

# 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)

Nº 6 December 1997

## CIRCULAR Nº 6

*Santiago, Chile*

A recurrent theme at recent international forums has been the supposed “*global water crisis*” and the spectre of an increasing water shortage. Discussions often focus also on the lack of appropriate mechanisms for resolving conflicts among water users with respect to quantity, quality and time. In turn, reference is made to the inadequacy of efforts made to ensure conservation of water as an element that is vital in ecosystems.

Since average annual rainfall in Latin America and the Caribbean is estimated at about 1.500 millimetres, which is over 50% above the world average, reference to a water shortage in our region in the absolute physical sense is not very appropriate, although one must recognize the fact that the natural distribution is highly uneven. There is no denying, however, that water management systems are often poorly organized if not non-existent. This results in a lack of information on water balances, an almost total lack of control of water quality and scant preparation for natural disasters such as droughts and floods. In addition, the region still lags behind in drinking water supply and above all in the development of adequate sewerage systems. Furthermore, deficiencies persist in the water management systems for agriculture, one of the outcomes of a long tradition of State paternalism.

A major obstacle to the improvement of water resource management is the institutional legacy of systems which traditionally were centralized and in many cases assigned to a user sector such as agriculture or power. Even today, there are draft bills which suggest that national water or water resource councils should be run either by the agricultural sector or the electricity sector. In addition, very often, such councils claim that they should be composed only of public officials, without water users or civil society, in particular the municipalities having any say in the decision-making process.

Another important obstacle is the legacy of a “subsidy” culture for water projects and rates. In many countries, there is still resistance to the establishment of real prices for water use. We are convinced that it is feasible to charge all water consumers (users) a price that reflects the total supply costs, including all capital costs. This, in itself, is a powerful tool for averting a shortage.

For these reasons, much of our work is geared towards advising Governments to formulate their water policies, in an attempt to achieve a balance between the advantages of markets and private participation, particularly in drinking water supply and sanitation, hydroelectricity, irrigation and drainage, and the need for government regulation to achieve social and environmental goals. Another part of our work consists in assessing the market’s real capacity to act as a mechanism for ensuring the efficient use and transfer of water rights. Proper policy-planning requires information on existing water resources, the existence of a land register and public register of water users, effective control of water quality and a system of participatory management at the river basin level.



A 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) was prepared as a contribution to the Second Latin American Congress on River Basin Management (Mérida, Venezuela, 1994), by

Axel Dourojeanni in collaboration with other officers of the Environment and Development Division of ECLAC. This study is supplemented in its practical application by the methodology of management procedures for sustainable development (see Circular Nº 2). It was published in Peru by the National Institute of Natural Resources (INRENA) and in Venezuela by the Inter-American Centre for Environmental and Territorial Development and Research (CIDIAT), and is also expected to be published in other countries.

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The years between the United Nations Water Conference (Mar del Plata, 1977) and

the United Nations Conference on Environment and Development (Rio de Janeiro, 1992) may be divided, with respect to Latin America and the Caribbean, into three distinct periods. The first, from 1977 to 1982 was a period of unprecedented growth. It was followed, however, by the most serious economic recession since the 1930s. From 1990, in most countries of the region, a new growth phase started, which, in many countries, coincided, more or less, with the holding of the United Nations Conference on Environment and Development.

Both the boom of the 1970s and the recession of the 1980s deflected interest away from the situation of the public sector, and this was reflected in a lack of innovation in the field of water management. Indirectly, however, both periods had repercussions on the administration of water resources. The economic boom of the late 1970s coincided with the climax in the expansion of public sector economic activities, but this expansion was reversed during the recession and subsequent recovery. In most countries of the region, the results of changes in the State's role are plain to see. One of the consequences of this policy was to allow central government administration responsibility for controlling and supervising the activities of third parties, but not the direct operation of productive enterprises related to water.

This reconsideration of the State's role in water resource management is a widespread trend and marks a significant change in the water management policies that had been pursued for over 50 years. These changes paved the way for decentralization and private sector participation. They also meant that institutional mechanisms for integrated management of water resources at the river basin level were needed to regulate and coordinate the actions of the various users and management of available water resources. A number of draft bills under consideration and others already approved favour the establishment of river basin institutions.

This revival of interest in the river basin as the most appropriate unit for water management is due mainly to the fact that it is precisely at this level that it appears more feasible to achieve a better integration between all parties, whether public or private and whether their concern with water management is for purposes of production or conservation. Furthermore, water resource management at the river basin level is increasingly considered to be the most appropriate way of absorbing the environmental costs of use of water resources. Nevertheless, there is still a strong emphasis on the physical components of the systems or on activities and investments in the

sector, while the organizational component for the establishment of river basin entities, which undoubtedly constitutes the most important aspect of this approach to water resource management, has scarcely been developed.

These problems have been the greatest motivation for the preparation of this study the purpose of which is to make proposals for the establishment of river basin management bodies in the countries of the region. The study outlines the main elements to be taken into account in proposals for the establishment of such entities, provides ideas on management at the river basin level and definitions on the different approaches to the issue and offers some recommendations for improving policy formulation and the operation of integrated management systems for water and river basins.

In this issue, we introduce the document. The discussion will be 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 the region. In the next issue, we will discuss in greater depth other contributions that the document makes to the issue of river basin management.

#### **Classification of approaches to river basin management**

Management at the river basin level has made a great deal of progress in the region, but despite these advances there is still no consensus on definitions that spell out the objectives of that management. The lack of conceptual clarity on the subject impairs the exchange of ideas and experiences, particularly between professionals of different countries, causes overlapping of functions and hinders the formulation of policies and laws on the subject.

Inconsistencies in the use and meaning of many of the terms relating to river basin management suggest the convenience of defining and classifying such concepts. The table below summarizes and classifies concepts related to river basin management in Latin America and the Caribbean. A matrix format is used to set out the stages of the management process as they relate to the objectives defined by the elements and resources covered by the management. This lay-out was chosen to enhance understanding of the actions that may be coordinated in a river basin, and the purpose of such coordination. Moreover, it was considered useful to clarify other complexities arising from differences in terminology between English and Spanish; hence the decision to include entries in both languages; it is hoped

that understanding of the Spanish term may be enhanced by a comparison with the original concept.

The table sets out two groups of factors, indicating the terminology used for each case:

#### ***The stages in a river basin management process*** (1,2 and 3):

- Preliminary stage (1): studies, formulation of plans and projects.
- Intermediate (2): the investment stage for river basin development with a view to the use and management of its natural resources for purposes of economic and social development. This stage corresponds to the notion of "development" as in "river basin development", "water resources development" (the corresponding term in Spanish being "desarrollo de cuencas" or "desarrollo de recursos hídricos" or "desarrollos de recursos hidráulicos").
- Permanent (3): the operation and maintenance stage of structures and management and conservation of natural resources and elements. This phase corresponds to the notion of "management" (a term, which, has as many as four meanings in Spanish: "gestión", "administración", "ordenamiento" and "manejo"). In general, "water resources management" is translated as "administración de recursos hídricos", and "watershed management" as "manejo de cuencas"). It should be noted that Spanish does not normally make a distinction between the concepts "watershed" and "river basin", both of these being translated as "cuencas hidrográficas", although some effort has been made to differentiate between the two by using terms such as "cuenca fluvial" and "hoya hidrográfica" to refer to "river basin", and "cuenca de alta montaña" or "cuenca de captación" to render the idea of "watershed".

#### ***Natural resources and elements that are considered in the process of river basin management*** (letters a, b and c):

- First group (a): all the elements, resources and infrastructure for development of a river basin.
- Second group (b): all the natural elements and resources to be found in a river basin.
- Third group (c): only water resources.

This form of terminological analysis is unusual and it is hoped that it may be helpful in classifying concepts of the objectives of river basin management. The table shows clearly that the most complete type of

management at the river basin level is indicated in column (a), under the heading “*river basin development*” at the intermediate stage and “*environmental management*” in the permanent phase. This approach amounts to applying regional development and environmental management techniques at the river basin level. It is an approach that gained currency in Latin America following the success of the Tennessee Valley Authority in the United States, an approach that attracted followers in Mexico, Colombia, Brazil and Peru. Agencies responsible for this type of management are usually referred to as water corporations or commissions. Most originated and developed out of major investment projects.

The intermediate river basin management level is shown under column (b) and includes activities aimed at the coordination of the development (“*natural resources development*”) and management of all the natural resources to be found in a river basin (“*natural resources management*”). This level of systematic management of all natural resources in a river basin (management of the use of a river basin according to its capacity and purpose) has not been applied comprehensively in the region.

There are no systems or entities that facilitate coordination of the activities of use and management of the natural resources in a river basin. However, there are many

watershed management programmes and projects (“*manejo de cuencas*”). Watershed management has become a sub-item or part of this integrated approach to natural elements and natural resource management.

The traditional approach to watershed management aimed at regulating the run-off of water (a concept that originated and was first applied in the United States) is part of the approach to natural resource management. Watershed management is therefore a mixed activity, linked to management and conservation of all natural elements and resources as well as water management itself.

The third level of management, which is shown in column (c) is geared towards coordination of investments in water resources development and subsequent management thereof. It is the best known level of river basin management in the countries of the region and it is at this level that most of the studies and investments in hydroelectricity, irrigation and drainage, drinking water and flood control are conducted.

In Latin America and the Caribbean, it is normal for the intermediate phase (“*development*”) geared towards planning and execution of investment projects, in particular hydroelectric projects, to be governed by strong systems of management. This is largely due to the fact that it is a phase that normally

benefits from substantial financial backing, political support and interest on the part of the banking sector.

Conversely, the permanent phase, (“*management*”), involving the day-to-day management or administration (for example, of water, use of flood-prone areas, pollution control or use of hillsides and operation and maintenance of waterworks except in the hydroelectricity sector and some drinking water services) was generally very poor. This is the phase that needs to be improved on all fronts.

### Development of integrated river basin management

The development of river basin management in the countries of the region has been neither uniform nor stable. Management systems have been changing erratically giving rise to many cases where in the past, management, at least of water resources tended to be more integrated than at present.

In its initial stages, coordination of activities at the river basin level was limited. Work was done at this level in order to solve problems as they arose and satisfy specific or sectorial demands for water, supplying water for population centres or irrigation, controlling flooding and building hydroelectric power stations.

The next step was to operate and maintain the structures thus constructed. This management was limited to the existing structures without any particular interest in multiple use of water resources or in managing the river basin area, that is to say the natural resources of the river basin. Thus a series of water management systems were implemented in the region, many of which were developed solely for sectorial water use.

In the late 1940s, corporations were set up for the integrated development of river basins, that is, for regional development at the river basin level. These corporations set out from the construction of water projects to embrace extensive areas under their jurisdiction and to invest in a number of sectors.

Around the 1970s, emerges the concept of “watershed management” mainly with the aim to reduce silting up in dams and to control land slides or flooding. There are very few instances in which all the natural resources of the river basin are managed. Integrated agricultural, forestry and livestock projects have helped to improve this aspect but do not compensate for the lack of a well-coordinated

Management stages	River basin management objectives		
	Integrated use and management	Use and management of all natural resources	Use and management of water resources
	(a)	(b)	(c)
(1) Preliminary stage	<b>Studies, plans and projects</b> <i>(Ordenamiento de cuencas)</i>		
(2) Intermediate stage (investment)	<b>"River basin development"</b> <i>(Desarrollo integrado de cuencas)</i>	<b>"Natural resources development"</b> <i>(Desarrollo o aprovechamiento de recursos naturales)</i>	<b>"Water resources development"</b> <i>(Desarrollo o aprovechamiento de recursos hídricos)</i>
(3) Permanent stage (operation, maintenance, management and conservation)	<b>"Environmental management"</b> <i>(Gestión ambiental)</i>	<b>"Natural resources management"</b> <i>(Gestión/manejo de recursos naturales)</i>	<b>"Water resources management"</b> <i>(Gestión/administración del agua)</i>
		<div style="border: 1px dashed black; padding: 5px; text-align: center;"> <b>"Watershed management"</b>  <i>(Manejo/ordenación de cuencas)</i> </div>	

system for the management of the natural resources of river basins.

The environmental dimension began to be taken into account in Latin America only at the end of the 1970s, that is, five to seven years after the United Nations Conference on the Human Environment held in Stockholm in 1972. First came environmental impact studies, and later environmental quality analyses. To a large extent, environmental management at the river basin level did not go beyond the phase of studies and proposals for forming organizations.

A look at the table is necessary to understand this development and to identify the different steps in management that cover the entire river basin depending on the phase of execution and the resources to be managed. The table shows a total of seven steps (intermediate and permanent phases) for river basin management: three geared to river basin development and four to the control, administration or management of the environment, natural resources or water resources.

The chronological order followed in Latin America in coordinating actions at the river basin level is as follows:

- Firstly, the question of water control and use in river basins is approached through the construction of water projects ("water resources development").
- Secondly, the question of the management of water in river basins is tackled ("water resources management").
- Thirdly, there is then a direct transition to "river basin development".
- Fourthly, the question of "watershed management" is taken up, especially with a view to controlling the erosion that affects existing dams and preventing landslides and mudslides.
- Fifthly, there is then a direct transition to consideration of the question of "environmental management".

What stands out in this evolution is that there has been an abrupt decision to coordinate, at least on paper, environmental management at the river basin and regional level, without yet having fully coordinated the measures for the development and management of all natural resources of a river basin. It will be remembered, however, that if natural resources are not managed in a coordinated manner, not even water, then it will be impossible to undertake environmental management. The first step should then be to manage the water resources in an integrated manner and then the other natural resources associated with them.

## Future activities

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

### ASCE-ECLAC

The American Society of Civil Engineers (ASCE) and ECLAC, together with the Coordinating Committee for Water Supply and Sanitation Institutions of Central America, Panama and the Dominican Republic (CAPRE), will hold their **Second ASCE-ECLAC Workshop on Private Participation in the Management and Operation of Water Supply and Sanitation Utilities**, in Costa Rica from 3 to 6 February 1998. This meeting will continue the debate started at the first ASCE-ECLAC workshop on aspects of privatization of water-related public utility companies in the Americas (see Circular Nº 3). The discussions to be carried out will centre on private-sector participation in the drinking water and sanitation sector with emphasis on the situation of the smaller countries, and case studies and experiences of countries of North, Central and South America, and Western and Eastern Europe.

Additional information on this workshop may be obtained from the following sources:

Vinio Floris  
1198 Primrose Lane  
Wellington, FL 33414, U.S.A.

Tel.: (561) 795-9288  
Fax: (561) 795-4273  
E-mail: [vinio@emi.net](mailto:vinio@emi.net)

Terence Lee  
CEPAL, Casilla 179-D  
Santiago, Chile

Tel.: (56-2) 210-2262  
Fax: (56-2) 208-0252  
E-mail: [tleee@eclac.cl](mailto:tleee@eclac.cl)

### AIDIS

The Inter-American Association of Sanitary and Environmental Engineering (AIDIS) will hold the **XXVI Interamerican Congress of Sanitary and Environmental Engineering**, from 2 to 6 November 1998 in the city of Lima, Peru. The meeting is being organized

by the Peruvian Association of Sanitary and Environmental Engineering (APIS).

The topic for discussion will be "Environmental Management in the XXI Century". The main objectives of the congress are:

- to analyze the common problems faced by the countries of the region and to propose viable solutions within the framework of international agreements;
- to foster mutual support among the different agents of the public and private sector to improve the provision of services and environmental management, making them more efficient and competitive;
- to promote the coordination and to strengthen institutional links of AIDIS national sections with governmental organizations and international agencies;
- to encourage the market for jobs, goods and specialized services as a means to improve the training of professional and technicians; and
- to enhance cooperation and friendship among the countries of the region, and to offer an opportunity to exchange experiences and opinions, and to transfer information, knowledge and technology.

Additional information may be requested from:

Peruvian Association of Sanitary and Environmental Engineering (APIS)  
XXVI Interamerican Congress of Sanitary and Environmental Engineering  
Pasaje Los Pinos 144, oficina 705  
Lima 18, Perú

Tel.: (511) 445-9336  
Fax: (511) 241-0030  
E-mail: [postmast@apis.org.pe](mailto:postmast@apis.org.pe)

### Wetland Systems for Water Quality Control Conference

The **Wetland Systems for Water Quality Control Conference** will be held in September 1998, in the city of São Paulo, Brazil. It will provide a forum for researchers and practitioners to exchange information and experience in the development and use of wetlands as a treatment process.

The discussions to be carried out will be directed towards the following issues: sewage treatment and pollution control using constructed wetlands; mining wastewater treatment using constructed wetlands; water supply systems: pretreatment and treatment using constructed wetlands; constructed wetlands for ecosystem conservation; natural wetlands conservation; environmental



legislation; ecology of aquatic microorganisms; utilization of constructed wetlands for reuse of wastewater treatment plant effluent; management and control of constructed wetlands; project development: criteria and selection of parameters; and industrial wastewater treatment using constructed wetlands.

Additional information may be requested from:

Samia Maria Tauk-Tornisielo  
Centro de Estudos Ambientais/UNESP  
Avenida 24-A, 1515 Bela Vista  
CEP 13506-900, Rio Claro (SP) - Brazil

Tel.: +55 019 534 7298  
Fax: +55 019 534 2358  
E-mail: cea@life.ibrc.unesp.br

### International Workshop on Non-Structural Flood Control in Urban Areas

The *International Workshop on Non-Structural Flood Control in Urban Areas* will be held from 20 to 22 April 1998 in São Paulo, Brazil. Its objective is to assess the state of the art at global level on the application of novel integrated technologies to solving urban water management problems. The emphasis is on non-structural flood control, however, the organizing committee may also consider contributions on non-conventional structural measures.

The following subjects will be considered for discussion at the workshop: non-structural measures in integrated urban water management under different climatic conditions; hydrology and hydrodynamics of local collection and infiltration systems; deterministic and stochastic flood forecasting modelling; landslide modelling; decision support systems for disaster mitigation; legal and institutional measures; socio-economical impacts of relocation; technical and socio-political aspects of flood plain zoning; flood insurance; education of the general public and raising awareness; and cost-benefits

Additional information may be requested from:

Benedito Braga  
IRTCUD-RCTC  
c/o Depto. de Engenharia Hidráulica  
Escola Politécnica - USP  
Av. Prof. Almeida Prado, 271  
05508-900 São Paulo, SP  
Brazil

Tel.: (+55) (11) 818-5396  
Fax: (+55) (11) 818-5423  
E-mail: benbraga@usp.br

analysis of structural and non-structural measures.

### The Next Breakthrough in Seawater Desalination

The Kompania di Awa i Elektrisidat di Korsou N.V. (K.A.E.), the company in charge of the drinking water supply and power production for the island of Curaçao, is organizing the international conference *The Next Breakthrough in Seawater Desalination*, to be held from 3 to 5 June 1998 at the World Trade Center Curaçao, the Netherlands Antilles. The focus of this conference will be towards identifying new breakthroughs in the field of seawater desalination expected for the next decade. Speakers are expected from all major contributors in this field. The organizers of the conference will offer the opportunity to visit the K.A.E. plant, one of the largest desalination plants in the Caribbean.

Additional information may be requested from:

K.A.E. N.V.  
"The Next Breakthrough in Seawater Desalination"  
Rector Zwijsenstraat # 1, P.O. Box 2097  
Curaçao, Netherlands Antilles

Fax: (599-9) 462-6685 or  
(599-9) 462-4074  
E-mail: desalconf@cura.net  
WWW: <http://www.cura.net/kae>

### Watershed Management Conference

The Water Environment Federation (WEF) is sponsoring a conference on *Watershed Management: Moving From Theory to Implementation*, to be held from 3 to 6 May 1998, in Denver, Colorado. Its objective is to provide latest information on implementing watershed planning, protection, restoration and education.

Topics to be discussed include, but are not limited to, the following: sustainable watershed protection; coordinating efforts; 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; effectiveness of best management practices; agricultural, silviculture, and mining issues; coastal and wetland issues; water quantity, 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; riparian rights in watershed management; watershed restoration activities; total maximum daily loads; water quantity and quality modelling and monitoring; use of G.I.S. 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.

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

## Meetings



### Meeting of Ministers of the Environment

The *Tenth Meeting of Ministers of the Environment of Latin America and the Caribbean* was held in Buenos Aires, Argentina and took the form of a preparatory meeting of high-level experts on the environment appointed by Governments of Latin America and the Caribbean, held from 31 October to 2 November 1996, and a ministerial segment on 11 and 12 November 1996.

The main objectives of the ministerial meeting were:

- to consolidate the role of this consultative body as a regional forum for implementing the environmental agenda of Latin America and the Caribbean;
- to identify opportunities for regional cooperation on environmental matters leading to the implementation of Agenda 21;
- to propose actions geared to achieving greater efficiency and coherence in regional planning and execution of environmental agendas of the organizations of the international system; and
- to agree on common positions to crucial issues for the international environmental agenda with implications for the region.

With respect to river basin management, the ministers and heads of delegation of the Governments represented at the meeting, bearing in mind that, in their documents and presentations, the countries of the region had considered integrated river basin management as a appropriate physiographic unit for joint planning, promotion and implementation of environmental measures and sustainable development, decided:

- to give priority to the formulation of a regional river basin programme including, when appropriate, the active participation of the countries involved, in order to provide an institutional framework for promoting integration in order to prevent and reverse the progressive deterioration of natural systems, including the economic, social and cultural aspects of the region; and
- to approach the funding agencies within the United Nations system and other multilateral agencies with a view to obtaining the necessary funding for the formulation and implementation of the above-mentioned regional programme.

For further details on the meetings see the "Informe Final de la X Reunión de Ministros de Medio Ambiente de América Latina y el Caribe. Buenos Aires, Argentina, noviembre de 1996" (UNEP/LAC-IG.X/4, 12 November 1996) issued by the United Nations Environment Programme.

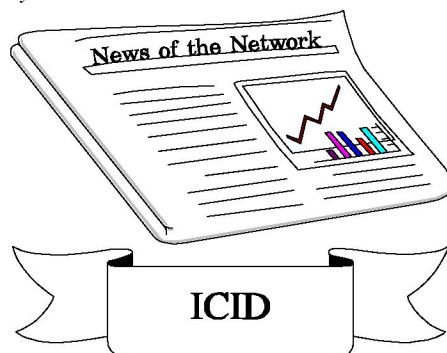
#### Meeting on the Financial Implications of Agenda 21

The **Fourth Expert Group Meeting on the Financial Implications of Agenda 21**, organized by the Department for Policy Coordination and Sustainable Development of the United Nations Secretariat (DPCSD), the Inter-American Development Bank (IDB) and ECLAC was held from 8 to 10 January 1997 at ECLAC headquarters.

The purpose of this meeting was to analyze and propose policies for mobilizing funding for sustainable development, a crucial element for implementation of the commitments made under Agenda 21. Over 60 experts participated including government representatives, academics, representatives of national and international bodies, non-governmental organizations and the private-sector including internationally renowned specialists in environmental economics.

The most animated discussions concerned the mobilization of internal funding, in particular, the reform of the system of subsidies, economic instruments for environmental management and the role of the private sector. In general, there was consensus

that the subsidies were expensive and ineffective. Economic instruments, on the other hand, were potentially much more effective; however, experience in using them was limited. As far as the private sector was concerned, it was recognized that many major national and multinational companies had increased their capacity for environmental management, but this was not the case with the small and medium-sized enterprises, which were responsible for most of the pollution. It was pointed out that the support role played by national authorities was crucial.



Starting with this issue of the Circular, information will be provided periodically on the activities of the **International Commission on Irrigation and Drainage (ICID)**. This is a non-governmental scientific and technical organization dedicated to improvement of water and land management to enhance the worldwide supply of food and fibre for all people. Its membership has increased from 11 in June 1950 to 84 at present, including 14 members in the region (Argentina, Brazil, Chile, Colombia, Cuba, Dominican Republic, Ecuador, Guyana, Honduras, Mexico, Panama, Peru, Suriname and Venezuela).

The objectives of ICID are to stimulate and promote the development and application of the arts, sciences and techniques of engineering, agriculture, economics, ecology and social sciences in managing water and land resources. To fulfil these objectives, ICID works in a number fields: conducting studies - data collection and analysis; technology transfer - dissemination of technology and experiences through technical publications; organizing technical congresses, conferences, workshops and round-tables at the global and regional levels; and cooperating with other international organizations.

ICID publishes a peer reviewed biannual technical journal, a quarterly newsletter and a monthly news update. Special publications are also released from time to time. Some of its best-known publications are a global review of irrigation and drainage in the world, a global review of flood control in the world, a worldwide survey on irrigation and salinity, environmental checklist, and ICID-World Bank Guide "Planning the management,

operation and maintenance of irrigation and drainage systems". The ICID multilingual technical dictionary has been translated into 14 languages so far.

ICID organizes annually by rotation three regional conferences, namely, Afro-Asian Regional Conference, European Regional Conference, and Pan American Regional Conference, and a triennial World Irrigation and Drainage Congress to address and discuss important current regional and global issues. Its forthcoming events include the following:

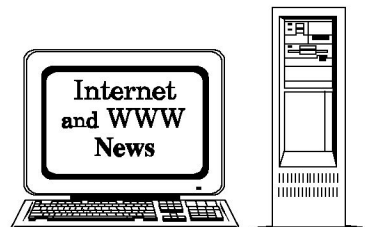
- **49th International Executive Council meeting, 10th Afro-Asian Regional Conference and Workshop on Saline/Brackish Water Use for Irrigation**, Denpasar, Indonesia, 20-25 July 1998. Contact: Hafied Gany, Secretary General, Indonesian National Committee of ICID, Directorate General of Water Resources Development, Ministry of Public Works, Jalan Pattimura **Nº** 20/Per.7, Kebayoran Baru, Jakarta 12067, Indonesia. Tel: 021 739 6616 (ext. 405 and 406); Fax: 021 726 1956.
- **1st Inter-Regional Conference on Environment-Water: Innovative Issues in Irrigation and Drainage**, 16-18 September 1998, Lisbon, Portugal. Contact: Portuguese National Committee of ICID, Instituto da Agua, Av. Almirante Gago Coutinho, 30, 1000 Lisbon, Portugal. Fax: 351 1 847 3023; E-mail: lenamar@inag.pt.

We have at your disposal the ICID annual report and most recent directory containing the addresses of its national committees.

For further information on the activities of ICID, contact:

International Commission on Irrigation and Drainage (ICID)  
48 Nyaya Marg, Chanakyapuri  
New Delhi 110 021, India

Tel.: 301 6837 and 301 5679  
Fax: 91-11-301 5962  
E-mail: icoiad@giasd101.vsnl.net.in  
WWW: <http://www.ilri.nl/icid/ciid.html>



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



In the previous issue of the Circular, information was provided on discussion lists that operate on the Internet. This is a service which allows those sharing a common interest to send messages through the Internet and these are automatically transmitted to the other participants.

The **AGUA-ES** list is a mailing list in Spanish on water policies which deals with every aspect of water: environment, ecology, economics, legal and social aspects, and so forth. To subscribe to the AGUA-ES mailing list, send the command **SUBSCRIBE AGUA-ES** plus your name and surname to [listserv@listserv.rediris.es](mailto:listserv@listserv.rediris.es) and leave the rest of the message blank

A new discussion list, **HIDRAULICA**, has recently been established to facilitate the exchange of information between engineers and other persons interested in issues related to water engineering. To subscribe to it, send a message to [hidraulica-request@listas.net-all.com.br](mailto:hidraulica-request@listas.net-all.com.br) with the words **SUBSCRIBE hidraulica**, followed by your electronic mail address.

The **EALatina** list is a discussion list on environmental education designed to provide a channel for discussion and for disseminating information on environmental education in the countries of the region through the Internet. The discussions are normally in Portuguese and Spanish. Additional information may be obtained through the following address: <http://www.redetec.org.br/ealatina/home.html>.

The **LCSEWERAGE** is a discussion list on low-cost sewerage in both industrialized and developing countries. To subscribe to it, send a message to [mailbase@mailbase.ac.uk](mailto:mailbase@mailbase.ac.uk) with the words **join lcsewerage** first name last name.

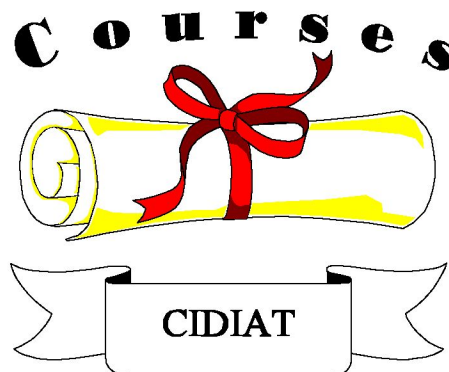
The **Water Engineering and Development Centre** (WEDC) at the Loughborough University, Great Britain offers new opportunities for study by distance learning for experienced professionals. The new postgraduate Diploma programmes are scheduled to start in July 1998. These are infrastructure for low-income communities and water supply and sanitation for low-income communities. For further information please e-mail Rod Shaw ([R.J.Shaw@lboro.ac.uk](mailto:R.J.Shaw@lboro.ac.uk)) with your postal address.

The **SimTanka** programme is now available. The programme, which runs under Windows 95, uses the rainfall record of the immediate past to simulate performance of rainwater harvesting systems. Contact: Vikram Vyas, The Ajit Foundation, 396 Vasundhara Colony, Tonk Road, Jaipur 302 018, India, Tel./Fax: 91-141-519938.

The Internet sites worth visiting for information on water management include:

- The **Pan American Centre for Sanitary Engineering and Environmental Sciences** (CEPIS) has set up its website (<http://www.cepis.org.pe>), which provides a good deal of information on issues such as environmental health and sanitary engineering (see Circular Nº 4). In addition, it provides access to the full text of some of the reports prepared by our Division.
- The **Social Programmes and Sustainable Development Department** of IDB has launched its website, which focuses on social development, environmental sustainability, infrastructure and community development in the countries of Latin America and the Caribbean (<http://www.iadb.org/sds>).
- The **Brazilian Water Resources Association** has a Home Page (<http://www.abrh.org>) which contains information on its activities, meetings, publications, software, water legislation, etc.
- Information on dams, water diversions, impoundments, and hydroelectric projects and their impacts, and related issues may be consulted at the **Dam and Reservoir Impact and Information Archive** Home Page (<http://www.sandelman.ocunix.on.ca:80/dams/Overview.html>).
- The **Revista de Ingeniería del Agua**, a channel used by Spanish- and Portuguese-speaking academics and professionals to share information on water resources, now has its Home Page located at <http://www.upv.es/ria>.
- The **Superintendencia de Servicios Sanitarios** of Chile, the agency in charge of economic regulation in the drinking water supply and sewerage sector, has a Home Page (<http://www.siss.cl>) which contains useful information on the sector, including the full texts of many laws.
- The Home Page of the **Instituto de Investigación y Desarrollo en Agua Potable, Saneamiento Básico y Conservación del Recurso Hídrico** (CINARA) of Colombia is <http://cinara.univalle.edu.co>.
- The **Environment Online** Home Page (<http://www.environmentonline.com>) is the springboard to a comprehensive group of online communities for those interested in the water and wastewater, pollution control, public works, and solid wastes industries, and to the **Environmental Software Warehouse**.

Lastly, we would like to remind our readers that ECLAC has had an Internet site since the beginning of 1996 (<http://www.eclac.cl>). The site provides access to selected documents and statistical data.



The Inter-American Centre for Environmental and Territorial Development and Research (CIDIAT), under the auspices of IDB, and in conjunction with the Universidad de los Andes, Venezuela, offers a **regional training programme in management of the environment and conservation of natural resources**. The main objectives of the programme are:

- To train high-level officials with responsibility for decision-making, senior public sector professionals, university professors and members of non-governmental organizations concerned with the environment and natural resources in IDB member countries.
- To strengthen national and regional training centres specialized in environment and natural resources with emphasis on the preparation, revision and monitoring of environmental impact studies.

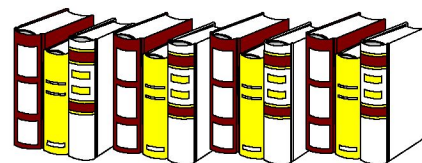
We will provide details on the 1998 programme as they become available.

Additional information may be requested from:

Luis Razuri Ramirez  
Coordinador del Convenio BID-CIDIAT  
Director Adjunto del CIDIAT  
Edificio CIDIAT - Parque La Isla  
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E-mail: [cidiat@dino.conicit.ve](mailto:cidiat@dino.conicit.ve)

## Publications



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

***“Private participation in the provision of water services. Alternative means for private participation in the provision of water services”*** by Terence R. Lee and Andrei Jouravlev (LC/L.1024), May 1997, Serie Medio Ambiente y Desarrollo **Nº 2**. This is a new edition of the report *“Private participation in the provision of water services. Volume I. Alternative means for private participation in the provision of water services”* (LC/R.1576), 8 September 1995. This report focuses on the benefits of the privatization of water services and on the range of alternatives available for private participation in their provision. These alternatives are analyzed and their possible application in the countries of Latin America and the Caribbean is assessed on the basis of examples from the region and from other parts of the world. The alternatives discussed include divestiture, the various forms of franchising, such as contracting out, management contracts, lease contracts and concessions, and joint public-private arrangements. The strengths and weaknesses of each alternative are discussed in some detail, in particular the demands their implementation is likely to make on the public sector. The privatization of water services requires a readjustment of the role of the state in water management. Most importantly, whatever the alternative chosen, all the experiences show that privatization does not stop with the transfer of assets. There is a need for continuing managerial actions in particular for regulation and, therefore, for on-going government responsibility for the provision of basic water services, even when the operators of such services are private companies.

***“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 presentation at the Second General Assembly of the International Network of Basin Organizations, held from 2 to 4 October 1997, in Valencia, Spain. The paper analyses recent changes in water resources management policies and the creation of river basin entities; classification of the different approaches to river basin management in the countries of the region; environmental management and water resources management at the river basin level; factors hampering the operation of river basin entities and how these can be overcome; recent reforms in water-related legislation in the region; principles for the creation of river basin entities in the region; and the work that should be done to facilitate the creation and operation of river basin entities in the region.

***“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 **Nº 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. The report summarizes the method described in the paper by Axel Dourojeanni, entitled *“Procedimientos de gestión para el desarrollo sustentable (aplicados a microrregiones y cuencas)”*, Ensayos series, Santiago, Chile, Latin American and Caribbean Institute for Economic and Social Planning (ILPES), October 1990.

The report provides a conceptual framework for reaching sustainable development within clearly defined geographical areas. Alternative methods for resolving conflicts that arise between economic growth, social equity and environmental sustainability are proposed. Four work sequences are described, aimed at the execution of initiatives, the carrying out of transactions between the actors, the incorporation of the environmental dimension, and the integration of separate disciplines. The most important sequence, the first, involves the following stages: identification of those in charge of managing an area, their values, problems and objectives; baseline assessment; identification of the constraints which impede the attainment of these objectives; formulation of solutions for overcoming these constraints; design of strategies and programmes, and execution of planned activities.

***“Regulation of the private provision of public water-related services”*** (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 services”* (LC/R.1635/Rev.1), 25 September 1997 (see Circular **Nº 4**).

Drafts of some reports and previous issues of the Circular may be obtained through the Internet as a file in Word Perfect 5.1 for DOS. Requests may be addressed to either of the following e-mail addresses:

tleec@eclac.cl or  
ajouravlev@eclac.cl

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