

# Network for Cooperation in Integrated Water Resource Management for Sustainable Development in Latin America and the Caribbean

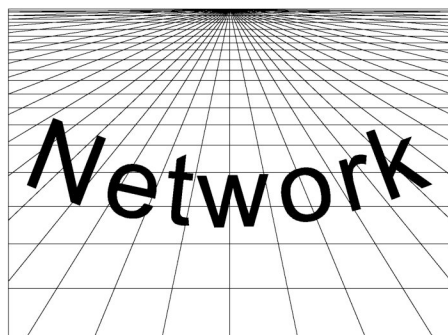


United Nations Economic Commission for Latin America and the Caribbean (ECLAC)

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## CIRCULAR N° 11

Improving the management of water resources is gaining an unusual prominence on Latin American and Caribbean government agendas, not only nationally but also at the state and local levels. The various effects of greater private sector participation in water-related public utility companies and in the management of irrigation systems, together with the decentralization of environmental management functions to the municipal level, including the management of river basins and streams, has generated increasing demand for information and technical assistance on this subject. This demand has been further boosted by the creation of numerous river basin organizations, or plans to do so, by debates on water law reform, and by the disastrous effects of flooding and increased water pollution.



While these situations and problems have actually been faced on a daily basis by countries and their governments both regionally and locally, there have been numerous meetings to discuss the issues, some of them motivated by the upcoming *Second World Water Forum "From Vision to Action"* and *Ministerial Conference* to be held in the Hague, the Netherlands from 17 to 22 March 2000, and others as a result of the situations mentioned above. These have resulted in a recognition of the need to increase efforts to provide support, which has also been requested by the many new players, such as municipalities, that have become involved in water issues.



In the previous issue of the Circular we began to present the paper "*El Código de Aguas de Chile: entre la ideología y la realidad*" (LC/R.1897, 30 March 1999) written by Axel Dourojeanni and Andrei Jouravlev. Recently this paper has been published as an article in the journal, *Debate Agrario*. In the previous issue, discussion centred on the water management system and water rights, and this one provides a more in-depth discussion of water markets.

### Water markets

The adoption of market criteria for water allocation in Chile has aroused great interest worldwide, although no exhaustive and detailed analysis has yet been made of the Chilean experience. The conclusions reached by the few studies that have been made suggest that it is important to remedy this situation. Clearly much more has been written on the current Chilean system than on any other previous system of water allocation adopted in any other Latin American country, but unfortunately the vast majority of these studies are of a theoretical and political type, with very poor or no quantitative underpinning whatsoever.

Since water is a scarce resource with an economic value, the ability to trade it is an important element in making sure it gets used in an economically optimal way.

Consequently, in principle, countries should allow the transfer of water rights both within and between sectors. It should be remembered, however, that the introduction of water markets in no way represents a blanket solution to every conflict that water management must solve. The market is but one of a series of management tools, and it needs to be appropriately designed and correctly used.

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The creation of a water market offers many potentially significant advantages, the main one being a better allocation of water in terms of economic return. Other potential advantages include the following: (i) the market will encourage water conservation, more efficient

water use and wastewater treatment, and it will rationalize consumption of the resource; (ii) it will confront — by setting an equilibrium price and making current and potential market participants aware of the possibility of buying and selling at that price if they so wish — water users with the opportunity costs of their water use and transfer decisions; (iii) by reallocating existing water supplies, the market will provide mechanisms to delay undertaking costly civil water works; and lastly (iv) it will offer a continuous incentive for the adoption, investigation and development of more advanced technologies for using and conserving water.

Of course these advantages will only be materialized insofar as the market approaches the competitive paradigm. The efficiency of competitive markets is based on many restrictive assumptions, and market failures (externalities, market power, etc.) raise the possibility that the transfer of water rights may be beneficial for the buyer and the seller, but inefficient from an overall economic, social and environmental perspective. To the extent that the conditions of the competitive paradigm are not satisfied, market prices will diverge from the true opportunity cost of water and will therefore neither convey precise market signals, not encourage efficient water use and transfer decisions.

In the situations of market failure, economic theory prescribes that governments should intervene to correct distortions and restore the necessary conditions for economic efficiency. As water markets tend to diverge considerably from the competitive model — mainly because of the external effects the transfer of water rights may cause — they should be regulated by the State. This has been confirmed by the experience of water markets in the west of the United States of America. The market can indeed act as an effective means of water allocation, but always provided it operates in an institutional framework capable of correcting the distortions that the nature of the resource inevitably generates, and thereby fulfilling the function of the State and civil society in safeguarding the public interest and the resource itself.

On the other hand, in general, there is no particular reason to expect that even a competitive market will necessarily lead to an equitable allocation of water resources or alter the distribution of income in a positive way. Usually it is users with greater economic resources and better access to financing — and not necessarily those that have the greatest capacity to employ water in its highest-value use — who buy water rights from those with less economic power. This means that even a competitive market can lead to the concentration of water in a few hands, with negative social and cultural effects in that

lower-income sectors or ethnic groups, whose cultures revolve around the use of water, sell their rights to economically more powerful sectors that are able to make highly profitable investments. If equity and other collective or social values related to water are an important part of public policies, some degree of government control is likely to be necessary.

The Chilean Water Code of 1981 suffers from significant shortcomings in these crucial aspects of regulation, so the results obtained so far have been contradictory. On the one hand, by not making water rights conditional on effective and beneficial use, or adopting alternative measures, the Water Code: (i) encourages speculation and hoarding; (ii) facilitates the use of water rights as an instrument of unfair economic competition and allows them to be used to exert market power in the markets for the goods and services that use water as an input, especially in the electricity sector; (iii) affects regional development; and (iv) promotes the transfer to private individuals of a public property of high economic, social and environmental importance, very often without any counterpart undertaking as regards increased investment in the short or medium term. As the regulation of externalities is weak and inefficient, there have been negative effects on the resource base, and on third parties and the environment.

On the other hand, there are acknowledged advantages that arise from the operation of water markets in areas involving users with good information and organization and flexible water infrastructure. In summary, a good water market needs an effective water management system. Under these conditions: (i) the market has facilitated a relatively fluid reallocation of water rights in areas undergoing urbanization; (ii) it has opened up an alternative source of supply to satisfy the growing demand for water from activities of great economic and social importance, thereby facilitating more efficient water use; (iii) it has played a role of some importance in mitigating the impact of drought by making it possible to concentrate available resources in the most productive and sensitive sectors; and (iv) the legal security of water rights has encouraged investment aimed at improving water-use efficiency, has led to a search for new alternative water sources and has also helped strengthen the autonomy of water user organizations.

The fact that the water market is practically the only economic instrument included in the Water Code, means that efficient water-use, the settlement of inter-sectoral conflicts and the achievement of other resource management objectives rely almost entirely on this market. So far the market has been relatively inactive, however, except for a few river basins mainly in the north of the country. It is estimated that

in rivers with a high degree of competition for water use, no more than 5% of water rights have been transferred from one user to another over a 10 year period, and 90% of such transfers have been from holders that were not making use of their rights to agents who were interested in using them. Some recent studies could raise these figures somewhat especially in agricultural areas on the outskirts of large urban centres.

In general, the low level of activity in the water market in Chile is not very surprising given that water market studies, both theoretical and empirical, suggest that they tend to be relatively small and inactive except in certain geographical areas with highly favorable characteristics. The main lesson for other countries is that water laws should not be confined to promoting a single water management tool, no matter how attractive it may appear, but should offer a wide and varied range of instruments and measures for carrying out effective water management.

The establishment of water markets requires new competencies and attitudes on the part of public administration, legal systems and water users, along with investments in systems of administration, vigilance, control and monitoring, information, data on water resources, the registration and regularization of water rights, and in improving systems of storage, distribution, transport and resource measurement. In brief, the technical, economic, managerial and legal requirements for an appropriately functioning water market are manifold, but it could be said that these prior requirements are basically the same as those needed for adequate water resources management. The implementation of a system of water markets that fails to meet these requirements will eventually result in serious social, environmental and economic problems and conflicts.

In practice the water market in Chile has revealed its vulnerability in these respects, since: (i) the institutional system for managing water resources has significant weaknesses; (ii) the available information is very scarce, fragmented and dispersed, and suffers from serious problems of quality and reliability; (iii) there are a large number of water rights that are not regularized, not registered or recorded in any public register and whose essential characteristics are difficult to discern; (iv) the Chilean legal system has been slow and ineffective; and (v) the available infrastructure is rigid and inadequate.

The failed attempts to modify the Water Code, and the results of its implementation suggest that it could be difficult, burdensome or impossible to reverse the situation that has been created. If an adverse situation arises, the government could be forced to compensate

holders of water rights — a complex and/or prohibitively expensive task — or expropriate them, which would probably be politically impractical, and if carried out would undermine investor confidence in the economy.

Consequently, it is essential that any decision to reform legislation on water resources should recognize that the changes to be introduced could basically be irreversible. If surprising results are expected or if one cannot be very certain that the content of any new law will fully achieve the expected goals, perhaps the more radical changes — such as the awarding of water rights with few conditions attached, the removal of certain faculties from the water management authority, the introduction of trading in water rights, etc. — should be carried out cautiously and under regulatory supervision, so as to minimize the chances of irreversible negative results. This could be done, for example, through pilot schemes in areas and river basins that voluntarily decide to implement innovative policies. In accordance with this criterion, a slow evolutionary process could be an advantage rather than a disadvantage.

The analysis carried out in this study leads to the following observations: (i) water resources management systems must respond to physical, cultural, social, economic and ecological characteristics of each region of a country and of its river basins in particular; (ii) the theoretical postulates underlying economic, social and environmental policies must take into account the characteristics mentioned above; (iii) water management amounts to handling conflicts between users and conflicts between users and the environment; (iv) there is a set of rules that must be respected in order to guarantee social, environmental and economic equity and efficiency; (v) mechanisms for the prevention and solution of water conflicts need to be created, such as arbitration and other similar types of negotiation, aimed at avoiding tedious and lengthy legal procedures; (vi) given the varied origins of conflicts it is essential that each hydrological system or river basin should be able to resolve such situations with the necessary flexibility and respecting the general legal framework; (vii) the most appropriate way to confront these conflicts is to establish water management systems at the river basin level for taking decisions in accordance with each situation; (viii) in general, water legislation should put greater emphasis on measures for preventing and resolving conflicts that on seeking and punishing guilty parties; and (ix) the water market and any other option for effectively allocating water for multiple-use will operate better the more these basic conditions are fulfilled.

*Axel Dourojeanni and Andrei Jouravlev*



The *Latin American water conference on water resources policies and management in the region* was held in Baranquilla, Colombia, from 6 to 8 October 1999, organized by the Universidad del Atlántico, Columbia. The main aim of the meeting was to generate a wide-ranging discussion on the different components of the structure and essence of water policies in Latin American countries and to define the basic instruments for managing their water resources. The debates centered around the following issues: water resources policies, water resources management, and education for integrated water resources management. The main basis of the discussions were the results and contributions made by the various seminars and meetings that had been held on water issues in the region during the first half of 1999.

In the meeting there were two separate sets of activities: conferences and panel discussions. On 6 and 7 October a series of conferences were given by specialists from international and regional entities, such as the Organization of American States (OAS), ECLAC, the Global Water Partnership, etc. Regional panels were held on 8 October.

Two relevant topics emerged at this meeting: (i) the importance of establishing the relation between continental river basins and the sea, for example, between the Magdalena River and the Caribbean Sea; and (ii) the importance of cooperation among teachers of university courses responsible for training professionals in integrated water resources management, and the importance of preparing textbooks on this topic.

The Natural Resources and Infrastructure Division of ECLAC presented three working papers: “*Institucionalización de acciones de gestión de cuencas*” and “*Las políticas hídricas: de la intención a los hechos*” by Axel Dourojeanni, and “*Mercados de derechos de agua y su regulación*” by Andrei Jouravlev. The first two documents will form part of the study entitled “*Gestión de cuencas y ríos vinculados con centros urbanos*” which is expected to be published in the near future.

The *first report* states that despite what has already been done, and despite the arguments that have been made in favor of coordinated activities at the river basin level, especially in terms of achieving management targets for multiple water use and river basin management, it is remarkable how the general deterioration of river basins and water continues to increase. The creation of water management organizations at the river basin level is a first step in achieving tangible targets to reduce the evident deterioration of water and its catchment areas. A detailed study of the demography of river basin organizations in the countries of the region reveals, however, that setting up these entities in their different variants is not an easy task. The report also observes that such organizations disappear as quickly as new ones spring up. The document is divided into five parts and two annexes:

- The first part analyzes the institutional variants for river basin management.
- The second part covers the history of the evolution of river basin organizations, both at the national and regional level, and examines the long road to their legalization.
- The third section deals with the institutional structures of river basin organizations at the national or federal level, and at the provincial, state and regional levels.
- The fourth part analyses the problems of creating and operating river basin organizations.
- The fifth section refers to the processes involved in river basin management, and identifies ten processes for shared management of river basins and urban centers, namely: awareness-raising; formation of alliances and agreements; legalization of functions; formulation of scenarios, assessments and hypotheses; operational consolidation of each water user; organization of management; formulation of working programmes; operation of shared water systems; conservation of water bodies, natural habitat and biodiversity; and pollution control, the restoration of water courses and areas around rivers, and the recovery of drainage capacity at the rural and urban level.
- The first annex presents the proposal made by the Natural Resources and Infrastructure Division for studying the advisability of creating a center or system to provide logistic support for the initiatives of programmes and projects for integrated river basin management in the countries of the region; and the second annex analyses the various river basin management modalities.

The *second report* states that it is common, in the official documents of the governments of Latin American countries, to find individual declarations on water policies which take into



account the feelings and spirit of people genuinely concerned for water resources. However, despite all declarations of good intent in water policies, assessments of the water resources situation in the region point to an increasingly deteriorated situation. It goes on to describe the trends in water management in the region, the forces governing water management and the instruments of water policy. The final chapter on the balance of the decade and future challenges, indicates that the 1990s have been very prolific in meetings and debates on water issues. It is also clear that this renewed interest in water management stems from an increase in the number of conflicts over a resource that is becoming increasingly scarce, and more and more polluted. In addition, the increase in electronic communication facilities between specialists on the topic has facilitated a larger flow of information and led to better quality results and proposals on water management processes. In most Latin American and Caribbean countries, however, management systems have still not improved enough to meet the challenges foreseen for the future, and more importantly, in some countries these management systems have actually deteriorated. This is due, at least partly, to certain constraints on the present current of reforms. Firstly, there is clearly a lag between the advance of privatization processes in water-related public services and the creation of water markets, on the one hand, and the formulation and implementation of regulatory frameworks and the organization needed for integrated water management, on the other. Unfortunately a trend can be discerned toward reducing the relative importance of water resources in the context of the general concern for the environment. The aim seems to be to manage the environment holistically without having shown the ability to effectively manage even one of the natural resources on the scale needed. Lastly, due mainly to a marked ideological bias, many proposals for reforming the institutional framework in the water sector display a lack of ethical vision with respect to water resources management. This produces a variety of results, such as a tendency not to respect the customary rights of indigenous populations and a failure to consider the social and environmental role of water, and a nearly total disregard for the technical and economic aspects needed for good water resources management.

The *third report* has been motivated by a widespread interest in many countries of the region to create the conditions needed for water markets to operate. The report explains the reasons for this interest in water markets and in economic instruments in general. It also deals with the following issues: (i) the design and structure of water rights; (ii) the regulation of external effects in market operations; and

(iii) complementary aspects between water markets and other management instruments, and the need for a gradual approach.

Further details on the conference are available at <http://www.uniatlantico.edu.co/confeagua/>. Copies of the papers presented by Axel Dourojeanni and Andrei Jouravlev can be requested from [ajouravlev@eclac.cl](mailto:ajouravlev@eclac.cl) or from the *Natural Resources and Infrastructure Division*.

### Provision and regulation of infrastructure services

From 23 August to 3 September 1999 the *first international seminar-course on the provision and regulation of infrastructure services* was held in Santiago, Chile. The event was organized by the Latin American and Caribbean Institute for Economic and Social Planning (ILPES), with technical cooperation from the Natural Resources and Infrastructure Division of ECLAC. The main aims of the course were to facilitate a structured exchange of national and sectoral experiences in the provision and regulation of infrastructure services and also help build up a regional stock of theoretical and practical knowledge on the subject.

The course consisted of teaching sessions in the morning, and evening sessions given over to presentations by participants, and case studies and lectures by special invited guests. The teaching part of the course consisted of three modules. In the first of these, the topic of providing and regulating infrastructure services was set in the framework of the current economic reforms which are collectively defining a new pattern of public intervention in the economy. This part also included a review of the political, economic and institutional foundations of public regulation, and provided a regional and sectoral overview of the breadth and depth of the changes taking place. The second module gave detailed consideration to the peculiarities of each sector, covering the areas of energy, telecommunications, drinking water supply and sanitation, and transport. In each case particular attention was paid to the current industrial organization of the sector concerned, to the scope of competition and regulation in each one, and to regulatory problems, both current and emerging. The final module again took up a global view of the issues dealt with, focusing this time on the institutional dimension. The accent was placed on interactions among state entities in encouraging competition and regulation, on the main guidelines for institutional design and on proven models for the division of tasks within the public institutional framework.

Information on the courses given by ILPES is available at [www.eclac.cl/Ilpes-Esp/indice.htm](http://www.eclac.cl/Ilpes-Esp/indice.htm).

### Workshop on water resources management and indigenous water rights

The workshop "*Manejo de recursos hídricos y derechos indígenas de aguas en la zona altoandina de Chile, Bolivia, Perú y Argentina: Propuesta de un programa de acción*" (*Water resources management and indigenous water rights in the high Andean zones of Chile, Bolivia, Peru and Argentina — proposal for an action programme*) was held in Arica, Chile, from 26 to 28 May 1999. The aim of the workshop was to identify research priorities to facilitate a more sustainable and equitable water resources management in the high Andes. Specialists from Argentina, Bolivia, Canada, Chile, Peru, Switzerland and the United States participated in the meeting, together with representatives from indigenous organizations in Bolivia, Chile and Peru. The working methodology entailed the following activities: (i) brainstorming the topic; (ii) characterizing the situation in each country, pointing out strengths and weaknesses; (iii) analysing and debating the issues requiring most urgent solution; and (iv) proposing programmes or lines of action.

The workshop report is available at <http://www.idrc.ca/minga/arica-document.html>.

## Future activities

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### Symposium on the Lerma-Chapala river basin

The first international symposium on the Lerma—Chapala river basin entitled "*The Lerma—Chapala Basin Evaluation and Management*" will be held at the Hotel Real de Chapala located in Ajijic on the shores of Lake Chapala, Mexico, from 10 to 12 April 2000. The symposium is intended as a way of bringing scientists together and integrating research projects on the Lerma-Chapala river basin. Its aims are as follows (i) to provide a discussion forum on river basins in general and the Lerma-Chapala river basin in particular; (ii) to disseminate the most recent progress made in technical, scientific and social knowledge related to the Lerma-Chapala river basin; and (iii) to promote an exchange of experiences and knowledge among professionals in the study and management of



natural systems. The symposium programme includes:

- a plenary session of presentations aimed at providing general overview of the Lerma-Chapala river basin, its problems and the actions implemented to resolve them;
- presentation of posters on each issue to be addressed;
- roundtable discussion on a variety of issues, including water resources management, water quality and the health of ecosystems, and social aspects; and
- summary and conclusions.

Additional information is available from:

Anne Hansen (pre-registration)

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Fax: +1 (52) 7 3194341

E-mail: ahansen@chac.imta.mx

WWW: <http://simposio.ram.com.mx>

### Argentine Congress on Sanitation and the Environment

The **11<sup>th</sup> Argentine Congress on Sanitation and the Environment** will be held in the city of Mendoza, Mendoza Providence, Argentina, from 10 to 12 May 2000. The congress slogan will be "*Tercer Milenio ... Es tiempo de convertir en acciones nuestros proyectos*" (*The third millennium ... time to turn our projects into action*).

Additional information is available from:

AIDIS Argentina

Av. Belgrano 1580, piso 3  
1093 Buenos Aires, Argentina

Tel.: +54 11 4381 5832/5903

Fax: +54 11 4383 7665

E-mail: [aidisar@aidisar.org](mailto:aidisar@aidisar.org)

WWW: <http://www.aidisar.org/11congreso.html>

### International Congress on Efficient Use of Water

The Engineering Faculty of the National University of Cuyo acting through its Hydraulics Institute, and the Mendoza General Department of Irrigation, are organizing the **International Congress on Efficient Use of Water**, to be held from 25 to 30 April 2000, in the city of Mendoza, Argentina. Two "chapters" have been scheduled, the first relating to improved water management, or the efficient use of the resource in meeting multiple demands; and the second will deal with the application of modern irrigation systems in their different forms, and in relation to their hydraulic, mechanical and electronic

aspects. For this purpose the following events are announced: seminar on efficient water use; seminar on technological developments for efficient water use; and exhibition of equipment and products.

Additional information is available from:

Facultad de Ingeniería — UNC  
Dpto. de Hidráulica

Centro Universitario — 5500 Mendoza  
Argentina — Casilla de Correos 405

Tel.: 54 261 4234448 ext. 2129

Fax: 54 261 4380120

E-mail: [ingamb@raiz.uncu.edu.ar](mailto:ingamb@raiz.uncu.edu.ar)

WWW: <http://fing.uncu.edu.ar/extension/cuea/>

### Dam Safety, Operation and Maintenance

The **International Technical Seminar and Study Tour on Dam Safety, Operation and Maintenance** will be held from 14 to 24 August 2000 in the United States. Bureau of Reclamation officials will provide the training for the seminar. The first portion of the seminar will take place in Denver, Colorado, and will consist primarily of classroom presentations and discussions. A tour of the Bureau of Reclamation Research Laboratories will also be featured. A study tour to Washington State will focus on the dam safety programme of the Bureau of Reclamation's Pacific-Northwest Region. During the study tour participants will visit several dams. Actual deficiencies experienced in recent years and remedial measures taken will be discussed.

The seminar is designed for managers, administrators, engineers, and geologists responsible for the design, construction, operation and maintenance, and safety of dams. Its objectives are: to provide an overview of the institutional and technical requirements of a successful dam safety, operation and maintenance programme; provide a model for establishing or improving a dam safety programme; increase the technical capabilities of those responsible for dam safety; and present procedures and demonstrations, through site visits, for conducting dam safety examinations and evaluations.

Additional information is available from:

International Affairs Team, D-1520  
U.S. Bureau of Reclamation

P.O. Box 25007  
Denver, Colorado 80225  
U.S.A.

Tel.: 303 445 2127

Fax: 303 445 6322

E-mail: [lprincipe@do.usbr.gov](mailto:lprincipe@do.usbr.gov)

### International Symposium on Integrated Water Resources Management

The **International Symposium on Integrated Water Resources Management** will be held from 9 to 12 April 2000, at the University of California, Davis, the United States. The main objective of the symposium is to provide a forum for technical and non-technical personnel to meet and discuss water resources related issues. Topics to be addressed include, but are not limited to: systems thinking and water resources; innovative water resources management; hydrologic extremes and related social issues; water science and its role in water management; integrated river basin planning; and integrated management of water quality and quantity with ecosystem protection.

Additional information is available from:

Prof. Miguel A. Marino

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E-mail: [mamarino@ucdavis.edu](mailto:mamarino@ucdavis.edu)

WWW: <http://conferences.ucdavis.edu>

### Millennium wetland event

The **Millennium Wetland Event** will be held from 6 to 12 August 2000, in Quebec, Canada. Its objective is to foster the understanding and sustainability of the world's peatlands and wetlands through promotion of positive interactions by the many stakeholders involved nationally and internationally in wetland and peatland science, policy, management, wise resource use and regulation. This event will bring together major global wetland and peatland meetings such as the **6<sup>th</sup> International Wetland Symposium** of the International Association of Ecology, the **11<sup>th</sup> International Peat Congress** of the International Peat Society, the **21<sup>st</sup> Annual Conference** of the Society of Wetland Scientists and the **12<sup>th</sup> International Symposium** of the International Mire Conservation Group.

Additional information is available from:

Millennium Wetland Event Secretariat  
Attention: Ms. Elizabeth MacKay

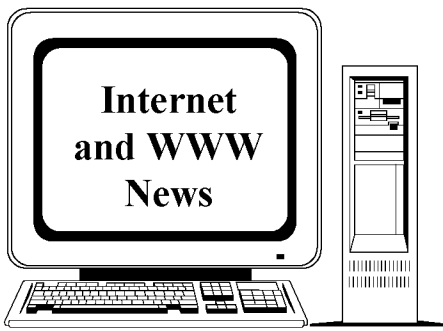
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Ste-Foy, Quebec, Canada G1V 2M2

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WWW: <http://www.cqvb.qc.ca/wetland2000/>



Internet sites worth visiting that deal with the management and use of water resources and related issues include the following:

- **Infoagua** (<http://www.infoagua.org>). This is a new website intended to serve as a meeting place for professionals, institutions, companies and associations devoted to preserving the aquatic environment in Latin American and Caribbean countries. It provides information on the following topics: water, what waste waters are, why waste waters need to be treated, how we pollute water, pollution prevention, environmental management systems, treatment of liquid industrial waste, waste water treatment, operation of treatment plants, auditing of industrial effluents, river basin management, bio-solids, privatization and concessions, clean production and ISO 14000.
- The United States Environmental Protection Agency (EPA) has created a website designed to promote **Community-Based Environmental Protection** (CBEP) (<http://www.epa.gov/ecocommunity>). CBEP is a policy framework that integrates environmental management with human needs, considers long-term ecosystem health and highlights the positive correlations between economic prosperity and environmental well-being.
- The **United Nations System-Wide Web Site on National Implementation of the Rio Commitments** contains country-by-country descriptions of social, economic, natural resources and institutional issues and related indicators (<http://www.un.org/esa/agenda21/natlinfo/index.html>). Of particular interest are the sections on agriculture, biodiversity, desertification and drought, freshwater, land management and oceans and coastal areas.
- The website of the **Public Works Department** of the **Ministry of Economy and Public Works and Services**, Argentina (<http://www.mecon.ar/serve.htm> and <http://www.mecon.ar/serv.htm>) contains several very useful documents in full-text versions, such as “*Catálogo de lagos y embalses de la Argentina*”, “*National Registry of Builders of Publics Works*” and “*Water and Sanitation Investments Opportunities in Argentina*”.
- The **Foundation International Center for Groundwater Hydrology** (FCIHS), a non-profit organization, is an offshoot of the Association International Course on Groundwater Hydrology set up in 1987 (<http://www.cihs.es/>). Its sphere of interest is hydrology, with special emphasis on groundwater hydrology and hydrogeology; its aims are: (i) to provide training in groundwater hydrology at Graduate, Master or Doctoral level; (ii) to organize scientific and technical meetings on the subject of groundwater hydrology; (iii) to carry out studies, projects and provide expert advice in the field of groundwater hydrology that may contribute to further knowledge in the field or support other research and teaching activities; (iv) to encourage studies, and research in the field of hydrology and hydrogeology; (v) to provide support, both technical and scientific, for institutions related to the use of water resources; and (vi) to publish information in the field of science and technology of groundwater resources.
- The **General Department of Water** (DGA), Chile, has prepared a national water policy document which contains the main guidelines and orientations it believes to be crucial in ensuring that water resources are used efficiently for the national benefit, with a future outlook that guarantees their sustainability over time. The paper is divided into six chapters as follows: scope of the document, policy principles and aims, the challenges facing water resources in Chile, the current legal-economic framework, analysis of the current situation and proposals, and final comments. The original document prepared by the DGA has been debated at several regional workshops, and the revised version together with conclusions reached at the regional workshops are available on the DGA website (<http://www.mop.cl/inter/dga>).
- The **Water Center for the Humid Tropics of Latin America and the Caribbean** (CATHALAC) was established in 1992 under an agreement between the government of Panama and the United Nations Educational, Scientific and Cultural Organization (UNESCO), with the aim of promoting research and cooperation among the countries of the humid tropics. The centre’s website (<http://www.cathalac.org/>) contains information on the following areas of interest: atmosphere-land-sea interactions; studies of hydrological processes; small islands; evaluation, management and conservation of water resources; knowledge, information and technology transfer; integrated urban water management; and water and public health.
- The **Inter-American Institute for Cooperation on Agriculture** (IICA) is the specialized agricultural agency of the Inter-American system. Its mission is to provide cooperation services in the pursuit of sustainable development of agriculture and rural areas, and to strengthen and facilitate inter-American dialogue. The IICA provides these services through its 34 technical cooperation agencies, its five regional centres and its central headquarters. Information on its activities is available at <http://www.iica.ac.cr/>.
- The **Coordination of People Affected by Large Dams and Water Transfers** (COAGRET) is an organization set up in 1995 to form a confederacy of communities, towns and people affected by large-scale water works in Spain — including works already carried out, and those under construction or at the project stage. Its website ([www.geocities.com/RainForest/Jungle/1839/](http://www.geocities.com/RainForest/Jungle/1839/)) contains information on its activities and on other interesting topics such as water conflicts in the Iberian Peninsula (classified by river basin).
- The **Consortium for the Sustainable Development of the Andean Ecoregion** (CONDESAN) is a partnership between the public and private sectors which under a common approach and a synergy of efforts, capacities and resources, carries out and facilitates joint actions in research, training, development and political initiatives which facilitate sustainable socioeconomic progress, with the aim of contributing to equity and welfare of the population in the Andean ecoregion. The consortium’s website (<http://www.condesan.org/>) contains information on its activities and an interesting library. Water-related studies that can be read directly online include the following: “*Análisis de opciones de desarrollo en la cuenca alta del Río Doña Juana — Victoria, Caldas, Colombia*”, “*El manejo del agua en la cuenca del Jequetepeque, costa norte del Perú*” and “*Hacia un desarrollo sostenible participativo en la cuenca del Río El Ángel*”.
- The website of the **Systemwide Initiative on Water Management** (SWIM) (<http://www.cgiar.org/jwmi/swimpb.htm>) has several very interesting full-text studies, including “*Accounting for water use and productivity*”, “*How to manage salinity in irrigated lands: a selective review with particular reference to irrigation in*



developing countries”, “Improving water utilization from a catchment perspective”, “Modeling water resources management at the basin level: review and future directions” and “Water harvesting and supplemental irrigation for improved water use efficiency in dry areas”.

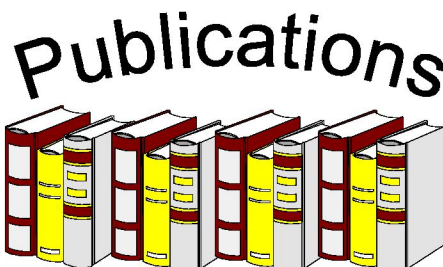
- The **International Association for Hydraulic Research** (IAHR) is an international non-governmental organization of engineers and scientists working in hydraulics and hydraulic engineering. Its mission is to advance applied and basic research on water-related issues and to contribute to the optimization of the world's water resources. The association tries to achieve its goals by a wide variety of international exchange activities and by offering a common infrastructure for the hydraulic research and engineering community. Information on the activities of its Latin American Division is available at [http://members.tripod.com/~iahr\\_lad/](http://members.tripod.com/~iahr_lad/).

- The **Sistema Permanente de Información de Saneamiento** (<http://www.enohsa.gov.ar/SPIDES/Spides.htm>) is a set of databases relating to the sanitation sector in Argentina. Information is organized in layers, and queries are structured by type: (i) urban areas (queries by locality, by provider and by service); (ii) rural areas (queries according to homogeneous provincial areas); (iii) provincial level (general queries and technical aspects); (iv) national level (general queries and technical aspects); and (v) providers (queries on sanitation service providers by jurisdiction, region, range of population, type of entity and others). The database currently covers about 81% of the entire population of the country.

- The website of the **Ministry of National Planning and Economic Policy** (MIDEPLAN), of Costa Rica, is a gateway to the **System of Sustainable Development Indicators** (SIDES) (<http://www.mideplan.go.cr/sides/>), which has the following aims: (i) to contribute to the diffusion of information to make it possible to extend and deepen the analysis of national development by the different social actors; (ii) to serve as a link between information producers and users; and (iii) to make progress in preparing aggregate indicators on sustainable development.

- The website of the **Information System on Drinking Water and Basic Sanitation in Colombia** (<http://www.sias.gov.co/>), contains information on the following topics: entities in the drinking water supply and sanitation sector, legal provisions of the sector, national inventory of drinking water

supply and basic sanitation (national directory of service providers, coverage of drinking water supply and sewerage services, physical infrastructure of drinking water supply and sewerage systems, commercial management of drinking water supply and sewerage companies, etc.); business modernization programme; public service providers (national and international), auctions, events and news, etc.



Recent ECLAC publications on water resources management in Latin America and the Caribbean:

- “**Debate sobre el Código de Aguas de Chile**” by Axel Dourojeanni (LC/R.1924), 30 July 1999 (available in Spanish only). This paper was presented by Axel Dourojeanni in the *first session of the roundtable on the sustainable use of water resources*, held in the Chilean National Congress (Valparaíso, Chile, 2 June 1999). The text of the original presentation has been improved by a number of contributions and analyses of the situation generated in Chile as a result of the implementation of the 1981 Water Code, together with suggestions for improving water resources management systems. It is expected to help readers understand the general complexity involved in legislating on water management. The debate ongoing in Chile has not yet been widely disseminated in countries of the region where legislative bills inspired by this code are currently being discussed. The debate on the Chilean Water Code is a good way to focus this complexity, which no country can avoid. It should be remembered that water management is management of conflicts in any part of the region, and that each place needs to establish its own rules of the game.
- “**La dinámica del desarrollo sustentable y sostenible**” by Axel Dourojeanni (LC/R.1925), 30 July 1999 (available in Spanish only). This document has been prepared for presentation at the *Fifteenth Venezuelan Conference on Earth Sciences* (Barquisimeto, Venezuela, from 30 November to 4 December 1999). The paper is intended to clarify the implications of sustainable development in the context of a triangle that relates social, economic and

environmental objectives (the conflict triangle). Particular reference is made to the linkages that exist between sustainable development and territory, and society's governance capacity over such territories. Reference is also made to the importance of interaction between the inhabitants of different areas in order to compensate and achieve better equilibria leading to sustainable development. Sustainable development does not refer to a tangible and quantifiable goal to be achieved in a given period of time, but rather to the possibility of maintaining a balance between factors that explain a certain level of development among human beings, a level that is always transitory, evolving and, at least in theory, should always lead to an improvement in the quality of human life. Sustainable development is thus the result of a set of decisions and processes which have to be carried out by generations of human beings, under ever-changing conditions and usually insufficient information, subject to uncertainties and with goals which are not shared by a population that is showing a growing trend to individualism.

- “**Informe del III Taller de Gerentes de Organismos de Cuenca en América Latina y el Caribe (Buenos Aires, Argentina, 16 al 18 de noviembre de 1998)**” (LC/R.1926), 3 August 1999 (available in Spanish only). This document contains a summary of the debates, together with the programme and list of participants of the *Third Workshop for Managers of River Basin Organizations in Latin America the Caribbean* (see Circular N° 9). The central theme of the workshop was the experience and evolution of river basin organizations in federal countries, experiences and progress in the creation of river basin organizations, the formulation of master plans and guidelines, and experiences of participation in water management. The report also contains an annex on Mexico's experiences in setting up river basin councils, and another one on the proposal by the Natural Resources and Infrastructure Division of ECLAC to analyse the advisability of creating a logistics center or system to support the initiatives arising from programmes and projects for integrated river basin management in the countries of the region.
- “**Tendencias actuales de la gestión del agua en América Latina y el Caribe (avances en la implementación de las recomendaciones contenidas en el capítulo 18 del Programa 21)**” (LC/L.1180), 17 August 1999 (available in Spanish and proximately in English). The aim of this document is to assess progress made by the countries of the region in

implementing the recommendations contained in chapter 18 of Agenda 21, entitled “*Protection of the quality and supply of freshwater resources: application of integrated approaches to the development, management and use of water resources*”, which was adopted at the United Nations Conference on the Environment and Development (Rio de Janeiro, 3 to 14 June 1992). The paper analyses progress made in the seven programme areas defined in chapter 18, namely: (i) integrated water resources development and management; (ii) water resources assessment; (iii) protection of water resources, water quality and aquatic ecosystems; (iv) drinking water supply and sanitation; (v) water and sustainable urban development; (vi) water for sustainable food production and rural development; and (vii) impacts of climate change on water resources. In general it can be said that those responsible for water resources management in the countries of the region show interest in adopting a set of standards aimed at applying integrated criteria for the development, management and use of water resources, as set out in chapter 18. However, while significant progress has been made, in most cases systems of water management and use have not yet improved enough to achieve this goal. This is the third document prepared by the Natural Resources and Infrastructure Division to appraise the progress made by the countries of the region in implementing the recommendations contained in chapter 18. It complements the previous papers, entitled “*Agenda 21 and integrated water resources management in Latin America and the Caribbean*” (see Circular N° 2) and “*Progress achieved by the Latin American and Caribbean countries in the implementation of the recommendations made in chapter 18 of Agenda 21 on integrated water resources management*” (see Circular N° 4).

- “*Report on the Second Workshop for Managers of River Basin Authorities in Latin America and the Caribbean. Santiago, Chile, 11-13 December 1997*” (LC/R.1802), 1 September 1999. Translation into English of the document “*Informe del II Taller de Gerentes de Organismos de Cuenca en América Latina y el Caribe*” of 12 February 1998 (see Circular N° 8).
- “*Servicios públicos y regulación. Consecuencias legales de las fallas de mercado*” by Miguel Solanes (LC/L.1252-P), September 1999 (*Serie Recursos Naturales e Infraestructura* N° 2) (available in Spanish and proximately in English). This paper is a revised and updated version of “*Servicios públicos y regulación*” (LC/L.1203) of 10 May 1999 (see Circular N° 10).
- “*El Código de Aguas de Chile: entre la ideología y la realidad*” by Axel Dourojeanni and Andrei Jouravlev (LC/L.1263-P), October 1999 (*Serie Recursos Naturales e Infraestructura* N° 3) (available in Spanish only). This paper is an updated version of “*El Código de Aguas de Chile: entre la ideología y la realidad*” (LC/R.1897) of 30 March 1999 (see Circular N° 10).
- “*Propuesta de reingeniería del CAPRE, tendencias y desafíos del sector de agua potable y saneamiento*” by Luis Leal, Mauricio López and Braulio Serna Hidalgo (LC/MEX/L.408), 20 October 1999 (available in Spanish only). The highest authorities of the Regional Coordinating Committee for Drinking Water and Sanitation Institutions of Central America, Panama and the Dominican Republic (CAPRE), in agreement with the general secretariat of the Central American Integration System, asked ECLAC to prepare a study for restructuring the

committee, with help from the Pan-American Health Organization (PAHO) and the German Technical Cooperation agency (GTZ). This would cover normative and functional aspects, along with adjustments in response to the changes the sector is currently undergoing. The report is divided into four parts. The first contains a proposal for the restructuring of CAPRE, including an examination of possible alternatives and new proposals relating to mission, vision, objectives and functions. The second part analyses the main problems, constraints and challenges facing the drinking water supply and sanitation sector. The third presents an analysis of the current organization, operation and recent performance of CAPRE, together with an analysis of the strengths, opportunities, threats and weaknesses of the organization. The fourth part analyses current trends for change in the sector with respect to privatization, municipalization and decentralization and the institutional separation of regulatory and operational functions. The proposal involves three stages: reactivation, consolidation and permanent operation. Special consideration is given to the financial autonomy of the organization. For that reason, a scheme of financing is presented at the end with an estimated expense budget, based mainly on the quotas paid by members and the ongoing sale of services. The report concludes with a proposal of the rules of procedure for the functional strengthening of CAPRE.

The publications of the Natural Resources and Infrastructure Division are available in two formats: (i) as printed documents, individual copies of which are distributed free of charge by air mail, and (ii) as electronic files distributed over the Internet as “attachments”. Requests may be sent to [ajouravlev@eclac.cl](mailto:ajouravlev@eclac.cl) or to the *Natural Resources and Infrastructure Division, CEPAL, Casilla 179-D, Santiago, Chile*.

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