

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

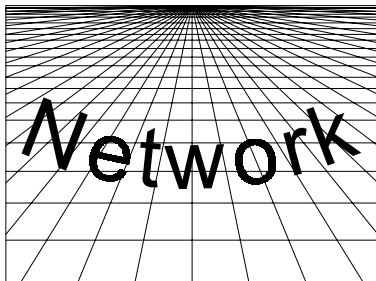


United Nations Economic Commission for Latin America and the Caribbean (ECLAC)

N° 7 February 1998

## CIRCULAR N° 7

This year we are once again confronted with El Niño. When, as in this case, such phenomena are very intense, many normally dry areas often experience torrential rainfall and floods, while areas that are usually wet suffer from drought. The effects of El Niño have already been strongly felt in Chile, Ecuador and Peru, and other countries are expected to be hit when the phenomenon reaches its peak.

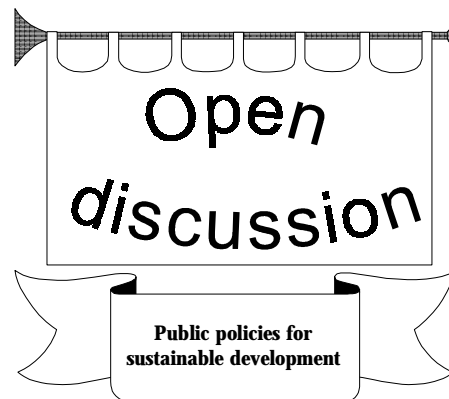


Policy makers in the area of water management have a number of options available to them for dealing with the effects of climate shifts, whether these are caused by El Niño or not. The most common strategies employed include postponing decisions until such time as no additional information is available, introducing flexibility in the design and operation of physical works, incorporating safeguards or providing for contingencies in their design, carrying out investments with a view to increasing the water supply and implementing regulations to restrict demand. The experience of the countries of Latin America and the Caribbean, as well as countries in other regions, shows that although such strategies may alleviate the situation in the short run, they are an inadequate response to climate change.

Perhaps the most important regulatory aspect of coping with the uncertainty generated by changing climatic and economic conditions is the need to create and implement mechanisms that allow for a more flexible water allocation. In particular, the introduction of property rights over water, the setting up of

a market for their voluntary transfer and the adoption of marginal cost pricing are examples of the kinds of institutional response required.

Since water use is sensitive to price, price provides signals and incentives for conserving water, adopting appropriate technologies, developing new sources of supply and allocating limited supplies among competing uses, in accordance with variations in climate. The correct functioning of the market mechanism is the only means of ensuring that scarce resources are allocated efficiently and that distribution is adjusted in line with changing availability and needs.



In the previous issue, we began our presentation of the document entitled "*Políticas públicas para el desarrollo sustentable: la gestión integrada de cuencas*" (*Public policies for sustainable development: integrated river basin management*) (LC/R.1399, 21 June 1994). The discussion in that issue centred on the classification of the different approaches to the issue of river basins and trends in integrated river basin management in the countries of Latin America and the Caribbean. In this issue, we shall discuss in greater depth other contributions that the document makes to the issue of river basin management.

### Functions of a river basin organization

The management of coordinated actions to achieve various types of goals at the river

basin level is normally undertaken by river basin organizations known variously as authorities, agencies or committees. The scope of the organization depends on the objectives it is set: these may range from regional development, to natural resource management or multi-purpose water management. Irrespective of the organization's level of coverage, ideally consideration should be given to environmental, social and economic aspects. Accordingly, the philosophy that determines these organizations' functions should be based, among other things, on:

- **Water/environmental criteria**, i.e., it should be designed on the scale of a hydrological unit and establish as a principle respect for the environment and its physical and environmental dynamics.

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- **Social criteria**, any negotiations which take place between actors and users of the river basin should seek to foster equity and minimize conflict, as well as provide for the safety of the inhabitants.
- **Economic criteria**, to promote economic growth through the efficient use of the river basin's natural resources.

Before defining the functions of a future river basin organization, it is necessary to identify which organizations individually and collectively administer the river basin's water resources at present, and how efficiently they perform this task. Then it is necessary to ascertain how reassigning some or all of these functions to river basin organizations could enhance water management. Only a limited number of functions related to water management should be assigned directly to the river basin organizations. The important thing is that river basin organizations should neither replace nor duplicate the functions performed by other institutions; in addition, they need to show profitability from the social, economic and environmental standpoints.

**Coordinating function:** the river basin organization should serve as a "coordinating forum" for water resources management using water/environmental criteria. *The extent of the organization's executive power*, i.e. its rights and responsibilities, *should preferably be stipulated in the water law*. In carrying out its duties, the new organization should respect those organizational and functional multi-purpose water management structures already in existence that operate efficiently.

**Administrative function:** in order for the river basin organization to accomplish its administrative functions, it is vital that the law require *internal administrative regulations* to be drawn up for each of them.

**Allocative function:** if the river basin organization has the power to allocate functions and responsibilities to other bodies or users with a view to improving multi-purpose water use, the law should state exactly how this is to be done. In order to gain the users' commitment, *the legislation in force should provide for and facilitate their participation in water resources management*, since clearly not all actors will be willing to submit to rulings by a river basin organization and will thus oppose the creation of such an organization at least initially.

**Consultative function:** aside from its coordinating role, the river basin organization should be able to provide advice to other bodies involved in water management at the river basin level which so desire, as well as undertake specific studies. One essential aspect

of this function consists in providing the agency responsible for *granting water use rights* with information on the water balance in the river basin.

**Monitoring function:** the river basin organization should be charged with monitoring water courses in the river basin from their source, over their entire length, and in respect of all their uses. This requires the existence of *standards in respect of water quality and quantity* which serve as the legal framework for the task of monitoring compliance. Standards and regulations will only be observed if, in addition, *arrangements to penalize non-compliance* effectively have been put in place.

**Arbitration function:** since the river basin organization is a coordinating body with participatory management, it is also considered to be the most appropriate entity for acting as arbitrator in disputes that arise between actors over water use, as well as for preventing disputes.

Public entities in charge of water management have at their disposal a simple method for initiating the organization of activities. All they need do, in the case of each river basin, is set up a centre devoted solely to gathering all available information on studies made of the river basin, maps and other existing documents, to which the general public can then have access. In this manner, both users and the general public can significantly increase their participation in water management, without the need for substantial expenditure or a rearrangement of the functions performed by already existing organizations.

The initial task may simply consist of facilitating the coordination of water management initiatives in the river basin, without attempting to modify the duties of each organization currently responsible for managing the water resources of the basin. This coordination process should help identify (i) the areas of activity for which no one has responsibility; and (ii) whether the authorities charged with performing a particular task are properly trained and equipped to do so.

#### **How can the failure of water resource and river basin management processes be prevented?**

Attempts to establish water resource and river basin management systems usually fail because proposals for the creation of the pertinent organizations, whether in the form of authorities, agencies or any other body, are presented in a relatively superficial manner. Generally the aim is to give systems a holistic focus. Hence they should: (i) be economically

efficient, self-sustaining and competitive; (ii) have a social orientation, promote social equity and be environmentally responsible; and (iii) involve both public and private sectors, provide for civic participation and take a conciliatory rather than an authoritarian approach. In essence, the objective is to create a superior body responsible for fostering sustainable development.

Experience shows that the creation of any organization that performs at least some of the basic functions, such as preventing, reducing or solving disputes among water users, should be a gradual process. The initial step should be to gather information on: public policies in regard to water resources and the economy; the features of water resource and river basin management; the characteristics of water management systems and the actors involved; and the most appropriate methods of operation for public or private organizations responsible for managing water and natural resources in a river basin.

Viewed from this perspective, it may be very useful to analyze policy declarations in terms of a methodological sequence which seeks to direct management procedures towards sustainable development (see Circular N° 2). It is suggested that in order to execute actions, it is necessary to:

- identify the actors involved in the management process;
- analyze the actors' criteria (policies, principles, etc.);
- identify any problems relating to these criteria;
- identify what the actors' objectives are;
- define the spheres within which it is hoped to attain these objectives;
- identify constraints on the attainment of these objectives;
- propose solutions for overcoming these constraints;
- decide on the strategies to be applied in order to achieve solutions;
- design programmes and projects for carrying out the selected strategies and evaluate them; and
- execute both one-off and ongoing programmes and projects.

In accordance with this sequence, policy formulation takes place mainly at the stage when criteria for action and the actors' objectives need to be specified. These criteria are for the most part declarations of intent. By contrast, policies for executing actions can only be formulated once the solutions and strategies have been designed. Thus, water policy formulation needs to be undertaken step by step, in a systematic way, so as not to overlook aspects critical to successful implementation.

Water policy formulation in the countries of the region has seldom been carried out in a rigorous way. Generally speaking, policy formulation is ad hoc, and does not follow any established procedure. Water policies in the region have at various times emphasized the preparation of plans, the formulation of laws, the creation of new entities, and so on. However, it is a matter of concern that the vast majority of these proposals are not properly harmonized. The measures taken in this context are piecemeal, their objectives limited to, for example, avoiding inconsistency with an economic system, reinforcing other laws, mitigating specific conflicts that arise from time to time among users, satisfying the demand of certain groups of voters or facilitating a particular decentralization project. In such circumstances, the water policies formulated are normally incomplete. For example, decentralization in some countries has led to profound contradictions between development policies and water policies, with the result that river basin organizations attached to the central government sometimes find themselves subordinate to two or even three authorities, because the river basin under their control has been divided by regional boundaries.

Water policies should fit neatly with national development policies, but it should also be pointed out that both water resources and processes to develop them have certain features which, if neglected, give rise to huge contradictions. The unique features of water as an economic resource demand, if not a dominant role for the State, at least joint management by the State and users of supply at the river basin or interconnected system level. This is the only way to resolve any conflicts that may arise, to make resources available to deal with shared problems and to control externalities, natural monopolies and other aspects that require regulation.

Because the consequences of water management policies in force are often unknown, it is difficult to come up with way to improve them. In other words, if there is a lack of information about how water development policies are currently working (causes and effects), it is hard to decide what to do to make them more effective. Many countries do not maintain an up-to-date register of laws dealing with water resources and watershed management. Countries also sometimes lack a register of users of river basin or water systems, as well as an inventory of studies on each system or of investments made in hydraulic-engineering works in each basin. It is not known to what extent policy declarations and official rulings on functions are implemented in practice. A large number of government agencies do not have sufficient resources to perform the tasks they are set. Up

till now, most water policies that stem from changes in economic policy remain little more than declarations or policies of intent. In many cases, without any deeper analysis, policies of intent have become laws of intent, and this has generated serious gaps, especially in terms of instruments to implement the laws. In several cases, the spirit of the policy bears little relationship to the provisions of the law or to the results it achieves.

#### **Procedures for creating a river basin organization**

*Despite all the arguments in favour of integrated river basin management, or at the least water management at the river basin level, it is clear that the countries of the region still face sizeable obstacles to the creation and operation of water or river basin organizations.* Proposals along these lines still encounter stiff opposition, often due to rivalries between different agencies or because of conflicts with regional laws and authorities. Even many of the organizations that have been in operation for quite some time face strong opposition.

Probably the most important factor that slows the creation of river basin organizations or hampers their operation is the lack of clarity about their roles (which generates sources of potential competition with other authorities), their economic viability and the methods which will be used to fund them. It appears that proposals sent to legislatures or debated in public are not sufficiently detailed. Most proposals formulated by the executive fail to specify sources of revenue, ways in which the actors should participate, the costs and benefits involved, the role of the public and private sectors, adjustments that may be introduced for a particular category of river basin, feasible investment programmes and the form that dealings with national and regional authorities should take. All this casts doubts on the viability of the proposals.

*It is possible to conclude that only limited tangible results have been achieved in the field of integrated river basin management and in the administration of the river basin or at least its water resources.* The gradual deterioration of water quality, the degradation of soil and vegetation in river basins, the overexploitation and pollution of groundwater and the general lack of control over water supply in river basins all provide evidence that integrated river basin management is not practiced.

*Initiatives in the management area aimed at improving the supply and quality of water are more often due to individual groups of users than to any authority.* Spontaneous coordination efforts are also undertaken in the face of catastrophes such as floods or droughts

but there is generally no traditional approach or school of thought with respect to the issue despite all the progress achieved.

The likelihood of finding positive solutions is even further complicated by the lack of economic data on the value of water use or of historical records on water management in each country, the dearth of information on the growth of conflicts over water development and the lack of clarity with respect to the roles of the different actors involved in water use, including government river basin management agencies, and inadequate knowledge of their true ability to act.

*A large number of river basin organizations will be created in the region in the near future.* This means there will be huge demand for training and cooperation activities to put them into operation. At present, there is little material available; in order to rectify this situation, it will be necessary to produce teaching materials similar to those currently being prepared with the aim of improving the management skills of municipalities and local governments. Today governments must rise to the task of advising a huge number of river basin organizations all at the same time, enabling them to equip themselves, even in a private-sector environment, with staff, communications systems and operations and control systems.

The most obvious strategy for creating river basin organizations, in view of the evident initial lack of resources, *is to set them up on a step by step basis.* To that end, a number of principles can be followed, some of which are listed below:

- Begin by creating *water management organizations* rather than river basin organizations. The functions of *river basin organizations* are broader and are more difficult to reconcile with those of regional development authorities. Water management organizations are restricted to administering water resources and natural resources associated with the river basin's water resources, so have fewer conflicts over spheres of competence with national and local authorities.
- *Water management organizations should, therefore, have responsibility only for multipurpose water management* and natural resources management, for the purposes of protecting and conserving water quality and containing extreme phenomena. In practical terms, they should administer the supply of water resources in the river basin.
- Water management organizations should be created gradually, under the terms of a general law, in such a way that energy and scarce resources are concentrated in the task of organizing users in a number of high-

priority river basins, while experience is built up in this field.

- *Water users should from the outset have a hand in designing the water management organization to which they belong.* The water management organization should be comprised of the users themselves along with local and central government representatives and should be assisted by a technical support team employed on permanent contract and which acts as secretariat.
- The State may start by organizing a relatively small water resources management system with the above-mentioned characteristics for priority river basins; however, from the commencement of operations, such a system should be able to rely on a fixed source of income, such as a land tax.
- This organization, which may be called either an agency or an authority, *should seek to ensure that the users organize themselves according to the watercourse or channel from which they draw, to register them as users and potential members of the board or committee overseeing the water resources of the river basin* and to become eligible for technical support and loans.
- It is necessary to determine the exact nature of the relationship between the water management organization and the regional and local authorities.
- The role of municipalities or districts in water management in each locality should be clearly established, and functions and resources assigned to them.
- *The regulation of users, with reference to water volumes, quality, location, regime and other factors, may be undertaken by private consultants, experts and lawyers, who are duly trained and accredited by the State.* The regulation of current water uses should be a precondition for the granting of water rights.
- Using the funds it collects, the water management organization should, in coordination with the public and private sectors, *equip the river basin with systems to measure water quantity, quality and frequency*, undertake studies and give users assistance in technical and financial matters.
- *Decisions concerning special charges and investments should be made by users' representatives and other members of the river basin board.* As measurements of water quality and quantity become more complete, it will be easier to determine forms of collection, the level of payment for pollution and the allocation of costs and benefits in each project.

#### Future tasks

This discussion can be considered as an introductory essay on the topic of public policies for fostering sustainable development through river basin management. The next task

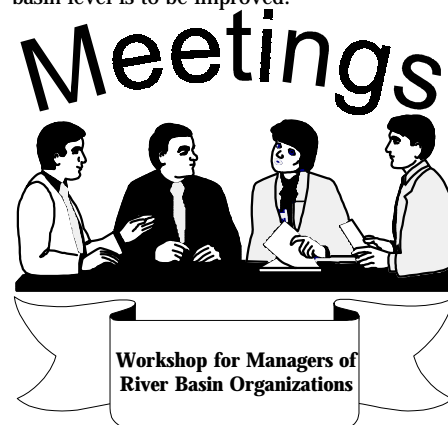
will consist of analyzing, expanding on and consolidating aspects that are still being debated, such as:

- Formulation of policies on the granting of "water rights" as a means of promoting water markets; in other regions, water resources are increasingly being seen as public property, with the trend being to manage them using a more community-based approach for the benefit of *all* users and not just the holders of "water rights".
- Definition of the respective roles of the State and the private sector in the management of natural resources, particularly water resources. Of particular importance are the strategies for the transfer to private users of water management tasks traditionally carried out by the State, bearing in mind that many users are still disorganized and lack an integrated river basin management culture.
- Definition of the way in which river basin entities will be organized in areas where the population of the river basin is largely marginalized, informal and poor, and lacking both traditional organizational structure and property rights.
- The economic and financial rationale and the identification of sources of financing for undertaking, at a minimum, coordination activities among the users of water resources in a river basin. It is important to note that water resources management at the river basin level, if performed properly, is a complex task. River basin organizations must therefore be assured of the continuity of their actions, particularly as regards technical staff, who must be suitably trained, well paid and sufficiently well equipped to carry out their functions.
- The process of identifying decentralization and regionalization mechanisms, as well as expanding the roles and skills of municipalities, remains at an early stage in many of the countries of the region. Water management organizations at the river basin level are dependant on whether the regional and local authorities are organized to participate in river basin committees.
- There is still no clear differentiation made in respect of "water management systems" at the national level. Currently there are no true "water resources associations or higher councils" operating at the national or local levels. The roles of organizations overlap and interagency coordination is plagued by serious problems. All this makes it difficult for river basin organizations to operate, as do loopholes in the law and disputes over budgetary authority. Consequently, it is necessary to clarify each institution's role in water management at the national and regional levels.
- In order for river basin organizations to function, various institutions need to work efficiently. The comptroller's office, the

judiciary, the police, the civil defence organization and the banks are just some of the exogenous actors that could be mentioned in this connection. Where such institutions are marked by inefficiency, a lack of resources or corruption, each river basin organization must take action directly or insist that each institution perform its functions properly.

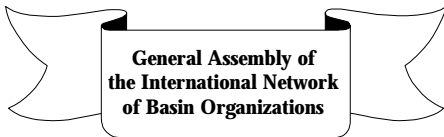
- Another key aspect is the need to standardize and update registers of water users along with measurement and assessment of water use. Until registers are updated to show allocation of water rights as well as information on water measurement and distribution systems, little can be done to improve the distribution and regulation of water quality; it would be worse still to grant water rights in the absence of such information.
- Many other issues need to be addressed, including: ways to respect the traditional water management systems of long established indigenous communities; methods of involving new districts in water management tasks; the possibility of setting up municipal watershed systems; the overhaul of training programmes on the topic of river basin management; and, in general, the need to exchange experience on legal, economic, scientific and social matters.

These issues deserve to be taken up and debated in the appropriate forums. They are just some of the aspects that need to be resolved if water management at the river basin level is to be improved.



**The second Workshop for Managers of River Basin Organizations in Latin America and the Caribbean** was held from 11 to 13 November 1997 at ECLAC headquarters. The workshop, which was organized by ECLAC and the Ministry of Foreign Affairs of France, was attended by some 50 experts from 14 countries in the region. The aim of the workshop was to study the legal, institutional and financial aspects of creating and operating river basin organizations, in order to review the experiences gained and facilitate its application in the region. The emphasis was on drawing up technical specifications and designing

procedures for the creation and operation of river basin water management organizations. The next issue of the Circular will include information about the discussions held at the workshop, as well as its main conclusions and recommendations.



**The second General Assembly of the International Network of Basin Organizations (INBO)** was held from 2 to 4 October 1997, in Valencia, Spain. The Assembly was attended by 94 delegates representing 61 member organizations in 26 countries.

INBO was formed in 1994. Its main aims are to promote the exchange of information and experience among agencies and organizations interested in river basin management; to promote cooperation programmes; to participate in the international dialogue on rational water management and integrated management of large river basins; to encourage the development of institutional management tools, databases and simulation models; to promote cooperation and training activities; and generally promote training programmes. Member bodies include basin management organizations, government water management agencies and bilateral and multilateral cooperation agencies involved in promoting activities that take account of river basin dynamics.

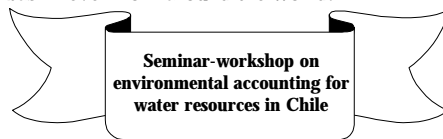
The General Assembly noted that 102 organizations from 42 countries were involved with INBO either as members or observers. **Mr. Juan Manuel Aragonés Beltrán**, who is currently President of the Confederación Hidrográfica del Júcar, was appointed as **the new President of INBO** until the next General Assembly, scheduled to be held in San Salvador de Bahía, Brazil from 2 to 4 December 1998. Delegates were informed about: (i) the French initiative to organize, at the ministerial level, a **World Conference on Water Management**, to be held from 19 to 21 March 1998; (ii) publication of the **Network Newsletter** and plans to organize discussions on the Internet in 1998, particularly on issues already addressed by INBO, such as financing of basin organizations, information required for decision-making, and the formulation of master plans for better multi-purpose water use; and (iii) the **AQUADOC-INTER** project, a system for disseminating information on the Network among INBO members.

Approval was given in principle for INBO to organize the first international course on **the creation of basin organizations**, to be conducted jointly by France and Spain in 1998. Lastly, the Assembly discussed the

recommendations reached during the meeting of 3 October 1997, the day devoted to the theme of **the financing of basin organizations**.

The meeting also affirmed the need for a study on **the systematization of river basin management practices**, which would serve as recommended technical specifications for turning this management method into a viable option. In the preparation of this document, contributions by INBO member organizations and the experience accumulated by ECLAC and the Inter-American Development Bank (IDB) would be drawn on. The document would serve as a teaching aid and as a general resource for facilitating the replicability of experiences. The ECLAC Environment and Development Division was represented at the General Assembly by Mr. Axel Dourojeanni, who presented a report entitled "*Creación de entidades de cuenca en América Latina y el Caribe*" (LC/R.1739) (see "**Publications**").

Information on **INBO activities** is available on the Internet (<http://www.oieau.fr/riob>). Highlights of the information available in English, French and Spanish on the site, include charter of organization and operation, declarations by the General Assembly at its sessions, seminar recommendations, information on future activities, the list of member organizations and, especially, the excellent Network Newsletters detailing latest developments in water management at the river basin level from around the world.



**A seminar-workshop on environmental accounting for water resources in Chile** was conducted at ECLAC headquarters and the offices of the National Environment Commission (CONAMA) of Chile, on 24 and 25 September 1997.

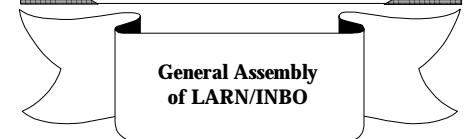
Water accounts seek to organize physical and financial information on water resources in a coherent manner that promotes the use of economic criteria in water management. This general objective is pursued through a more specific one, which is to measure periodically the flows associated with variations in water resource stocks; this makes it possible to actively monitor trends in water assets and thus calculate the influence of human activities on changes in the water cycle and their impact on social welfare. The role of water accounting as a tool of water management is in analyzing, assessing and formulating water policy. Water accounts are not a replacement for the information systems maintained by the organizations directly in charge of water resource management, which require an

altogether different level of detail and precision.

The objectives of the seminar were to learn about the experiences of France, Italy and Spain in the field of water accounting, to examine the information requirements for drawing up of water accounts and to discuss the usefulness and feasibility of introducing such accounts in Chile. Discussions centred on the following issues: water accounting within the framework of national heritage accounting; quantity and quality aspects of water accounts; content of monetary accounts of water resources and the methodology used to draft them; and the situation as regards information needed for the preparation of water accounts in Chile. The discussions of the working groups focused on the following topics: water in the natural environment and characteristics of the water cycle in Chile, water uses in Chile, water quality in Chile and water economy in Chile.

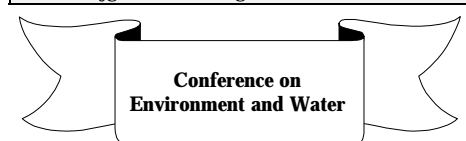
## Future activities

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**The first General Assembly of the recently formed Latin American Regional Network of the International Network of Basin Organizations (LARN/INBO)** is scheduled to be held in Bogotá, Colombia in July 1998. The constituent assembly of LARN/INBO took place in Brasilia on 9 and 10 Jul 1997.

Additional information may be obtained from:  
 SGAN Q.601, lote 01 - 4 andar - sala 429  
 70830-901 - Brasilia - DF - Brazil  
 Tel.: + 55 (61) 317-1347, 317-1348 and 225-9862 (speak with Mr. Raymundo Garrido or Mr. José Roberto Farsette)  
 Fax: + 55 (61) 223-5366  
 E-mail: rjgarrido@mma.gov.br



**The first Inter-Regional Conference on Environment and Water: Innovative Issues in Irrigation and Drainage** will be held in Lisbon from 16 to 18

September 1998. The following items have been included on the conference agenda: pollution control, demand management, action on chronic water deficits, and crisis prevention and management.

Additional information may be obtained from:

Portuguese National Committee of the International Commission on Irrigation and Drainage (ICID)  
Instituto da Agua, Av. Almirante Gago Coutinho, 30, 1000 Lisbon, Portugal

Fax: 51-1-847-3023  
E-mail: lenamar@inag.pt

### Conference on watershed management

A conference entitled *Watershed Management: Moving from Theory to Implementation* is to be held from 3 to 6 May 1998, in Denver, Colorado, under the sponsorship of the Water Environment Federation (WEF). Topics to be discussed include, but are not limited to, the following: sustainable watershed protection; coordinating efforts - successes and failures; watershed management approaches and steps; voluntary versus mandatory approaches; local, regional, national, and international experiences; regulatory, legislative, and institutional issues; inter- and intra-jurisdictional issues; watershed pollutant loading trading; innovative enforcement: pollutant control versus habitat improvement; effectiveness of best management practices; coastal and wetland issues; water quantity (droughts and floods), reuse and arid land issues; industrial and commercial development issues; land management; cross media control, planning and impacts; water resource planning and source water protection; watershed restoration activities; total maximum daily loads; water quantity and quality modelling and monitoring; use of Geographical Information Systems (GIS) and databases; new approaches for environmental indicators and standards; public education and stakeholder involvement; financing and market-based issues; and risk-based watershed management strategies.

Additional information may be obtained from:

Water Environment Federation  
601 Wythe Street, Alexandria, VA 22314, USA  
Tel.: (703) 684-2400

### World water resources at the beginning of the twenty-first century

*The International Conference on World Water Resources at the Beginning of the Twenty-first Century* will take place in Paris from 3 to 6 June 1998. The objectives of the conference are to assess the present knowledge of water resources of the world considering both the quantitative and qualitative aspects; to identify water problems to be faced in the next century due to the increased demand for water for human water supply, irrigation and industrial use; and to make recommendations to the international scientific community for dealing with future challenges.

Additional information may be obtained from:

UNESCO  
Division of Water Sciences  
1 Rue Miollis, 75732 Paris Cedex 15, France  
Fax: 33 1 45 68 58 11

## Courses



### CELAA

The following are some of the courses and meetings scheduled by the Centre for Water Resource and Environmental Economics, Legislation and Management (CELAA) of Argentina for 1998:

- *Meeting on regulatory systems for water-related services* (31 March-3 April 1998).
- *Course on human resources administration for environmental management* (27-30 April 1998).
- *Course on environmental impact valuation methods* (4-29 May 1998).
- *Course on modelling for technical and economic evaluation of environmental impacts* (5-27 June 1998).
- *Course on juridical protection of the environment in Argentina* (31 August-10 September 1998).

- *Course-workshop on integrated management of water and environmental systems* (21 September-2 October 1998).

Additional information may be obtained from:

CELAA  
Casilla de Correo 589  
5500 Mendoza, Argentina  
Fax: (5461) 285416  
E-mail: celaa@cpsarg.com

### CINARA

The Institute for Research and Development in the fields of Drinking Water, Basic Sanitation and Water Resources Conservation (CINARA) of Colombia is planning a series of courses entitled *AGUA 98* to be staged at the Universidad del Valle, Cali, Colombia in June 1998:

- *International conference on sustainability in integrated water resources management* (1-3 June 1998).
- *Course-workshop on sustainability in water development and conservation projects* (1-12 June 1998).
- *Course-workshop on sustainability in water supply projects for human consumption* (1-12 June 1998).
- *Course-workshop on sustainability in basic sanitation projects* (1-12 June 1998).
- *Course-workshop on solar treatment technology "SODIS"* (4-5 June 1998).

Additional information may be obtained from:

Aydeé María Quintero M.  
A.A. 25157  
Santiago de Cali, Colombia  
Tel.: (57-2) 339-2345 or 330-8961  
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### IMTA

The Mexican Institute of Water Technology (IMTA), the National Water Commission (CNA), the Ministry of Health and the Pan American Health Organization (PAHO) are jointly organizing the *International Seminar on Water Treatment*, to be held from 7 to 9 September 1998 in Cuernavaca, Morelos,

Mexico. The aim of the seminar is to exchange knowledge and experience on both water treatment in Latin America and the use of filtration to solve problems with the quality of water for human consumption. The seminar is targeted at professionals from research and technical development institutes, institutions of higher education, and public- and private-sector firms involved in drinking water supply.

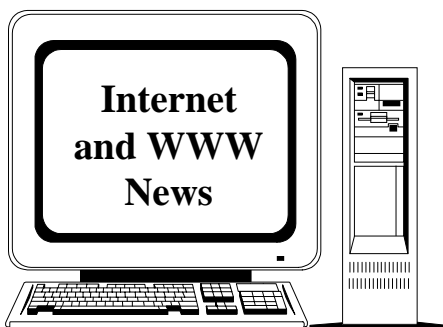
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We continue our discussion on communication networks through which information on integrated water resource management may be obtained.

## El Niño

One recent event that continues to elicit attention and concern in all the Latin American countries is the formation of El Niño. This natural phenomenon is among the most spectacular instances of annual variability and it has profound consequences for the climate and ecosystems of many countries around the globe. El Niño is normally defined as the appearance and persistence of an unusually warm current along the Pacific Ocean coasts of South America; however, this anomaly is just one of the many facets of what is a large-scale phenomenon affecting life in man countries. The phenomenon is of concern because it has the potential to wreak significant damage. For example, during the 1982-1983 El Niño, intense persistent rainfall caused huge floods in the coastal areas of Ecuador and northern Peru, and

in the Amazon region of Bolivia, while a severe drought affected practically all of the highland areas of Bolivia and Peru. Total losses amounted to almost US\$ 3.5 billion, or over 8% of those countries' combined gross domestic product at the time. Many other countries in the region were also affected, though to a lesser extent.

One of the best websites on the Internet for information about El Niño is the site set up by the Pan American Centre for Sanitary Engineering and Environmental Sciences (CEPIS) (<http://www.cepis.org.pe>), which provides access to national plans for dealing with emergencies caused by El Niño, news, a bibliography and other documents, as well as an exhaustive list of links related to the subject. A further source of information about El Niño is the Water Centre for the Humid Tropics of Latin America and the Caribbean (<http://www2.usma.ac.pa/~cathalac>), an organization set up in 1992 under an agreement between the Government of Panama and the United Nations Educational, Scientific and Cultural Organization (UNESCO).

## Places of interest

The home page of the UNESCO *International Hydrological Programme* (IHP) can be accessed at <http://www.unesco.org.uy/phi>. The site contains information on IHP activities, projects, publications, databases, etc. It is possible to consult the virtual library, whose publications include: "*Microcentrales hidroeléctricas*", "*Historia del agua*", "*Manual para la interpretación de los ensayos de bombeo y programas de cálculo*", and "*La hidrología operativa: Base para el desarrollo de la hidrología aplicada y de los aprovechamientos hidráulicos: experiencia cubana*". Also available is the bulletin entitled "*Waterway*".

Mexico's *National Institute of Ecology* (INE), a decentralized organ of the Ministry of the Environment, Natural Resources and Fisheries (SEMARNAP) responsible for designing overall environmental policy and for implementing its various regulatory and

environmental management instruments, has a home page (<http://www.ine.gob.mx>) with a great deal of information on the environment. One highlight is a section on the legal framework of environmental policy, with complete texts of the National Waters Act and the General Act on Ecological Balance and Environmental Protection.

The *Lerma-Chapala River Basin Board* is the first organization of its kind to be created in Mexico under the National Waters Act. River basin boards are responsible for coordination and consensus-building between the National Water Commission, federal, state and municipal government departments and agencies, and users' representatives. Their primary objective is to formulate and execute programmes and activities for improved water management, development of water control works and the corresponding services and the preservation of river basin resources. The Board has a home page (<http://www.ciateq.mx/~lermaham/lerma.htm>) which contains information on its activities. The Lerma-Chapala River Basin Information Centre also publishes a free quarterly newsletter, entitled INFO-LERMA, which notifies readers about the latest available information, training courses, news of interest and relevant aspects of the Board.

The *Water, Engineering and Development Centre* (WEDC) at Loughborough University in the United Kingdom is one of the world's leading institutions for education, training, research and consultancy services in the field of infrastructure planning, provision and management in low- and middle-income countries. To subscribe to WEDC-INFORMATION, an information service on WEDC activities, send a message to [majordomo@lboro.ac.uk](mailto:majordomo@lboro.ac.uk) with the words *subscribe wedc-information name@address end* and leave "Subject" and the rest of the message blank.

Other Internet sites worth visiting for information on water resources include:

- The *executive secretariat of the Intergovernmental Waterway Committee* (CIH) has a home page which provides a great deal of information on the Paraguay-Paraná

waterway project (<http://www.ssdnet.com.ar/hidrovia>). The aim of this project is to allow convoys to sail day and night for most of the year between Puerto de Cáceres, Brazil, and Puerto de Nueva Palmira, Uruguay. The site gives a brief outline of the project objectives, costs and benefits, environmental issues associated with its construction and summaries of various studies.

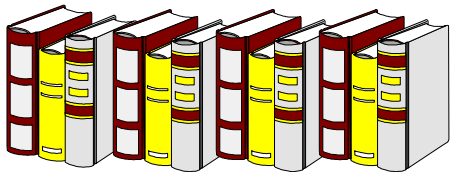
- Those interested in the applications of remote sensing using radar should note that the **Radarsat Distance Learning Program** (RDLP) has just been set up (<http://icsima.net/rdlp>). The program is divided into nine modules: basic principles of radars, what is RADARSAT?, and seven modules describing the application of this technology in a variety of areas (agriculture, hydrology, etc.).
- The International Irrigation Management Institute (IIMI) and the Utah Climate Center at Utah State University have developed, with support from the Government of Japan, the **World Water and Climate Atlas**, which is located at <http://atlas.usu.edu/>.

- "**Creación de entidades de cuenca en América Latina y el Caribe**" (LC/R.1739), 10 July 1997 (available in Spanish only). This report was prepared for the General Assembly of the International Network of Basin Organizations, held from 2 to 4 October 1997, in Valencia, Spain. The main aim of the paper is to highlight the complex issues involved, as well as describe some of the reasons which make it difficult to implement policies for multi-purpose water resources management at the river basin level in Latin America. The paper suggests a system for the classification of river basin entities and examines the most common disputes and ways of resolving them, with a view to setting up and consolidating these organizations in the countries of the region. One of the most frequent requests made by Governments is for suggestions and support to help set up a national or regional institutional framework capable of guiding actions in favour of sustainable development. The reforms currently being introduced to water-related legislation serve to improve water management systems, formally establish water management agencies and legalize the formulation and implementation of river basin management plans. Legislation on sustainable development of natural resources should seek to combine the functions of water use allocation, regulation, monitoring and long-term planning that the State ought to perform with the advantages of private participation. The document suggests a series of activities for assessing the situation with respect to river basin

management in the region, including a questionnaire to determine whether the creation of such entities would be feasible, and technical specifications to streamline the information available on individual river basins.

- "**Regulation of the private provision of public water-related service**" (LC/R.1635/Rev.1), 25 September 1997. This is a new edition of the report "**Regulation of the private provision of public water-related service**" (LC/R.1635), 8 April 1996 (see Circular N° 4).
- "**Management procedures for sustainable development (applicable to municipalities, micro-regions and river basins)**" by Axel Dourojeanni (LC/L.1053), September 1997, (Serie Medio Ambiente y Desarrollo N° 3). This is a new edition of the report "**Management procedures for sustainable development (applicable to municipalities, micro-regions and river basins)**" (LC/G.1769), 29 March 1995 (see Circular N° 3).

## Publications



Recent publications of the Environment and Development Division related to integrated water resources management in Latin America and the Caribbean:

The publications of the Environment and Development Division, as well as back issues of the Circular (beginning with this issue, the Circular is being prepared in Microsoft Word), are available in two formats: (i) electronic files distributed directly over the Internet as "attachments"; and (ii) printed documents, copies of which are sent free of charge by post. The official version is published by ECLAC in printed form; the electronic version is provided for informational purposes only. Requests may be sent to either of the following e-mail addresses:

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