Technical Assistance and project funding
33	United Nations Children’s Fund (UNICEF)	Aid for children development worldwide	Technical Assistance and financing in water, environment, and sanitation
34	United Nations Development Program (UNDP)	Aid for development worldwide	Technical Assistance and financing
35	United Nations Food and Agricultural Organization (FAO)	Cooperation for agricultural and watershed management issues worldwide	Technical Assistance
36	United States Agency for International Development (USAID)	Aid for development worldwide	Technical Assistance and financing
37	United States National Weather Service (NWS)	Cooperation in weather, hydrology, and forecast models in the region	Technical Assistance
38	World Meteorological Organization (WMO)	Cooperation in climate, meteorology, Hydrology, and water resources worldwide	Technical Assistance

HEADQUARTERS	CONTACT	TELEPHONE	E-MAIL AND WEBPAGE
USA With country Offices	Luis Alberto Moreno, President	1-202-623-1000	webmaster@iadb.org www.iadb.org
France With Regional Charters	Permanent Technical Secretariat	(33) 1 44 90 88 60	riob2@wanadoo.fr http://www.riob.org/friobang.htm
France	Jean Renard, President	01.44.90.88.60	dg@oieau.fr www.oieau.fr
Japan With country Offices	Sadako Ogata, President	81-3-5352- 5311/5312/5313/5314	jicagap-opinion@jica.go.jp www.jica.go.jp
Ecuador	Diego Pérez Pallares, Executive Secretary	(593 2) 2598-122 / 2598-280 2597-995 / 2599-489	olade@olade.org.ec www.olade.org.ec
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USA	Conrad C. Lautenbacher, Administrator	1 (202) 482-6090	answers@noaa.gov www.noaa.gov
Mexico	Cristobal Jaime Jaquez, Director General	55-50-64-59 y 55-50-63-02	direcciong@cna.gob.mx www.cna.gob.mx
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USA With country Offices	José Miguel Insulza, Secretary General	1 (202)458-3000	pimultimedia@oas.org. www.oas.org
St. Lucia	Len Ishmael, Director General	(758) 452 2537	oesec@oecs.org www.oecs.org
USA With country Offices	Mirta Roses Periago	1 (202)974-3000	webmaster@paho.org www.paho.org
Spain With country offices		34 91 583 81 00	www.aeci.es
Sweden		(46) 8 698 50 00	info@sida.se http://www.sida.org
USA With country Offices	Paul Wolfowitz, President	1 (202)473-1000	pic@worldbank.org www.worldbank.org
Switzerland With offices troughout the world.	Valli Moosa President	41 (22) 999-0000	webmaster@iucn.org www.iucn.org
USA With country offices	Mehdi Danesh-Yazdi, President of Executive Board	1 (212)326-7000	information@unicefusa.org www.unicef.org
USA With country offices	Kemal Dervi, Administrator	1 (212) 906-5295	IDPOversightPanel@undp.org www.undp.org
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Switzerland Regional offices in Paraguay Costa Rica	Michel Jarraud, Secretary-General	+ 41 22 730 81 11	wmo@wmo.int www.wmo.ch

ANNEX 6

SELECTED REFERENCE **bibliography**

1. Ballestero, Maureen; Brown, Ernesto; Jouravlev, Andrei; Küffner, Ulrich and Zegarra, Eduardo. ***"Administración del agua en América Latina: situación actual y perspectivas".*** Series Natural Resources and Infrastructure No. 90. ECLAC. Santiago, Chile. May, 2005. Available at http://www.eclac.cl/publicaciones/RecursosNaturales/9/LCL2299PE/lcl2299s.pdf

Many countries of Latin America and the Caribbean are involved in process of elaborating new water laws of water or modifying the existing ones. One of central issues around the debates carried out to implement this reform relates to the institutional design of the administrative system for managing the water resources. Invariably, successive diagnoses about water management in the region's countries conclude that these administrative systems are characterized by an essentially sectoral approach. Present conditions of growing shortages, increasing externalities, and a drastic and sometimes ruthless competence among users, have lead to a generalized interest in water demand management. However, this approach is introducing growing conflicts and use inefficient water use, mainly due to: (i) the lack of objectivity and impartiality, and often the absence of appropriate technical criteria, in the decision taking process associated to water resources management, and (ii) the fact that the management functions tend to be separated in a way that does not respond to the physical characteristic of the resource and to its optimum use, thus preventing an integrated vision of water management. Consequently many countries are reforming their administrative organization to promote the integrated management of the water resources. Through four studies commissioned to well known Latin American experts by the Technical Advisory Committee for South America (SAMTAC) of the Global Water Partnership (GWP), and for the GWP Central America, this document analyzes the present situation and perspectives of water management in Chile, Ecuador and Peru, as well as a joint analysis of Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama.

2. Barkin, David, Editor. ***"Innovaciones Mexicanas en el Manejo del Agua"*** (Mexican Innovations for Water Management). Universidad Autónoma Metropolitana. Mexico, 2001.(purchase thru http://www.earthscan.co.uk/)

This book was the result of the Seminar Mexican Water Management Innovations organized at the end of 1999.

The Seminar was sponsored by the Third World Centre for Water Management and the Metropolitan University of Mexico (Universidad Autónoma Metropolitana). The primary objective of this meeting was to identify those elements which have significant impacts in water management, both positive and negative, as well as to analyze practical experiences in the development of water projects to foster the efficiency in the water management in the country. The diversity of topics presented in the Seminar reflects the challenges that the society is facing to solve the water-related problems in Mexico.

3. Biswas, A., C. Tortajada, B. Braga, and D. Rodríguez, editors. ***"Water Quality Management in the Americas".*** Springer-Verlag, The Netherlands, 2006.

This book incluyes the papers presented in the Fortaleza workshop convened by the Third World Centre for Water Management, The Nacional Water Agency (ANA) of Brazil, and the Inter-American Dvelopment Bank. Important major issues related to water quality management for the countries of the American region were objectively, comprehensibly and critically examined, without any dogmas, consideration of vested interest, or political correctness. The effectiveness and impacts of different water quality management practices were objectively examined. The participants came from different disciplines as well as institutions. Case studies were presented from Argentina, Brazil, Costa Rica, Chile, Colombia, Mexico, Panama, and the United States. In addition, experiences from the North American Development Bank and the International Food Policy Research institute were also presented.

4. CN/RCA (2005). ***Aportes y Observaciones de las Organizaciones Sociales al Documento Regional de Las Américas. Proceso Preparatorio del Componente de Sociedad Civil del Comité Operativo de Las Américas***. Consultative Network/Regional Comité of the Ameritas, Buenos Aires, San Salvador, México. 2005.

As part of the preparatory process for the Iv World Water Forum, the civil society component of the Regional Comité of the Ameritas held during November 2005, three regional events in North, Central, and South America. More than 110 social organizations of the region participated in these events. One of the main objectives of these preparatory meetings was to produce inputs to the Regional Document of the Americas, and to define a joint position, as civil society, to be presented at the Forum. This document summarizes the results of this process. Some of the main issues discussed refer to water as a human right; compensation for environmental services; implementation of National Action Plans within the framework of the UNEP Global Action Plan for coastal zone management; water pollution; the tendency to revise the results of private sector participation in the provision of water supply and sanitation services; the inefficiency of the mechanisms adopted for community participatin in decision n making; the Argentinian and Chilean cases regarding transfer of water supply systems to the private sector; the theme of Free Trade Agreements; transboundary river basin management; and risk management.

5. Colegio de México & Comisión Nacional del Agua. ***"Agua para las Américas en el Siglo XXI"*** (Water for the Americas in the XXI Century). Mexico, 2003. (available at http://www.pamas.colmex.mx/CdAguaParaLasAmericas/Foro/Publicacion/Publicacion.htm)

To analyze the water problems in the American continent and to explore some perspectives of solution, the National Water Commission, in contribution with several institutions, organized the forum Water for the Americas in the Century XXI, celebrated in the City of Mexico in October of 2002. The main topics of this forum were: (i) Integrated water management in the Americas. From Vision to Action; (ii) Water management and environmental management Integration; (iii) Financing, and (iv) Governance and water policies. The book of reference, of multiple authors and directed to an extensive public, includes the main results derived from this forum and presents information and ideas that are relevant for the analysis of water management practices in the Americas.

6. Comité Organizador del Día de Las Américas, Tercer Foro Mundial del Agua, Kyoto, Japón, 19 de marzo de 2003. ***"Día de Las Américas-Resúmenes".*** Global Water Partnership Centroamérica-Inter-American Development Bank, 2003. http://www.gwpcentroamerica.org http://www.iadb.org

This publication is the Proceedings of the Day of the Americas at the 3rd World Water Forum in Kyoto, Japan. It includes the work "Water in the Americas: Challenges and Opportunities" presented at the 3rd Forum. It also includes the Declaration of the Americas and a wrap-up

summary of the Day of the Americas. It also includes the proceedings of the panels: Urban Transformations in the Americas-Challenges for Water Management; Effect of Structural Changes in the Water Resources Sector of the Americas. It describes the papers presented in the "Voices of the Americas" session and the results of the debate about a new water agenda for the Americas. Finally, it describes the poster sessions.

7. De Ford, Federico Valerio (2005). ***Implicaciones del Tratado de Libre Comercio Centroamérica-Estados Unidos Sobre el Recurso Hídrico y la Prestación de Servicios.*** Global Water Partnership Centro América, San José, Costa Rica, 2005. http://www.gwpcentroarica.org

This document includes a section where the background, contents, scope and application of the FTA are analyzed. The social and economic importance of water is also emphasized, linking it to the FTA, and pointing out where this topic could be related to the commercial content. The chapters of the FTA that could be related to water are also analyzed, as well as the exceptions listed by the Central American countries to the principles established in the investments and services chapters that are related to water resources. This section of the document includes an analysis of the specific annexes related to Costa Rica, El Salvador, Honduras, Guatemala, and Nicaragua. The reason is that a treaty is superior to a law and therefore, the way in which the application of laws that are contrary to the FTA provisions could be protected, is by explicitly clarifying in the text of the treaty, the possibility that one or more of its obligations would not be applied to those laws or articles that may not be in concordance with the treaty.

8. Donoso, Guillermo; Jouravlev, Andrei; Peña, Humberto; and Zegarra, Eduardo. ***"Mercados (de derechos) de agua: experiencias y propuestas en América del Sur".*** Series Natural Resources and Infrastructure No. 80. ECLAC. Santiago, Chile. November, 2004. Available at http://www.eclac.cl/publicaciones/RecursosNaturales/4/LCL2224PE/lcl2224s.pdf

Many countries of Latin America and the Caribbean are involved in the process of elaborating new water laws or modifying the existing ones. One of the central issues being debated in the process of legal reform, and an especially conflicting one, relates to the design of systems/mechanisms for assigning and reallocating the water resources. A generalized dissatisfaction with the traditional methods for the assignment of water is leading to the analysis of water markets (tradable rights), as an attractive alternative that promises to achieve a more economically efficient use of the available water resources. This document gathers three studies commissioned by the Technical Advisory Committee for South America (SAMTAC) of the Global Water Partnership (GWP), and elaborated by well known Latin-Americans experts, to evaluate: (i) the results obtained with the operation of the water market established by virtue of the Chilean Water Code of 1981; and (ii) the possibility to introduce a water market in Peru, considering historic, present and future conditions of the institutional framework for water management in this country. Finally, some conclusions are outlined around: the rights of water, the markets of such rights and the administrative system for the assignment and reallocation of the resource.

9. Dourojeanni, Axel & Jouravlev, Andrei. ***"Evolución de políticas hídricas en América Latina y el Caribe".*** Series Natural Resources and Infrastructure No. 51. ECLAC. Santiago, Chile. December, 2002. Available at http://www.eclac.cl/publicaciones/RecursosNaturales/6/LCL1826PE/lcl1826e.pdf

The document summarizes the main dilemmas faced by those responsible for water resources management in Latin America and the Caribbean, including the management of the resource as such and the provision of water related services, particularly water supply and sanitation. The great diversity of focus included in the legal and institutional proposals for reform reflect the long debates around the drafts of new water laws or the constant proposals of legal reforms to the few laws already approved. On one side, there is a theoretical debate to define concepts such as the integrated water management, water governance and water management through river basin organizations. On the other side, there is a marked tendency to consider and incorporating more water management objectives than those traditionally taken into account, as well as to debate and analyzing the alternative options to achieve them. The inclusion of these objectives is aimed at making operative certain "altruistic" concepts such as sustainable development, through the promotion of participatory processes and the consideration of gender and indigenous groups issues, among others. The statements to this respect are full of good purposes. However, each country and each region within the country, confront complex situations.

Though the countries of the region have good number of successful experiences in achieving the objectives mentioned before, these experiences have not achieved yet the necessary continuity in the time neither the coverage required, thus limiting positive experiences to isolated cases. The document explores the relationship between the difficulties the countries are facing, the successes achieved by some of them and, in some cases, the alternative solutions adopted by countries outside the region. The investigation is based on a series of documents presented in conferences, as well as in technical reports and an extensive revision of case studies.

10. Economic Commission for Latin America and the Caribbean-Inter-American Development Bank. ***"A Matter of Development: How to Reduce Vulnerability in the Face of Natural Disasters".*** ECLAC-IDB, March 2000. http://www.eclac.cl http://www.iadb.org

All things considered, the long-term effects of disasters seriously affect countries'prospects for development. This calls into question at least two aspects related to a country's development strategy: first, understanding that resources earmarked for preventing and mitigating the impact of natural phenomena are a very high-yield investment, both in economic and social and political terms, in line with long-term growth. Second, the spending actions and decisions that are taken once a phenomenon has arisen, must be seen from the perspective of reducing vulnerability. There is a close relationship betweenj the need to reduce vulnerability and the increase in the organizational and participatory capacity of communities, the private sector and the government. The publication includes an annex with data about the magnitude of damages and a typology of disasters and their impact in Latin America and the Caribbean.

11. Environment Canada. ***"Federal Water Policy".*** (available at http://www.ec.gc.ca/water/en/policy/pol/e_pol.htm). Canada. 2005.

Canada's new federal water policy calls for a radically new attitude toward the country's water – one that attaches real value to the resource itself. The policy also recognizes the need for a more open style of decision-making in this area. Because the public gains when policies work and suffers when they don't, it makes sense for the government to involve Canadians in every facet of water management. The water policy sketches broad courses of action that call for federal leadership, but other levels of government, industry and the public have important roles as well. The scientific, legislative and institutional approaches set forth in the document are not presented as panaceas. In all cases, Government will be guided by the report of the Inquiry on Federal Water Policy (the Pearse Inquiry), which submitted its findings in September 1985. The Federal Water Policy is a statement of the federal government's philosophy and goals for the nation's freshwater resources and of the proposed ways of achieving them. It recognizes that water is, at present, Canada's most undervalued and neglected natural resource. In no part of Canada is fresh water of sufficient quality and quantity that it can continue to be overused and abused in the way it has been in recent decades. The underlying philosophy of the policy is that Canadians must start viewing water both as a key to environmental health and as a scarce commodity having real value that must be managed accordingly.

12. Garcia, Luis E. ***"Integrated Water Resources Management in Latin America and the Caribbean".*** IDB Technical Study No. ENV-123, Washington, DC, December 1998. http://www.iadb.org

The document is organized in two parts and complementary annexes. Part One (Chapters I to IV) presents an overview of water resources in Latin America and the Caribbean (LAC), a summary of Bank financing in the water resources sector, a summary of situations and conditions that justify the shift to integrated water resources management in LAC, and the reasons for the Bank's involvement in support for that shift. Part two contains the Strategy for Water Resources Management of the Bank in four additional chapters and a summary. Chapter V includes the objectives of the strategy, Chapter VI contains the guiding principles, Chapter VII deals with well-known strategic instruments, Chapter VIII deals with the use of the main instruments and actions that the Bank will use to provide support and assistance for IWRM, and Chapter IX is the summary.

13. Garcia, Luis E., Enrique Aguilar, and Salvador Parrado. ***"Marco Conceptual de la Gestión Integrada de los Recursos Hídricos"*** Comisión Nacional del Agua, Programa de Modernización del Manejo del Agua (PROMMA), World Bank-World Meteorological Organization (WMO)-CONAGUA. Conceptual Document, January 2005.

This publication summarizes several positions about IWRM and proposals for its application in Mexico, to abide by the National Water Law (LAN). Its main purpose is to interpret the definition and mandate of LAN and translate them into practical applications within the responsibilities of CNA. It has two parts. The first one refers to the evolution of the concept of IWRM and the many definitions about it, presenting nine points around which its application in Mexico could be materialized. The second part uses the nine points and presents nine proposals on how to translate and apply the concept of IWRM to the Mexican realities. The document also reports on the results of an international workshop on the subject held in Mexico City, organized to enhance the document.

14. GWP, JICA, CCAD, MINAE. ***"Memoria; Foro Centroamericano del Agua: Avances, Retos y Desafíos para una Gestión Integrada. Hacia el IV Foro Mundial del Agua".*** San Salvador, El Salvador, 2004. http://www.gwpcentroamerica.org

This publication is the Proceedings of the Central-American Water Forum held in San Salvador in December 2004, as a preparatory event for the 4th World Water Forum. It summarizes the keynote presentations and describes the discussions and results of four workshops and two panels: Actions for an effective decentralization and participative governance; Investment models; Regional institutions; Policy and common principles for transboundary river basins and integrated water resources management; advances in the compliance of the Johannesburg accords regardin IWRM plans; Regional Water Resources Strategy; and Risk assessments. It also reports on twenty case studies. It ends with a section on general conclusions and perspectives for the 4th Forum.

15 Inter-American Development Bank. ***"Seminario Sobre Temas Estratégicos del Agua en América Latina y el Caribe–Agenda para la Acción"*** Anales del seminario de Fortaleza, Brasil, marzo 2002. IDB, Washington, DC, 2002. http://www.iadb.org

This paper contains the proceedings of the Seminar organized by the Inter-American Development Bank in Fortaleza, Brazil. The objectives of the seminar were to initiate the process and mechanisms in support to the region for financing the solution to the most pressing water resources problems. It also served the purpose of a preparatory event for the 3rd World Water Forum to be held in Kyoto, Japan the following year. There were three panels: Water resources problems and alternatives for their solution; governance and water resources management in Latin America and the Caribbean; and options and challenges for financing the Latin American and Caribbean Water Resources Agenda.

16. Inter-American Development Bank. ***"Strategy for Integrated Water Resources Management".*** IDB Strategy Paper No. ENV-125. Washington, DC December 1998. http://www.iadb.org

The goals of the strategy are to support water resources conservation through a process of change regarding water resources issues; namely, a shift from development to management and from a sectoral to an integrated approach following the principles of the Dublin Declaration. It focuses on principles and on the flexible appliaction of instruments on a case by case basis. The strategy is also envisioned as a continuum involving a succession of actions of diverse nature, that does not start or end with this paper. It started with a strategy development and consultation process, whose results are reflected in this document, and shall continue with an iterative implementation procedure, whose initial supporting actions are described in the document and whose results ought to be reflected and periodically evaluated in the field.

17. Inter-American Development Bank. *"Water and the Millennium Development Goals-Investment Needs in Latin America and the Caribbean".* IDB, Okinawa, Japan, April 6, 2005. http://www.iadb.org

This study was carried out with the purpose of assessing the overall investment needs of Latin America and the Caribbean by 2015, based on the assumption of meeting the Millennium Development Goals with regards to improving access to drinking water services and to better sanitation. The estimates calculated in this survey are preliminary and constitute the first overall and systematic assessment of the investment needs in water and sanitation required in order to meet the MDGs. Chapter I includes the description and interpretation of the MDGs for drinking water and sewage, an analysis of regionalization of Latin America and the Caribbean for the purposes of the study, and the definition of relevant variables. Chapter II realtes to drinking water supply. Chapters III and IV address sanitation services in the region's urban centers. Chapter V addresses equality as

long-term goal and the need to mitigate the deep regional imbalances suffered by some of the countries in the region. Appendix I focuses on the data sources and criteria used in order to lend consistency to the data quality and maximize its reliability.

18. Jouravlev, Andrei. ***"Administración del agua en América Latina y el Caribe en el umbral del siglo XXI"***. Series Natural Resources and Infrastructure No. 27. ECLAC. Santiago, Chile. July, 2001. (available at http://www.eclac.cl/publicaciones/RecursosNaturales/4/LCL1564PE/Lcl1564-P-E.pdf).

Over the last fifteen years, almost all the countries of Latin America and the Caribbean have undertaken great efforts to reform existing water legislation and existing institutional frameworks for water resources development management. In various countries this processes have already concluded, with different degrees of success, while in other are in full march. In spite of the differences that would be expected in a region like the Americas, the reforms have some common characteristics, such as the aspiration to establish an administrative system that facilitates integrated water resources management; the perception that the water resource management should be carried out through river basin organizations; the reduction of the role of the State; the displacement of the responsibilities of the State, passing from the responsibility of financing, execution and operation to the supervision, promotion and regulation of the activities of third parties; the decentralization of responsibilities toward local governments; the interest in utilizing economic and market instruments; and the incorporation of the private sector and the water users. The document analyzes the institutional changes that have been produced in the countries of the region: (i) for the integrated management of the water resources; (ii) for the management of water resources at the level of river basins; and (iii) for the provision of the water supply and sanitation services. The document summarizes the present situation and the relatively recent events around to those three aspects in Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Equator, The Savior, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, the Dominican Republic, Uruguay and Venezuela.

19. Jouravlev, Andrei. ***"Drinking water supply and sanitation services on the threshold of the XXI century".*** Series Natural Resources and Infrastructure No. 74. ECLAC. Santiago, Chile. July, 2004. Available at http://www.eclac.cl/publicaciones/RecursosNaturales/9/LCL2169PE/lcl2169i.pdf

The objective of this paper is to analyze the status of drinking water supply and sanitation services in the countries of Latin America and the Caribbean at the beginning of the twenty-first century. For this purpose, and for methodological reasons, the study is divided into two parts. The first section consists of an analysis of access to services and their quality. The coverage levels achieved in the region may be considered reasonable, with the possible exception of wastewater treatment, but there are still serious deficiencies in access to services, which disproportionately affect low-income groups and rural areas. The insufficient coverage and poor quality of the services not only have negative impacts on the health of the population but also affect the environment, the economy, foreign trade and the availability of water for various uses. The second section of the study contains an analysis of the reforms carried out in recent years by the countries of the region. Despite the inevitable differences in a region that includes very different countries, the reforms have shown many common features: institutional separation of the functions of sectoral policymaking, economic regulation and systems administration; extension and consolidation of the decentralization process in the provision of services; a general interest in promoting private participation; formulation of new regulatory frameworks; and the requirement, since the crisis of the 1980s, that services should move towards being self financing, and when that occurs, that subsidy arrangements should be set up for low-income groups. Lastly, some conclusions are drawn.

20. Jouravlev, Andrei. ***"Los municipios y la gestión de los recursos hídricos".*** Series Natural Resources and Infrastructure No. 66. ECLAC. Santiago, Chile. November, 2003. Available at http://www.eclac.cl/publicaciones/RecursosNaturales/3/LCL2003PE/lcl2003e.pdf

The last decades of the 20th Century have been marked in the countries of America Latin and the Caribbean by strong and conflicting processes of decentralization of diverse activities and competences to municipal level. In various countries, these processes are still on the way. As

result of such reforms, in many countries, the traditional municipal participation in the provision of water related public services has been consolidated, thus turning the Municipalities into important institutional users of the resource. This report considers the objective of contributing to the debate on decentralization that is being hat is carried out in region. The attention is centered in water management, in the modalities of its decentralization with municipal participation and its inherent limitations, and in the potential contributions of municipal governments, especially in connection with watershed management. The study is based on: (i) the revision of theoretical and empirical bibliography related to the participation of the local governments in the development and management water, and (ii) the answers to a survey applied to various local governments and experts by that ECLAC's Division of Natural Resources and Infrastructure.

21. Jouravlev, Andrei. ***"Water Utility regulation: issues and options for Latin American and the Caribbean"*** LC/R.2032. ECLAC. Santiago, Chile. October, 2000. (available at http://www.eclac.cl/publicaciones/RecursosNaturales/2/LCR2032I/LCR2032-I.pdf).

Since the eighties, for a variety of reasons - some budgetary, some political/ideological, some technological, some arising from pressures from abroad, and some grounded in economic theory - the governments of Latin American and Caribbean countries have been transferring many publicly-owned companies to the private sector. The issues to be confronted and options to be considered in developing an adequate regulatory framework for the water supply and sewerage industry in Latin American and Caribbean countries are the subject of this paper. It reviews a vast body of recent theoretical and empirical literature on economic regulation and private sector participation, including the experience of the countries where privatization and regulatory reforms have advanced most and its applicability to the countries of Latin America and the Caribbean. Emphasis is given to the implications of the asymmetry of information between regulator and regulated utilities as well as to the regulation of prices, service quality, investments, and diversification. The possible underinvestment problem arising from the limited commitment powers of governments and regulators, and the implications of the existence of separate regulators with different duties and powers are also discussed, as are the possibilities of introducing competition and facilitating regulation through horizontal and vertical restructuring.

22. Lemay, Michele H. ***"Coastal and Marine Resources Management in Latin America and the Caribbean"*** Technical Study N° ENV-129. Inter American Development Bank. Washington D. C. December, 1998. (available at http://www.mdb-egp.net/sds/doc/1097eng.pdf).

The document presents a coastal and marine resources management strategy for the Inter-American Development Bank (IDB). The strategy provides new directions for Bank activities which significantly affect sustainable development of coastal and marine areas in Latin America and the Caribbean. Calling for a renewed, more integrated approach, the strategy is intended to bring the Bank's interventions in aspects of sustainable development such as water transport and pollution control in line with the fundamental objectives of the 8th Capital Replenishment. Looking beyond these sectoral considerations, the strategy highlights new opportunities for lending and non-lending support in line with the distinct character of coastal and marine areas, their evolving regulatory framework, and the responsibility shared by governments and coastal communities in the Region to manage them. The principles, elements of innovation and actions which are at the core of the strategy are designed to fill a void in the Bank's existing policies in natural resources management. The document begins with an overview of the Region's coastal and marine resources, conditions, and trends in use. This is followed by a review of the main issues and underlying forces of coastal transformation in Latin America and the Caribbean. Globally accepted principles for coastal management and emerging policy reforms in the Region are introduced along with the shortcomings of traditional approaches. The document examines the Bank's own experience in financing coastal infrastructure, marine fisheries and coastal management operations. Finally, the core of the strategy is presented and actions are recommended in line with the fundamental goals of the 8th Capital Replenishment. The document concludes with instruments, resource requirements and constraints for applying the strategy in Bank activities.

23. Lord, William B. & Israel, Morris. ***"A Proposed Strategy to encourage and Facilitate Improved Water Resource Management in Latin America and the Caribbean"*** Environment Division, Social Programs and Sustainable Development Department. Inter American Development Bank. Washington D. C. March, 1996. (available at http://www.iadb.org/sds/doc/740eng.pdf).

Around the mid 90s it was anticipated that substantial percentage of the $40 billion of the Eighth Replenishment will be for operations in the water sector. The Eighth Replenishment identified key objectives for IDB operations in the coming years, including poverty alleviation, environmental protection and sustainability in resource use. Water projects were an integral component of IDB strategies in achieving these goals. This document provides some background for the formulation of water resources development guidelines that are based firmly on existing conditions in LAC countries, while drawing from the valuable experience gained in water resources management in the United States and Europe. Following an introduction the document presents key elements which should be part of a water resources management strategy: namely, goals, instruments, and a conceptual framework for evaluating and analyzing water resources management needs and opportunities. A distinction is drawn between ends and means in water resources management, and a structured problem solving approach is discussed. Various options for water management including: building and maintaining infrastructure, changing water management institutions, and augmenting human capital are presented. Later on, the document presents findings from country visits. Advances and existing short-comings in water resources management in LAC are discussed, and an evaluation of some of the measures being taken to address water resource problems is provided; this part draws heavily from interviews conducted in each country and is supported by supplementary documentation received during the visits and a brief review of current literature. The conceptual framework developed by the authors is then applied to the findings of country visits; from this exercise stem some possible strategies for improving water resources management in Latin America and the Caribbean to be developed by the countries themselves and international donor organizations. Some specific elements which might be included in such strategies are also explained.

24. Ministerio de Planificación Federal, inversión Pública y Servicios, Secretaría de Obras Públicas, Subsecretaría de Recursos Hídricos, Consejo Hídrico Federal. ***"Principios Rectores de Política Hídrica de la República Argentina... trabajando juntos para darle al agua una política de Estado"*** Buenos Aires, Argentina, August 8, 2003.

It describes the Federal Water Agreement and the fundamentals of a national water resources policy agreed between the Federal Government and the Provincial Governments. Includes 2 principles regarding the water cycle, nine related to water and environment, four to water and society, eight about water management, seven about water and institutions, four related to water and legislation, eight on water and the economy, and seven about water tools and mechanisms.

25. Querol, Maria. ***"Estudio sobre los convenios y acuerdos de cooperación entre los países de América Latina y el Caribe, en relación con sistemas hídricos y cuerpos de agua transfronterizos"***. Series Natural Resources and Infrastructure No. 64. ECLAC. Santiago, Chile. November, 2003. Available at http://www.eclac.cl/publicaciones/RecursosNaturales/2/LCL2002PE/lcl2002e.pdf

The report analyzes the current situation of regional cooperation related to the agreements subscribed by the countries of Latin America and the Caribbean, in relation to the transboundary water resources and water bodies. To such end, and by reasons methodology, the study is divided into two parts. A first section is dedicated to the analysis of the existing norms of international law in the matter. The existence of customary norms can be inferred from the analysis of current practices adopted by the States; in such cases, the doctrine has helped to the development and to the precision of said rules, which have been and continue to be applied by the jurisprudence. In the second part of the document, specific treaties of cooperation signed by the countries of the region are analyzed individually; six representative cases were selected and special attention was paid to the creation of permanent commissions responsible for the execution of the agreements, the mechanisms for the solution of controversies solution and the way of dealing with environmental aspects of transboundary water resources. Finally, some conclusions are outlined.

26. ***REGA***, Revista de Gestión del Agua en América Latina. Vol. 1, No. 2. Jul/Dic 2004. GWP South America. Santiago, Chile, 2004.

This volume of REGA includes the first of three sets of articles presented at the Water Resources Public Policies Seminar held in Brasilia, Brazil, in September 2004. These articles were selected for publication on the basis of recommendations made by at least two peer reviewers.

This volume starts with the "Letter from Brasilia", which approved principles of consensus about public policies in water resources among the participants to the seminar. The volume includes articles about regulation of water supply and sanitation services; water, development and public policies, the Chilean experience; water and health in the State of Rio de Janeiro, Brazil; analysis of the privatization process of urban water and sanitation services in Chile; water and conflict; a model for transboundary action for water resources conservation in the Merim Lagoon; and mechanisms for water management: command and control, social mechanisms, economics instruments, and voluntary adherence mechanisms.

27. Russell, Clifford S., William J. Vaughan, Christopher D. Clark, Diego J. Rodríguez, and Arthur Darling. ***"Investing in Water Quality–Measuring Benefits, Costs, and Risks"*** Inter-American Development Bank, Washington, DC, 2001. http://www.iadb.org

The Bank's Integrated Water Resources Management Strategy issued in 1998 suggests that an integrated, basinwide approach should be adopted to formulate wise water resource policies and develop cost-effective investment programs in the water sector. The knowledge and tools to do so are available, so the failure to take an encompassing view that can hold down the systemwide costs of maintaining acceptable levels of ambient water quality involves costly and serious deficiencies in focus and planning. This study shows how the general principle of integrated water resources management can be put in practice to develop cost-effective and beneficial programs that reduce water pollution in urban areas. It reviews a decade of IDB experience in the design and analysis of projects in urban water pollution control and describes the IDB method of choice. The study is primarily intended to provide guidance for engineers and economists involved in the economic analysis of large wastewater treatment projects.

28. Ruth Meinzen-Dick & Richard Reidinger. ***"Participation in Irrigation".*** Social development Papers. Paper No. 3. The World Bank. Washington D. C. February, 1995. (available at http://lnweb18.worldbank.org/ESSD/sdvext.nsf/60ByDocName/ParticipationinIrrigationSocialDevelopmentPaperNo3February1995/$FILE/SDP03.pdf).

The irrigation sector provides a rich source of farmers provide experience and lessons in user participation. Participation by farmers in system design and management helps to ensure sustainability of the system reduces the public expenditure delivery and improves efficiency, equity and standards of service. Mobilizing support at all levels and establishing the participatory process, however, involves costs; it also nothing to do with farmers motives knowledge of the incentives facing each group of stakeholders, and of the essential elements in building effective users' organizations. Fundamental in meeting all these conditions, a strong and transparent legal framework for the organization is needed from the outset, providing farmers with rights and benefits as well as duties and responsibilities. This framework should also be flexible enough to allow farmers to evolve their own organizational structure, and to permit the organization's responsibilities to grow in line with its capacity.

29. Savedoff, William and Pablo Spiller, editors. ***"Spilled Water– Institutional Committment in the Provision of Water Services".*** Latin American Research Network, Inter-American Development Bank, Washington, DC, 1999. http://www.iadb.org

Questions about the political-economy of the water supply and sanitation subsector are the core of the studies reported in this volume. It is oriented towards policymakers and researchers who are concerned with the water subsector. Those who recognize that Latin America's challenge in the next few decades is to design, promote, and establish new institutional frameworks that can break the strangeholds of the present and promote greater welfare in the future, will also find this work interesting. It has an introductory chapter on government opportunism and the provision of water, and describes five case studies: Reform efforts and low-level equilibrium in the Honduran water sector; Reform efforts and low-level equilibrium in the Peruvian water sector; Governance and regulation: decentralization in Mexico's water sector; Governance and regulation in Chile: fragmentation of the public water sector; and Governance and regulation: the tale of two concessions in Argentina.

30. Solanes. Miguel and Getches, David. ***"Prácticas recomendables para la elaboración de leyes y regulaciones relacionadas con el recurso hídrico"***. Informe de Buenas Prácticas No. ENV-127. Inter American Development Bank. Washington D. C. February, 1998. (available at http://www.iadb.org/sds/doc/1085spa.pdf).

This report about "Recommended practices for the elaboration of laws and regulations related to water resources" analyzes and clears the experience of the countries of Latin America and the Caribbean that have initiated legal reforms related to water resources management in the last years. The document elaborates about the disjunctive between, in one hand, elaborating a complete and thorough General Water Law, with the risk of getting into lengthy discussions and thus delaying their approval, many times indefinitely, and, on the other hand, elaborating a Draft Law containing some basic principles that are considered as necessary minimums to trigger a process of modernization and institutional reform for integrated water resources management. The authors consider this basic dilemma and after analyzing comparatively the form in which this issue is resolved in several legislations in and out of the region, offer a number of recommendations that are considered of general application. The report does not pretend to be a manual for the elaboration of laws, but a collection of experiences presented in coherent form, that can guide to those that are interested in the reforming of water legislations and those professionals of the countries of America Latin and the Caribbean whose field of activity relates to the integrated management of water resources as well as in matters concerning specific sectors of water use.

The intention of the document is to provide guidance specifically for those commissioning and executing technical assistance to governments interested in exploring the potential for reform involving the private sector (the target audience, therefore, includes transaction advisers including lawyers, economic reform advisers and water and sanitation sector professionals). The document assumes a fairly high level of knowledge of the general issues relating to private sector participation in infrastructure provision and focuses specifically on what might be needed to ensure that transactions deliver benefits to poor consumers (both present and future) as well as the better-off. Obviously this is a complex and highly technical subject; as the document has been developed the authors have striven to balance detail with clarity and maintain a degree of general applicability in the arguments that have been developed. The document does not contain a blue-print or off-the-shelf solution for would-be reformers, rather it provides some principles and guidelines which could be used as a cross-check to ensure that the transaction designers deal with the poor explicitly and sympathetically in each individual case. Neither does the document seek to advocate the involvement of private sector players; the intention is rather to show interested readers that the poor can benefit if the realities of their situation are understood and explicitly addressed.

31. Tortajada, Cecilia, Benedito P. F. Braga, Asit K. Biswas, and Luis E. Garcia, Editors. ***"Water Policies and Institutions in Latin America"***. Water Resources Management Series, Oxford India Paperbacks. Oxford University Press, New Delhi, 2003.

Efficient water management, in terms of quality as well as quantity, is not possible without functioning institutions, which must be responsible, in the final analysis, for the current status of the use of this resource in a national context. Latin America, the main focus of this book, is a geographical region where the challenges faced by the countries to ensure efficient water management are significant. The book includes papers that discuss and exchange information from practitioners, scholars, and researchers on the rapid institutional changes that have occurred in the region during the last ten years.

32. Tucci, Carlos M., and Juan Carlos Bertoni, Organizadores. ***"Inundaçoes Urbanas na América do Sul".*** Global Water Partnership-ABRH-World Meteorological Organization. Porto Alegre, Brazil, 2003.

This work is part of the Flood Management Program developed jointly by the Global Water Partnership and the World Meteorological Organization. It includes papers about floods in some of the countries and reports on several decision makers workshops that have taken place in South America on the subject of urban floods. The first part has chapters on urbanization, urban water resources, urban flooding and urban drainage. The second part deals with urban flooding and urban drainage in the following South American Countries: Argentina, Bolivia, Brazil, Paraguay, Peru, and Uruguay. The third part reports on a workshop for decision makers held in Santiago-Chile in 2001.

33. World Bank-PIAF. "***New Designs for Water and Sanitation Transactions. Making Private Sector Participation Work for the Poor".*** Washington, D.C. 2005. (available at http://www.wsp.org/publications/global_newdesigns.pdf).

This document provides guidance to governments for commissioning and executing technical assistance in the water and sanitation sectors. The areas of reform identified for pro-poor transactions include the design of flexible, legal and contractual frameworks. Recommendations are offered for designing pro-poor tariffs and targeted subsidies, with a focus on subsidizing access (e.g. water connections) over consumption. The publication also addresses the importance of timing the reform process so as to properly coordinate information collection, consultation and stakeholder engagement.

34. 4th Forum/IUCN. ***"Indigenous and Traditional Peoples and Protected Areas – Principles, Guidelines and Case Studies"*** (IUCN) Edited and coordinated by Javier Beltrán. World Commission of Protected Areas. Best Practice Protected Area Guidelines Series No. 4. UICN- 4th Forum-International, 2001. (available at http://www.iucn.org/themes/wcpa/pubs/pdfs/indig_people.pdf).

It is sometimes assumed that protected areas must be in conflict with the rights and traditions of indigenous and other traditional peoples on their terrestrial, coastal/ marine, or freshwater domains. In reality, where indigenous and traditional peoples are interested in the conservation and traditional use of their lands, territories, waters, coastal seas and other resources, and their fundamental human rights are accorded, conflicts need not arise between those peoples' rights and interests, and protected area objectives. Based on the advice in the protected areas management categories, on established 4th Forum and IUCN policies on indigenous peoples and conservation, and on conclusions and recommendations of the IV World Congress on National Parks and Protected Areas, the two organizations, 4th Forum and IUCN/WCPA, have adopted five principles and a number of guidelines concerning indigenous rights and knowledge systems, consultation processes, agreements between conservation institutions, decentralization, local participation, transparency, accountability, sharing benefits and international responsibility.