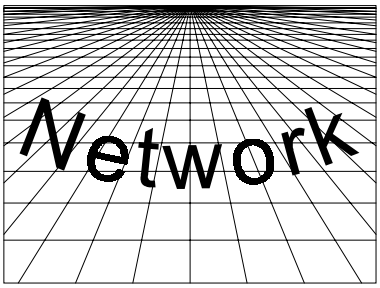
Network for Cooperation in Integrated Water Resource Management for Sustainable Development in Latin America and the Caribbean

United Nations Economic Commission for Latin America and the Caribbean (ECLAC) N° 8 June 1999

CIRCULAR N° 8

From the hydrological viewpoint, water resources should be managed in accordance with the concept of the river basin. There are invariably problems in implementing such an approach, because most of the countries of the region have a long-standing tradition of centralized public administration. Attempts to apply the concept of water management at the river basin level in these countries have generally been only partially successful.

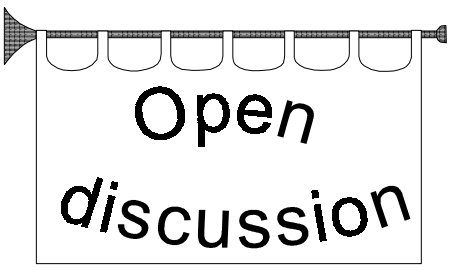


Despite this history, some progress has been observed recently in implementing that concept, and there has been widespread and increasing interest in creating and operating river basin authorities to manage multiple water use and resolve disputes arising out of its development. This revival of the notion of the river basin as the most appropriate unit for water management is mainly due to the fact that the river basin is the level which permits the best possible integration among all those having an interest in water management, whether in the private or public sector, and whether they are involved in productive water use or working for its conservation. In addition, water management at the river basin level is increasingly considered to be the best means of absorbing the environmental costs of water resource development.

This interest raise practical issues regarding the creation of water management systems or the improvement of existing ones. Some of the countries have useful experiences; however, the shortage of experience, and the failure to systematize what experience there is, are an obstacle to the sharing of ideas and the dissemination of the available knowledge. They also impede the formulation of policies and legislation in this sphere.

One of the most urgent tasks, therefore, is to make progress in disseminating the experience gained from past initiatives in the countries of the region in water management at the river basin level. ECLAC has already begun doing so, with the documents 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 (currently available in Spanish and proximately in English) and ***Creación de entidades de cuenca en América Latina y el Caribe*** (Creation of river basin organizations in Latin America and the Caribbean) (LC/R.1739), 10 July 1997 (available in Spanish only) (see Circulars N° 6 and N° 7). The holding of the ***second workshop for managers of river basin authorities in Latin America and the Caribbean***, on which this issue reports, is a further proof of efforts to further the creation and operation of river basin organizations.

As always, our readers are encouraged to submit information on past or future activities, courses or publications, and to communicate any other comment, article, concern or suggestion relating to the Network's objective of promoting cooperation in integrated water resource management.



In 1997, ECLAC cooperated with the General Department of Water (*Dirección General de Aguas - DGA*) of the Government of Chile on reforming that country's water code. The Government had expressed interest in reforming the code owing to its potentially monopolistic effects which had been recognized in decisions by the Central Preventative Commission (992/636/97) and the Resolutory Commission (480/97).

CONTENTS

Those decisions recognized that, since water rights were not tied to any requirements of effective and beneficial use, there was a potentially monopolistic concentration of water rights. The latter were not always used, but could be employed to impede market entry in the area of electric power generation. It was therefore recommended that no new water rights should be granted until the legislation has been amended.

As a result of this and other situations, the Government of Chile has submitted a draft

water code reform to Congress, including a proposal that new water rights should be subject to requirements of effective and beneficial use as a condition for their maintenance.

ECLAC has provided assistance to the Government, based on the premise that water belongs to the public domain and the actions of the Government in requiring effective use were consistent with the normal conditions for water use throughout the world (the United States, Spain, Mexico, Brazil and Argentina, for example). Such conditions, as expressly embodied in United States law, are designed to prevent monopolies and speculation in a vital good having environmental, social and economic dimensions.

A decision by the Constitutional Court of Chile (court records, roll Nº 260 of 13 October 1997) recognized that public ownership of water does indeed enable the Government to impose requirements of effective and beneficial water use and that this does not impair the constitutional guarantee of the freedom to own property, since the goods themselves are in the public domain and private rights are generated only through concessions. The Government has powers to regulate concessions as the public interest demands.

It should be noted that this decision, which is an important one for Chile, is not innovative in terms of comparative water law, since the requirement of effective use on the penalty of forfeiture for non-use is standard throughout water law and particularly in the United States, where the ethical, economic, legal, environmental and anti-trust dimensions of the principle have been fully developed.

Details of all the cases mentioned in this note are available to interested readers.

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The ***Fluid Mechanics Group*** (*Grupo Mecánica de Fluidos*) of the Polytechnic University of Valencia, Spain, is carrying out a number of activities in the area of water engineering:

- Publication of the journal "***Ingeniería del Agua***", the objectives of which are to disseminate the theoretical and practical experience of the Mediterranean and Latin American regions, to promote study and the technical application of progress in the water engineering field, and to provide access to information for technicians and scientists in administrative, engineering and construction tasks (*http://www.upv.es/ria*);
- Creation, within the ***European Thematic Network of Education and Training for ENVIRONMENT-WATER*** (ETNET), of a Latin American database to provide "who's who" information in the area of professional training in water engineering; and
- Other activities including the production of publications, such as "*Ingeniería hidráulica aplicada a los sistemas de distribución de agua*", "*El agua en la Comunidad Valenciana*", "*Los abastecimientos de agua urbanos. Estado actual y tendencias futuras*", "*Mejora del rendimiento y de la fiabilidad en sistemas de distribución de agua*" and "*Transitorios y oscilaciones en sistemas hidráulicas a presión*" and software packages (for example, *EPANET*, for analysis and dynamic simulation of hydraulic networks, *DYAGATS*, for design and analysis of the waterhammer phenomenon in simple tubing, and *DIOPRAM*, for optimum design of branched networks), as well as the master's degree programme in management and efficient use of water.

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WWW: http://agua.udmf.upv.es/default.html

The ***second workshop for managers of river basin organizations*** was held at ECLAC headquarters from 11 to 13 November 1997, organized by ECLAC and the Ministry of Foreign Affairs of France, Regional Delegation for Scientific and Technical Cooperation for the Southern Cone. Participants in the workshop included experts from Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, France, Guatemala, Italy, Mexico, Paraguay, Peru, Spain, Uruguay and Venezuela, as well as representatives of international bodies.

The central objectives of the meeting were:

- to analyse the legal, institutional and financial aspects of the creation and operation of river basin organizations; and
- to acquire and systematize knowledge of successful experiences in the creation and operation of such bodies and facilitate its application in the region. Efforts were also made to make progress in elaborating technical specifications and designing procedures to create and operate such entities.

The discussions focused on the following issues:

- Progress in the creation of river basin organizations in the region, and the outcome of the second General Assembly of the International Network of Basin Organizations (INBO), held in Valencia, Spain from 2 to 4 October 1997 (see Circular Nº 7).
- The outcome of the first Workshop for Managers of River Basin Organizations in Latin America and the Caribbean ("Sustainable Development and River Basin Management"), held in Rio de Janeiro, Brazil, from 4 to 6 December 1996. Systematization of information on river basin organizations.
- Options for the financing of river basin organizations, with particular reference to organizational, political, legal and administrative conditions needed for this financing to be made effective.
- Experiences in the creation of river basin organizations and their evolution in the countries of the region.
- Experiences in forms of financing of river basin organizations. Economic and financial justification and legal framework for their financing.
- Formalities and legal requirements for the application of "river basin master plans". Experiences in their formulation. Available conceptual models.
- Progress, difficulties and strategies in the creation of river basin organizations in Brazil and Mexico. Discussion and sharing of experience, with particular emphasis on preconditions for creating and operating such bodies.
- Experience in creating river basin authorities in countries outside the region.

The following were the main conclusions and recommendations produced by the experts relating to the creation and operation of river basin organizations:

Legal aspects

- The reformulation of water legislation should take into account the successes of previous legislation and embody its basic principles, as well as technological progress and the latest criteria and experiences in the sphere. New water legislation should include an explanatory introduction which clearly expresses the underlying motivations; the text of the laws should only cover substantive issues, leaving technical specifications to be incorporated in regulations.
- The participants suggested that in the formulation of new legislation, the work should be oriented towards a conceptual technique of the "framework legislation" type, tying the text in with other laws, and setting out broad and flexible criteria to facilitate effective application in such a way as to make the new laws always adaptable to situations that may arise in different regions within a country.
- Where the law provides for the creation of "integrated master plans", it should also specify their legal structure and adoption procedures, the minimum requirements for their implementation and their purposes and objectives, and should define responsibilities for their application.
- The law should provide for the creation of an entity at the water system level having sufficient institutional and financial autonomy to be able to collect the funds needed for appropriate management of water resources.
- The water management entity is generally set up as an autonomous public body, but mixed or semi-public structures are not excluded.
- In the regulations, water legislation should place greater emphasis on preventive measures, rather than on detection and punishment.
- The legal framework setting up a river basin organization should include a terminological glossary in order to avoid arguments over interpretation, and a list of powers and responsibilities which should be provisional and subject to change.
- In federal countries, where the states involved in water management structures are autonomous, the federal Government should create a law establishing national water policy objectives and providing for river basin authorities to be set up as an excellent means for decentralized regional management of water resources.
- The participants observed that mechanisms should be created for dispute prevention and settlement, conciliation, harmonization and other similar negotiations, tending to avoid cumbersome and lengthy court proceedings.
- Each country should endeavour to elaborate a set of technical and administrative standards to provide guidance for water management at the river basin level.

Financial aspects

- Modern legislation must specify the need to determine the value, price, and scales of charges for water, taking into account the fact that water is not only a resource and a socio-environmental factor, but also an economic good.
- To determine the economic value of water it is useful to use the market as a mechanism for allocating rights and financial contributions. It should be borne in mind that this principle is not absolute and that the market for water rights must be regulated by the State.
- In practically all countries of the region, water users are willing to pay for water-related commercial services. Furthermore, in some countries there is a growing belief that payment should be made for water use or for activities which cause externalities, and that the funds collected should be used to finance water management activities.
- The main weaknesses in the system of financing of the water sector in the countries of the region are not solely a matter of charging for water use as such, but also have to do with deficiencies in supervision and pollution control, water resources conservation, and monitoring the effects of extreme natural and other phenomena.
- The basic charge which is used for maintaining a water management entity at the river basin level should come from a fixed, permanent source, contributed by water users and by all the inhabitants of the river basin. Charging for contamination will only be feasible once systems are in place for direct or indirect measurement of contamination, which may take over 10 years; a simple system of charges should therefore be used initially.
- In many of the countries of the region, major weaknesses in existing legislation make it difficult to establish sources of financing which are clear, transparent and sustainable in the long term.
- Some countries of Latin America and the Caribbean have already implemented or are implementing systems of charges for water use, there are similar proposals in other countries, and many countries already have the elements that would be needed for the possible implementation of such systems.
- It is more efficient to meet the need for financial resources to support river basin authorities than to provide the same resources in order to alleviate the consequences of a negative impact caused by the lack of such management.
- The participants recommended that multilateral financial assistance institutions should expand their activities to support the creation of water management organizations at the river basin level.

Institutional aspects

- The nature and role of a water management organization at the river basin level should be clear and oriented towards serving water users in such a way as to promote appropriate water use in qualitative and quantitative terms, minimizing potential conflicts among users. Such organizations should not be given conflicting roles, and their tasks and functions should not replace the functions of already existing bodies.
- A few organizations already existing in the countries of the region tend to perform tasks corresponding to a river basin organization. The existing bodies should not be changed, but should be adjusted, strengthened and made financially sustainable in the long term. A water management body at the river basin level should avoid taking over the functions of existing bodies, public or private, which have functions connected with water management; rather, it should strengthen their operational capacity.
- Water management models cannot be transferred inflexibly from country to country; rather, they should be adapted to local needs. What can be done, however, is to adopt the underlying principles of a particular water management model, adapting it to needs and conditions in each country, region and river basin.
- Programmes should be designed, set up and implemented to promote and strengthen river basin management entities in the countries of the region.
- For a system of multiple water-use management to function properly, each user sector should be capable of appropriate operation and maintenance of its own water systems.
- Measuring stations for obtaining information on water resources can and should be constructed and operated by each user sector to the extent necessary for operating their systems. However, it is essential that all the information should be concentrated in a "water information centre".
- A State water department having technical and regulatory functions of a multisectorial nature should not be dependent upon a user sector; this would make it both judge and party in the same case, diminishing its authority. It is best not to separate the construction of waterworks by Government from the technical, regulatory and operational aspects of water systems. Also, during the phase of investment in major waterworks designed for multiple water use, the organization which will be in charge of

managing multiple water use at the river basin level should be set up.

- Locating a water department within a natural resources institute is appropriate for conducting scientific and environmental studies on the availability of water, but not for setting it up as the national water authority in such an inconvenient location.
- Pilot projects should be set up in relation to the establishment and launching of water management bodies at the river basin level, and studies should be conducted into the systematization of experience gained from such projects.

Additional details on the workshop can be found in "***Informe del II Taller de Gerentes de Organismos de Cuenca en América Latina y el Caribe (Santiago de Chile, 11 al 13 de diciembre de 1997)***" (LC/R.1802), 12 February 1998 (see "***Publications***"), and in the "***Research and Studies***" section of the ECLAC website (*http://www.eclac.cl/espanol/investigacion/dmad/lcr1802/iorganiz.htm*, *http://www.eclac.org/espanol/investigacion/dmad/lcr1802/iorganiz.htm* and *http://www.cepal.org/espanol/investigacion/dmad/lcr1802/iorganiz.htm*).

Second ASCE-ECLAC workshop on private participation

The ***second ASCE-ECLAC workshop on private participation in the administration and operation of water supply and sanitation utilities in the Americas*** was held from 3 to 6 February 1998 in San José, Costa Rica, organized by the American Society of Civil Engineers (ASCE) and ECLAC, together with the Regional Coordination Committee of Drinking Water and Sanitation Institutions of Central America, Panama and the Dominican Republic (CAPRE). This meeting continued the discussions begun during the first ASCE-ECLAC workshop on aspects of the privatization of water-related utilities in the Americas (see Circular Nº 3).

Participants in the workshop included experts from Canada, Costa Rica, the Dominican Republic, Guatemala, Honduras, Mexico, the Netherlands, Nicaragua, Peru, the United Kingdom and the United States of America.

Discussions focused on experiences of privatization within and outside the region, private sector participation in medium-sized and small systems (experiences in Costa Rica, Trinidad and Tobago and the United States), private sector participation in large systems (experiences in Canada, Chile, Colombia and Mexico), institutional arrangements, and the outlook for the future. The participants agreed on the following recommendations:

Setting goals, priorities and strategies for water supply and sanitation so as to protect human health and safeguard the environment:

- The prime goal must be the protection of human health, therefore, drinking water supply should be given priority until universal supply has been achieved.
- If pressurised piped water supply and water-borne sewerage is the preferred solution then joint installation is to be recommended. The best option involves installing major collectors or, at least, designing for their future installation. Solutions must consider individual situations, for example the importance of protecting tourism, and be site-specific.
- Waste treatment, normally, can be a secondary priority once universal water supply and sewerage coverage is achieved.
- Education should be an important element in strategies.
- The goals established and the actions to achieve them should recognise national and local health and environmental characteristics as well as the availability of resources.

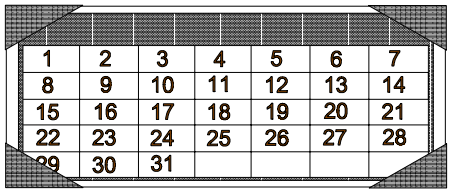
Improving the efficiency of public sector water supply and sanitation companies:

- The Chilean experience has shown that it is possible to achieve high levels of efficiency in water supply and sanitation provision through public sector companies. Two of the prime elements in this achievement appear to have been: (i) strict standards for financial reporting, similar to those of private companies; and (ii) the establishment of a rigorous independent regulatory authority. Other elements seem to be a well-qualified staff, competitive salaries, company autonomy and accountability to directors, to owners (CORFO) and to the consumers.
- The World Bank and the Inter-American Development Bank made a major effort in the 1980's in institutional building in the public sector, but it did not succeed. There seem not to have been any thorough studies of why this occurred.
- Not only in Chile are there well run public sector companies. It is important to learn which factors are most significant in improving performance.
- It is important to recognise and influence public expectations. Public involvement, through advisory consumer groups, as the experience of São Paulo illustrates, can help to improve accountability.
- There is a general tendency towards "municipalisation" of services. The question here is to ensure sufficient managerial ability and financial resources to allow real improvements in services, as well as, to manage private participation. There is a need to look again at the Chilean experience with regional companies.

ECLAC offered to attempt to identify relevant criteria to take into account when governments are considering changing the structure of the water supply and sanitation sector.

Additional details on the first and second ASCE-ECLAC workshops on private participation in water utilities as well as the papers presented at them can be found in "***Proceedings of the Workshop on Issues in the Privatization of Water Utilities in the Americas (Santiago, Chile, October 4-6, 1995)***" (LC/R.1722, 26 May 1997), "***Proceedings of the Workshop on Issues in the Privatization of Water Utilities in the Americas (Santiago, Chile, October 4-6, 1995). Contributions to the Workshop on Issues in the Privatization of Water Utilities in the Americas. Addendum 1***" (LC/R.1722/Add.1, 26 May 1997), "***Contribuciones al Taller sobre aspectos de la privatización de las empresas de servicios públicos relacionadas con el agua en las Américas***" (LC/R.1723, 26 May 1997), and "***Report on the Second Workshop on Private Participation in Water Supply and Sanitation Utilities in the Americas" (San José, Costa Rica, 3-6 February, 1998)***" (LC/R.1868, 9 November 1998).

Future activities



CCWI '99

The Centre for Water Systems at the University of Exeter will hold the ***International Conference on Computing and Control for the Water Industry*** (CCWI'99), from 13 to 15 September 1999, in Exeter, United Kingdom. Its objectives are: (i) to facilitate continued cooperation of academic institutions and industry; (ii) to examine the current state-of-the-art in computing and control techniques applicable to the water industry; and (iii) to provide a forum for discussions and the dissemination of ideas on applied computing and control for the water industry, with particular emphasis on: provider's perspective - recent developments in research, user's perspective - users' experience of latest techniques, and future needs - current and future planning and operational requirements.

Application areas are intended to cover water supply and distribution. The topics of interest include, but are not limited to, the following: (i) steady-state and transient analysis, modelling and simulation;

(ii) operational management, scheduling and control; (iii) resource management and allocation; (iv) quality modelling, management and control; (v) monitoring and estimation; (vi) information and decision support systems; (vii) geographic information systems; (viii) internet, intranet and extranet applications; (ix) SCADA, data modelling and management; (x) rehabilitation planning and optimization; and (xi) performance, security and reliability assessment.

Additional information is available from:

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WATERSHED 2000

The Water Environment Federation (WEF), the British Columbia Water and Waste Association, and the Western Canada Water and Wastewater Association are sponsoring the international conference ***WATERSHED 2000***, to be held from 9 to 12 July 2000, in Vancouver, Canada. The conference will bring together environmental professionals for a showcase on integrated resource management and environmental protection principles using watershed-based approaches.

The conference will explore national and international challenges of managing watersheds. Topics to be discussed include: sustainable watershed protection; multiple use watershed management approaches and steps; voluntary versus mandatory approaches; local, regional, national, and international jurisdictional issues; total maximum daily loads and watershed pollutant load trading; watershed restoration activities and habitat improvements; effectiveness of best management practices; regulatory, legislative, and institutional issues; forestry, agricultural, and mining best management practices and issues; managing watersheds to support fisheries; coastal and wetland issues; water resource planning and source water protection; urban watershed issues; land management (public and private); geographic information systems, modelling, and monitoring; use of environmental indicators and standards; public education and stakeholder involvement; financing best management practices and watershed programs; risk-based watershed management strategies; creative watershed programs (case studies); and balancing environmental and economic issues.

Additional information is available from:

Technical Programs - WATERSHED 2000
Water Environment Federation
601 Wythe Street
Alexandria, VA 22314-1994. U.S.A.

Tel.: 703 684 2400
Fax: 703 684 2413

New Trends in Water and Environmental Engineering for Safety and Life

An international conference entitled "***New Trends in Water and Environmental Engineering for Safety and Life: Eco-Compatible Solutions for Aquatic Environments***" will be held in Napoli, Italy in July 2000. The conference will focus on the new approaches to land and water management and protection.

Topics to be discussed include: fluid mechanics aspects of eco-hydraulics techniques; eco-hydraulics in soil erosion and sediment transport; remote sensing applications in eco-hydraulics; instream flow requirements and minimum acceptable flow; flood plain rehabilitation; biological aspects of eco-hydraulics; architectural and planning of fluvial/coastal landscape; and economical and legal aspects of the environmental hydraulics. A parallel exhibition of industrial products for the protection of the environment will be organized.

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Water Resource Management - Efficiency, Equity and Policy

The University of Cyprus and the Centre for Social and Economic Research on the Global Environment (CSERGE) University College London are hosting an international symposium on "***Water Resource Management - Efficiency, Equity and Policy***", and are inviting papers in the area of water management and related economic and policy issues for presentation at the symposium to occur at the University of Cyprus, from 22 to 24 September 2000.

The symposium will focus on different aspects of water resource management, ranging from supply and demand management issues to institutional and legal frameworks that effect certain management regimes. It will provide an opportunity for scholars and practitioners to engage in a series of sessions that reflect the scope and depth of this active and important area of research and policy activity.

Papers are invited in the following four areas: (i) optimal water resource management (demand, supply, management); (ii) welfare aspects of water management (distributional and welfare implications of water supply policies and water pricing); (iii) political economy of water (conflicts, rent seeking, prior appropriation); and (iv) instruments for management (institutions, prices and property rights, law reforms)

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Manaus 99

The ***International Symposium on Hydrological and Geochemical Processes in Large–Scale River Basins*** (with special emphasis on the Amazon and other Tropical Basins) (Manaus 99) will be held from 15 to 19 November 1999, in Manaus, Brazil. This symposium will address all aspects of hydrology, geochemistry, eco-hydrology and the general role of large river basins (more than ten thousand square kilometres) as pathways of materials transport, and their contribution to the ocean. The topics for discussion are:

- Hydrology of large-scale river basins (water balance and hydrological regimes: role of environmental factors; short and long-term (100 years) variability of river discharge: implications for the water yield to the oceans; impact of the ENSO events on the hydrology of large rivers; and major advances in instrumental gauging techniques for large rivers and hydrological network management).

- Erosion, transport and sedimentation in the large-scale river basins (runoff generation, erosion and associated material fluxes; long-term variability of sediment transport: implications for sediment yields to the oceans; use of new technologies in the determination of sediment load in large rivers; and sediment storage in foreland basin systems: correlation between actual processes and subsidence history).
- Geochemistry of large-scale river basins (weathering processes: use of geochemical tracers; transport of chemical species: role of the colloidal phase and the adsorption/desorption processes; transfer of river-borne material to the oceans; and integrated hydrological and biogeochemical studies).
- Eco-hydrology of large scale river basins (riparian zones and wetlands as control points in regional nutrient cycles; hydrology and biological productivity links in large floodplains; impacts of human activities on water quality and biogeochemical cycles; and impacts of engineering projects of large basin eco-hydrology).
- Toward hydrological and biogeochemical models of large-scale basins (hydrological and sediment transport models; and coupled hydrological and biogeochemical models).

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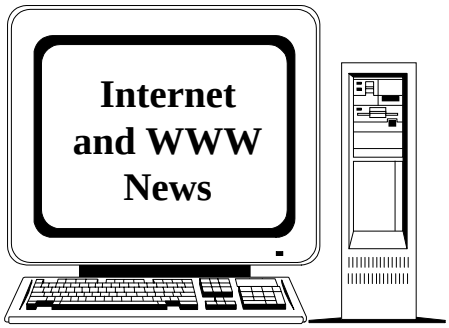


We continue our discussion on communication networks through which information on integrated water resource management may be obtained.

Places of interest

- The website of the ***Regional Office for Latin America and the Caribbean of the United Nations Environment Programme*** (UNEP/ROLAC) contains much useful information, including an exhaustive list of environment ministries, departments and governmental authorities in the countries of Latin America and the Caribbean, and the final report of the eleventh Meeting of Ministers of the Environment of Latin America and the Caribbean which was held in Lima, Peru, from 10 to 13 March 1998 (*http://www.rolac.unep.mx/indice_i.htm*).

- Readers are invited to visit the website of the ***Department of Water Resources of the Ministry of the Environment, Water Resources and the Amazon Treaty Region*** of Brazil (*http://www.mma.gov.br/port/SRH/*), which provides access to a great deal of information including legislation governing the sector, information on national water resources policy and the national water resources management system.

- A mirror for the ***United Nations Educational, Scientific and Cultural Organization*** (UNESCO) website, produced in cooperation with the University of Nebraska in the United States, has recently been inaugurated on *http://mirror-us.unesco.org*. This new website should give a quicker access time to users in the Americas. With more than 40 000 pages and ten databases updated daily, this website offers information on all UNESCO activities, documents and publications, as well as UNESCO conferences and events. Numerous hyperlinks exist with other websites of organizations in the United Nations system as well as with those of UNESCO's main partners.

- ***WWW Virtual Library IRRIGATION*** is an excellent catalogue of information relating to irrigation which is available on the Internet (*http://www.wiz.uni-kassel.de/kww /projekte/irrig/irrig_i.html*). It has completely been reorganized to facilitate the information retrieval in the field of irrigation and related topics, and a search service has been implemented allowing a fast and effective search.

- The Internet address of the ***Citizens' Movement for Water*** (*Movimento de Cidadania pelas Águas*), an initiative by the Department of Water Resources of the Ministry of the Environment, Water Resources and the Amazon Treaty Region of Brazil, is *http://www.radiobras.gov.br/agua.html*.

- The website of the ***International Commission on Irrigation and Drainage*** (ICID) (see Circular N° 6) is at *http://www.ilri.nl/icid/ciid.html*. The site contains much information on the Commission: its objectives and activities, members, national committees, news, publications, databases, events, conferences, cooperation with international organizations, etc.

- The ***IRRISOFT*** database (*http://www.wiz.uni-kassel.de/kww/irrisoft_i.html*) provides information on irrigation and hydrology software (public domain, shareware and commercial software) and links to servers containing the software packages and further information.

- Exhaustive information on the activities of the ***U.S. Geological Survey*** (USGS) is available from its website at *http://www.usgs.gov/*.

- ***AguaTIC*** is a Spanish-language electronic journal on aquaculture; its address is *http://AquaTIC.unizar.es/*.

Aiguarium

Aiguarium is a new interactive scientific information medium specializing in water issues (*http://www.upf.es/occ/aiguarium*). Its structure grows on the basis of user contributions. It includes a documentary database, and experts are available to respond to requests from users. Aiguarium publishes fortnightly monographs on water-related subjects, which are updated periodically on the basis of requests, contributions and questions from the public. It also functions as a meeting place for those interested in the subject.

Water Forum

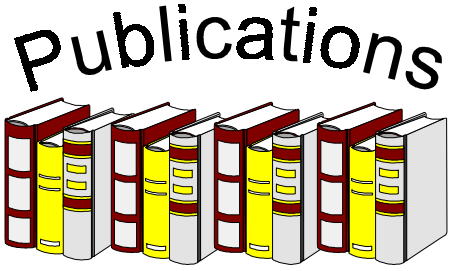
The ***Water Forum*** is a virtual forum for all those - Governments, NGOs, international organizations, research centres, universities, the private sector and individuals - interested in sustainable water resources management (*http://www.gwpforum.org*). Among other things, the Forum provides a medium for exchanging, disseminating and obtaining information about all aspects of water resources management; links to various databases, libraries and places of interest; a space for discussion groups and newsgroups; and the means for creating networks. A calendar of events is available for conferences, seminars, symposiums and other events which address water resources management topics.

One of the many ways of participating in the Forum is to create an individual "kiosk", a small personal Web page. This can contain any data, such as general information on activities, training or publications or a link to the website of the owner of the kiosk.

The ***ICM-L*** is a new e-mail discussion list managed by the River Basin Management Society, an Australian group established in 1986 to advance a balanced approach to land, water and natural resource management on a catchment basis (*http://home.vicnet.net.au/~rbms/*).

The list is designed to facilitate communication between scientists, managers, farmers, recreationalists, fishers and practitioners in the area of Integrated Catchment Management, internationally. According to the description of the list, "Integrated catchment management" is a holistic approach to natural resource management of land and water. It aims to integrate the various scientific, engineering, management and practical disciplines to enable sustainable management of the land and water resources within a catchment. Integrated catchment management is based upon the concept that a catchment or river basin is the smallest geographic unit that can be managed holistically.

Additional information on the list is available at *http://avoca.vicnet.net.au/~rbms/icml.htm*. To subscribe to it, send the command *subscribe icm-l@vicnet.net.au <your email address>* to *majordomo@vicnet.net.au* and leave the rest of the message blank.



Recent publications of the Natural Resources and Infrastructure Division related to integrated water resources management in Latin America and the Caribbean:

- "***Ordenamiento político–institucional para la gestión del agua***" (LC/R.1779), 7 January 1998 (available in Spanish only). River basin management is defined as the organization of coordinated actions by mankind in the light of their impact on the natural system formed by the river basin and the dynamics of that system. The management of multiple water use at the level of a river basin or two or more interconnected river basins is one of the options for "river basin management". ECLAC already has a long-standing tradition in promoting the management of multiple water use at the river basin level, based on the principle that effective water management is a necessary step on the way to integrated environmental management. There is widespread interest in Latin America and the Caribbean in creating and operating water entities or organizations at the river basin level to administer multiple water use and resolve conflicts arising out of water resource development, but this interest has not yet been sufficiently realized with the necessary scale and depth in the countries of the region. In order to guide the creation of such entities, ECLAC has contributed substantive documents to the following meetings: the General Assembly of the International Network of Basin Organizations (Valencia, Spain, October 1997), the workshop for managers of river basin organizations of Latin America and the Caribbean (Santiago, Chile, November 1997), and a seminar-workshop on development of management capacity for water resources (Lima, Peru, December 1997). The present document is a synthesis of those contributions, which are mainly oriented towards legal, financial and institutional aspects relating to river basin organizations in the region. It covers a series of considerations and recommendations for procedures and studies relating to the creation and operation of river basin organizations which are generally accepted by the managers of such entities. The recommendations take into account the conditions prevailing in the countries of Latin America and the Caribbean. Reference is made to modifications currently under way in water legislation. The document contains five annexes: two of these describe study projects relating to institutional aspects, two relate to an analysis of financial systems, and the fifth discusses and gives renewed attention to an effort in the area of municipal participation in integrated river basin management. The main purpose of this document is to serve as a basis for sustaining and guiding the creation of river basin organizations, and to suggest studies and projects to justify their existence.

- "***Prices, property and markets in water allocation***" by Terence R. Lee and Andrei S. Jouravlev (LC/L.1097), February 1998 (*Serie Medio Ambiente y Desarrollo* Nº 6) (also available in Spanish). The development of water markets is an idea which has gained strength in many countries. Since water is a finite resource having economic value, the creation of stable rights and the introduction of transfers constitute a major element in ensuring the economic optimization of its use. This means that water sector professionals must be open to the idea of transfers of water rights. This report examines the means to incorporate the use of market signals through prices into water resources management with the objective of improving efficiency in the allocation of water. It reviews a vast body of recent literature on tradable resource use rights as well as actual experiences with implementing tradable water rights programmes both in Latin America and in the rest of the world. The issues discussed include the conditions required for a well-functioning water market; the potential strengths and weaknesses claimed for markets as a means of water allocation; the characteristics of the operation of a water market; types of transactions; the initial allocation of water rights; design issues, including permanent and time-limited water rights, and hydrological security and allocation rules; the limitations of markets and the factors that can adversely affect their performance, including externalities (return flow, instream and area-of-origin effects), market power, transaction and transportation costs, and steps to mitigate them; and opportunities for expanding the role and scope of water markets. The full text of the report is available at: *http://www.eclac.cl/English/research/dmad/lcl1097/conten~1.htm*, *http://www.eclac.org/English/research/dmad/lcl1097/conten~1.htm* and *http://www.cepal.org/English/research/dmad/lcl1097/conten~1.htm*).

- "***Progress in the privatization of water-related public services: a country-by-country review for Mexico, Central America and the Caribbean***" (LC/R.1697/Rev.1), 5 February 1998 (also available in Spanish) and "***Progress in the privatization of water-related public services: a country-by-country review for South America***" (LC/R.1697/Add.1), 16 June 1998 (also available in Spanish). These reports, which are updated versions of earlier reports (see Circular Nº 4), examine recent events concerning private sector participation in the provision of water-related public services in all the countries of the region. The information on each country summarizes the situation of private participation in the sectors of drinking water supply and sanitation, electric power, irrigation and drainage, and

inland waterway transport; statistical data on these sectors are also provided. Private sector participation is still in its infancy in the majority of the countries and the public sector administers most of the infrastructure, but there are a few examples and ambitious plans have been made. There are few such examples in the area of drinking water supply and sanitation, and they are mostly limited to Argentina, Chile, Dominica, Mexico, Puerto Rico and Trinidad and Tobago, while in the remaining countries the private sector mostly participates through small private enterprises and subcontracting. Reforms have progressed much further in the electric power sector. Many countries have decided to break up existing State monopolies and to set up independent generation, transmission and distribution entities, privatizing them fully or partly, and to use electricity pools and fixed-term contracts to introduce competition in electric power generation. Other countries prefer an evolutionary reform process in which competition in electric power generation is introduced gradually.

- "***Informe del II Taller de Gerentes de Organismos de Cuenca en América Latina y el Caribe***" (LC/R.1802), 12 February 1998 (available in Spanish and proximately in English) (see "***Meetings***").

- "***Reflections on territorial strategies for sustainable development***" (LC/G.1944), 18 March 1998. English translation of the report "***Reflexiones sobre estrategias territoriales para el desarrollo sostenible***", prepared for the Summit Conference on Sustainable Development, Santa Cruz, Bolivia, 7 and 8 December 1996 (see Circular Nº 5).

- "***Integrated water management from the perspective of the Dublin Principles***" by Miguel Solanes (*ECLAC Review*, Nº 64, LC/G.2022-P), April 1998 (also available in Spanish). This article analyses the relation between the 1992 Dublin Principles, integrated water planning, and water law. The Dublin Principles were an attempt to concisely state the main issues and purposes of water management in the following terms: fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment; water development and management should be based on a participatory approach, involving users, planners and policy makers at all levels; women play a central part in the provision, management, and safeguarding of water; and water has an economic value in all its competing uses and should be recognized as an economic good. The article does not seek to endorse any single given model or solution, but to provide a set of alternatives and experiences which may be of use to readers desiring information on institutional aspects of water management. Throughout the world, water legislation offers examples of systemic approaches to water resources management which incorporate, more or less comprehensively, the principles and norms of integrated water resources management and planning. However, there are different types of approach and degrees of development. These differences include those relating to the ethical aspects of integrated water management, the capabilities of water management agencies, public participation (generally limited), information, water rights and planning, water pricing and the limits of planning.

The publications of the Natural Resources and Infrastructure Division are available in two formats: (i) electronic files distributed directly over the Internet as "attachments"; and (ii) as printed documents, single copies of which are sent free of charge by post. Requests for copies should be sent to: *ajouravlev@eclac.cl*.

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