

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



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

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Water resources management has come to figure as a major item on the agenda at national and international meetings, after a long period in which the issue went relatively unnoticed among other environmental topics. Recent international meetings, however, have neither touched on new aspects nor, apparently, made any major strides in improving water management policies, particularly not in the Latin American and Caribbean countries. The concerns of national, regional, provincial and local governments have proved to be a great deal more elementary than the lofty declarations of principles that usually arise from these events.

ECLAC is accustomed to receiving very specific water-related requests for assistance. Examples are support for preparing preliminary draft water legislation, evaluating the implementation of existing legislation, assisting with the organization of water management systems at the river basin level, transferring hydraulic infrastructure systems to users, participating in river and lake restoration programmes, recovering natural water courses in urban areas, developing plans for international river basin management and advising Governments on the privatization of water-related utilities. Consultancy requests have increased exponentially in recent years. Central Governments are no longer the only ones to request support. In the wake of decentralization and the privatization of water management and use, the demand for consultancy now comes from public and private organizations at national, state, provincial, departmental and local level, as well as universities, multilateral and bilateral aid agencies, non-governmental organizations, water-user commissions, public utilities, banks and river basin organizations.

This growing demand reveals a need for principles, processes and practices to enable

the different actors to proceed correctly in multiple water-use management and public utility regulation. As a general rule, the countries of the region lack these basic instruments by which to coordinate the work on a large scale, covering many regions and situations simultaneously and making the most of the scarce resources available.

To fill this gap, ECLAC attaches particular importance to its activities aimed at systematizing, analysing and comparing experiences in water management and utility regulation (political, legal, economic, environmental, social, financial and managerial aspects). It is hoped that organizations concerned with documenting and evaluating principles, processes and practices in water management and utility regulation will join forces in this task. Though still incipient in the region, such a joint effort would, without doubt, facilitate the concrete application of the great declarations that are approved in international gatherings. From the perspective of ECLAC, at this point in time, the “water crisis” is more of an institutional crisis than a water crisis as such.



Water management is akin to conflict management among human beings and between human beings and their environment. Water and river basin

management systems are created to avoid, prevent or resolve such conflicts. Humankind needs to learn to live with these conflicts and deal with them adequately. All the more so since the relative scarcity of water will become ever more pressing as time goes on, as a result of economic growth, social demands and climate change. Competition between users will become ever more intense and ruthless, so that legislation and institutions to manage the system satisfactorily will become an absolute necessity.

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Conflicts over water use are worse in river basins where human settlements have grown up or which supply urban areas—in particular those which are used by large populated, mining or industrial areas. These river basins are sometimes known simply as “urban basins”. To implement processes of integrated water and river basin management it is necessary to form alliances or agreements with many actors who normally act independently by sector, and in areas which do not coincide with the limits of the river basins. It is often difficult to coordinate these actors in Latin American and Caribbean countries due to the existence of a vast

informal sector of the population which neither complies with the legal norms nor responds to the economic instruments that are used in the countries more advanced in their organizations for water resources management and use.

The Division of Natural Resources and Infrastructure has recently published a book entitled "*Gestión de cuencas y ríos vinculados con centros urbanos*" (LC/R.1948) ("*Management of rivers and river basins linked to urban areas*"), written by Axel Dourojeanni and Andrei Jouravlev. This is the second book the Division has published on river basin management. The first was "*Políticas públicas para el desarrollo sustentable: la gestión integrada de cuencas*" (LC/R.1399, 21 June 1994) ("*Public policy for sustainable management: integrated river basin management*") (see Circulars N° 6 and 7 for details).

The present publication deals with situations of conflict that arise over the use of water and of the river basins that supply population centres, and over alterations to water courses as a result of human settlements. It analyses different modalities of river basin management and devotes particular attention to its operational aspects, with emphasis on the participation of local governments. Guidelines for setting up river basin organizations are also presented. Options for funding these organizations are suggested as well as guidelines for valuing the environmental services provided to urban areas by watersheds. An analysis of technical options for river basin management emphasizes alternatives for watershed management for drinking water supply and for managing water courses that pass through urban areas. The book also highlights the need to rehabilitate water courses, for their high value in conserving biodiversity, providing human recreation, mitigating the effects of flooding and controlling water pollution.

The publication makes reference to several river basin management situations in Latin America and the United States. It includes annexes on decision-making tools for the rational use of water in cities and technical specifications to serve as inputs for managing multiple water use at the river basin level. The text is based largely on material compiled by the authors on consultancy missions, contributions from professionals to water-related events, case studies and personal experiences. An extensive list of bibliographical references is provided. This book compiles and classifies information that is usually dispersed and difficult to access.

In this issue of the Circular we present the publication and focus on the processes

involved in creating river basin organizations. Our next issue will take a more in-depth look at other contributions the book makes to the topic of river basin management.

Processes involved in river basin management

Setting up any kind of river basin organization, with a view to river basin management under any of its modalities (see Circular N° 6), entails a series of ongoing processes that can be implemented in parallel. The processes that are particularly worthy of further analysis are: (i) communication and awareness-raising; (ii) formation of alliances and agreements; (iii) legalization of operations; (iv) scenario development, evaluation and diagnosis; (v) operational consolidation of each water user; (vi) administrative organization; (vii) economic valuation and preparation of strategies; (viii) operation of the shared hydraulic system; (ix) conservation of bodies of water, natural habitats and biodiversity; and (x) pollution control, stream corridor restoration and recovery of rural and urban drainage capacity. These processes can be divided into three groups: a central coordination process, a group of socioeconomic processes and a group of physical and technical processes.

Communication and awareness-raising.

Awareness-raising campaigns through whatever media are available are to be recommended before proposing the establishment of any river basin organization. It is a good idea to explain to the actors involved in managing the water resources of a river basin why an agency to coordinate their efforts is useful and necessary. This stage also serves to gather information, identify conflicts and compile bibliography. It is worthwhile to establish which bodies or organizations are operating in the basin, which of them distribute the water, how they measure distribution, if they keep water-quality records, if they have emergency programmes and, in general, how they operate the existing water systems and with what resources.

Formation of alliances and agreements.

The actors involved should set up a preliminary alliance to take action that will gradually progress toward the establishment of an overall system of river basin management. The scope of the alliance can be widened as time goes on but, initially, it is usually easier if the actors set a specific objective for their action (clean-up of a lake or river, reforesting a river bank, administering the water of a river or canal used by several users, managing the banks and course of a river or any other subject that

is of interest to more than one actor). The actors may include public or private, non-governmental organizations, municipalities, universities and professional organizations. Alliances must be formally established and set concrete goals for their work. Ultimately, this activity is expected to give rise to round tables for coordination and dialogue. The list of actors who are invited to take part must be flexible, since it will vary from one situation to another.

Legalization of operations. The legal framework for a river basin organization can be consolidated gradually. If there is no specific legislation under which to create a river basin management system, the parties could start with a simple agreement to carry out a project. The final objective of the process, however, is to give the river basin management system legal personality and clearly identifiable competencies to manage the water in the basin (collection of charges, monitoring, etc.), either directly or by coordinating the actions of responsible organizations. There are several ways of affording legal status to actions relating to river basin management, including ministerial resolutions establishing special programmes and projects and responsibilities which are assigned by law to municipalities, ministries or institutes, which then give their actions legal status through the modalities of ordinances, regulations and other directives.

Scenario development, evaluation and diagnosis. Once a minimum of commitment and agreement has been obtained among the actors in the alliance about what they want to achieve in the river basin through their coordinated action, the existing situation must be evaluated in order to arrive at a diagnosis. This will require the participation of an interdisciplinary team and can be defined as a management procedure for sustainable development. The actors must be encouraged to participate in a public debate about the issues to be addressed. It is also important to promote the use of geographical information systems and, in general, of all available techniques for describing what is happening in the basin, who the affected and responsible parties are, and the costs and benefits involved in the programme of action.

Operational consolidation of each water user. This aim of this process is to help each actor involved in managing the water and the river basin to ensure that they are complying fully with their responsibilities. For example, support should be given to organizations of agricultural users, drinking water and sanitation services, mining, fisheries and recreational users and, in general, all those actors who in some way alter the flow of water in the basin, to ensure that their practices conform to the highest standards

possible. This consolidation process includes providing support to local governments to help them comply with their environmental responsibilities and to ministries —such as health ministries— to help them discharge their role of environmental quality control, and to other entities including non-governmental organizations.

Administrative organization. All the stages must be carried out within an adequate administrative framework, including the collection of charges, registering of actors, accounting, financial controls, monitoring and ensuring compliance, procurement of equipment and hiring of staff and consultants. The administrative system will become more complex as the process advances. If the organization is to survive, it must make itself indispensable, and that will only happen if it generates confidence in its financial management and the quality of its work. The professionals who make up the administrative system must be suitably qualified.

Economic valuation and preparation of strategies. Plans are written strategies and strategies are presented in the form of programmes of work or projects which have due technical and financial backing. Once it has begun, the process of planning is never concluded. Planning should be seen as equivalent to building a system of information and rules, standards and criteria that facilitate decision-making among multiple actors. The factors which are used to calculate costs and benefits, design strategies and draw up a plan come from the stages of identifying the actors, their criteria, problems and objectives, building shared scenarios, evaluating the existing situation, making diagnoses and identifying obstacles and restrictions. The plan should serve to communicate intentions and coordinate where necessary.

Operation of the shared hydraulic system. Qualified technicians are needed to operate and maintain the hydraulic system built in the river basin and to support water conservation and management, and the many users in the river basin must also participate in the process. The basin's rivers and hydraulic systems must also be equipped with a series of water monitoring stations and satellite information systems, or these must be reinforced if they already exist. In general, the organization needs to be sufficiently equipped to be able to keep track of situations and plan ahead. Modern communications systems are essential to enable the overall system to function correctly.

Conservation of bodies of water, natural habitats and biodiversity. It is not enough to merely operate the hydraulic systems built. A huge amount of work is required to recover

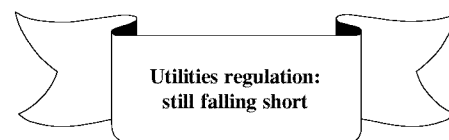
damaged areas along riverbanks and riversides and rehabilitate biological habitats. It is essential to mitigate the effects of conflicts related to water and river basin management by ensuring that plans for the use and occupation of the territory respect — as far as possible— the natural catchment and water-flow conditions in the basin. This is necessary to maintain all the river basin's original functions, in particular to conserve biodiversity and the landscape. This process requires town-planners to take account of natural water courses, with normal and seasonal flows, in their decision-making.

Pollution control, stream corridor restoration and recovery of rural and urban drainage capacity. In most river basins, especially in urban areas, this process entails reversing situations that have already profoundly altered water courses and flows. This is a long task and likely to be the most challenging of all. It is not possible to conserve basins or water courses if they have already deteriorated totally. While industrialized countries are in the process of rehabilitating stream corridors, most developing countries are in the process of destroying them.

This analysis is clearly not intended to be complete. Neither does it address how to combine all these processes in a flow diagram of work, incorporating the activities, staff and time for each action. The implementation of the stages described above will be greatly aided if theoretical and practical data is compiled to support the establishment of the river basin organization. This can be complemented with additional information such as an evaluation of the knowledge of water-users, the actors who will be involved in managing the water in the river basin, their criteria on multiple water-use management, the problems and conflicts involved in shared management and the objectives they are pursuing. It is also necessary to carry out a comparative analysis of past and present experience and attempts to create such organizations within the country —and if possible in more than one country— whether these have been successful or not.

A particularly important point for making the processes of creating and consolidating a river basin organization as smooth as possible is to begin while the hydraulic works are still being built, whether they are State- or privately operated. Commonly, the “master plan” for integral river basin management is not thought of until the works are finished. Still worse is that this often means that no resources are available for setting up the operative system —which amounts to much more than making a plan— including funding for complementary communication works and

monitoring systems. At least 5—10% of the cost of the major hydraulic works should be allocated to establishing the management system —including the necessary infrastructure. No less than ten years should be allowed for consolidation, especially in river basins featuring a combination of formal and informal actors and low-income groups.



An evaluation of the result of structural reforms and changes in public policy implemented in the region during the 1990s, as well as a balance of the problems still outstanding, were central issues at the twenty-eighth session of ECLAC, which was held in Mexico City from 3 to 7 April 2000. The session is the most important two-yearly gathering for ECLAC, when the Governments examine the progress of the Commission's activities during the preceding biennium and approve the plan of work for the coming two-year period.

At the twenty-eighth session, ECLAC presented a document entitled “*Equity, development and citizenship*” (LC/G.2071(SES.28/3)), which analyses the region's development challenges from the point of view of public policy, in the framework of the complex and dynamic process of globalization. In this edition of the Circular we present the main conclusions of the Chapter “*Utilities regulation: still falling short*” which members of our Division participated in preparing.

The countries of the region have been privatizing public utilities in response to a combination of financial forces and changes in political and economic paradigms. The process has been spreading across the region steadily since the mid-1980s, although the rate of advance, level of coverage and depth may vary from one country to another. An overall look at the situation reveals a general perception of quantitative and qualitative improvements in utilities following privatization. Two important lessons can be drawn from this process:

- First, privatization *per se* cannot take place until the regulatory and legal framework has been developed, and the designated institutions have been designed and set in place. Otherwise, reforms may prove unstable and give way to asset transfers and unjustifiable revenues, sometimes of very large quantities.
- Second, it is best to establish clear divisions among the various functions: policy-making for the sector, regulation,

and operation of services. Such a distinction marks a major step in institutional development, and in fact is to be recommended even if the decision is made to continue providing services publicly.

Market regulation grew by leaps and bounds in the 1990s. However, the region's experience demonstrates that, when competitive conditions cannot be guaranteed, regulatory frameworks and practices need to be improved. Some countries are clearly falling short in this area; in others, new challenges have arisen as markets mature.

New avenues are being found to coordinate public services; but regulatory schemes are clearly needed as a response to two basic types of problems posed by these solutions. In the first place, many utilities, by their very nature, are ill-fitted to the mechanisms typical of competitive markets. It therefore becomes necessary to construct a context more hospitable to competition by reorganizing production and introducing institutional and regulatory mechanisms. In the second place, the new private-sector actors make their decisions according to a rationale (profit maximization) that is not necessarily consistent with the overall social purposes expected of the basic public-service activities —requirements of coverage, quality and cost.

New options need to be found for seizing the advantages of private investment and management. However, it is equally necessary to ensure that reforms will be sustainable by offering greater efficiency and broader coverage, adapting better to technological change, intensifying competition, improving service quality and offering new services. In such a setting, regulation seems the best way to reconcile public and private interests in areas where differences may arise.

It is also understood that the basis of the market system is the transaction of individual ownership rights. Such transactions take place through contracts, and any disputes are settled in national or international courts. The trend recently has been for conflicts involving foreign investments to be transferred to international courts, even when the contract stipulates national jurisdiction as a condition. Thus, it is very important to consider and avoid any possibility that national-level regulatory processes could be in some way conditioned by agreements or other initiatives underway in the international sphere. Contracts need to be written with the utmost clarity and precision to protect a country that agreed to national jurisdiction as a condition of the contract from being taken by surprise with external arbitration.

Our analysis points to a number of conclusions. One of the most important is that practically no country in the region has general legislation on utilities regulation. The result has been the widespread fragmentation of national systems and a lack of legal backing for the most basic principles of public services. The countries therefore need to learn about experiences with regulatory reform from countries outside the region, in order to improve their systems and adopt general frameworks into which future regulations can fit. It is particularly important for these general frameworks to exist before specific contracts are signed.

In developing regulatory frameworks, it is important to bear in mind that, while the behavior of utilities is determined mostly by regulation, it is also affected by other types of legislation. General laws that protect and promote competition may well apply, as may specific legislation, including contract law and laws for the protection of natural resources, such as water.

Certain minimum principles need to be respected in the drafting of specific regulatory frameworks, so as to guarantee oversight of the activities and their objectives: service of acceptable quality and quantity; reasonable rates; information; access to essential facilities and natural resources; and binding rules for accounting, procedural matters and dispute settlement, to ensure transparency and impartiality. Such regulations should be relaxed only if market structures are clearly able to ensure effective competition.

Because the potential for competition varies according to the nature of each activity, it would be a mistake to apply a single general scheme to everything. In a few cases in the region, countries have adopted regulatory systems based on the assumption of competition, when in practice, there was none. A useful principle for the countries to establish would be that of residual regulatory capacity, understood as the authority to remedy regulatory gaps if initial expectations of performance and behaviour are not fulfilled.

Regulations do not always clearly recognize the importance of essential facilities, or the need to guarantee fast, adequate access to them. Rules and practices tend to be weak in this regard or fall short of the ideal. Despite significant progress, the region also suffers from demonstrated deficiencies in its institutional capacity to regulate the activities of holding companies and conglomerates. Certainly, no company has earned the right to operate as an unregulated monopoly; but antitrust laws, in and of themselves, are not enough. More

specific provisions need to be on the books for tackling problems that involve holding companies, intra-company transactions and transfer pricing, so that the actions of all subjects that determine market structures can come under regulation.

In some cases, current practices, contracts and regulations may need to be altered; such an action, however, needs to be backed up with a solid base of information and must respect the principle of reasonable rate of return, in order to uphold constitutional property guarantees. Measures of this kind have clear precedents in the experiences of the United States and the United Kingdom, whose mature regulatory systems have a key common goal: to promote sustainable provision of services, without excessive cost to users. Some of the systems that were examined in this region do guarantee a minimum level of profits but set no limits; others make no reference to the principle of reasonable rate of return. These shortcomings need to be remedied, as reasonable rates are an important guarantee for users and providers alike.

Other important issues that require more detailed coverage in the region's regulatory systems are the inclusion of quality standards for services, penalties for violation of these standards, and customer information. Deficient regulation is tantamount to charging users an additional tax, which strikes a blow against equity. Indeed, some authors have claimed that service providers in developing countries are reaping excessive profits.

Various countries of the region have attempted to replace cross-subsidies with targeted subsidies. However, many lack the political, tax and auditing conditions necessary to bring about such a change. Moreover, the persistent practice of granting subsidies and guarantees to companies continues to generate contingent liabilities.

Consumer protection and participation are relatively new in the region. Several governments began to pass legislation recognizing consumer rights and establishing protection mechanisms from the mid-1980s onward. Current regulatory frameworks still fall short, however. One critical issue is tariff-setting which, in some cases, has become a mere exercise in negotiation between companies and regulators.

The countries of this region and elsewhere have acquired a variety of experiences with regulatory bodies, including different approaches to institutional placement, configuration and degree of autonomy. These issues depend very much on each specific institutional setting, and much more attention to them is required in Latin America and the

Caribbean, which have on the record various instances of regulatory capture of a given agency or even of the regulatory process as a whole. As a general rule, in order to minimize such a risk, it would appear best to establish a more balanced system of powers, with checks and balances and greater accountability.

It is no secret that the asymmetry of information seriously affects the quality of regulation. For example, few countries in the region have compulsory, uniform accounting systems even though such systems would help reduce to an acceptable level the degree to which asymmetric information is able to skew the efficiency and transparency of the regulatory process, especially with regard to rates. Given a lack of appropriate information, it becomes very difficult and complex to justify regulation. The legal acceptability of a regulatory system is a function of its reasonableness, which in turn depends on whether the facts on which it is based can be proven. A lack of information also leaves users unprotected and unable to act, when their basis and means of participation are already very limited.

Finally, an issue that needs to receive more and more attention is that, while private companies are operating in increasingly global spheres, regulatory bodies continue to be national agencies. The countries of the region stand to benefit if they can promote contacts, exchange of information and the design of common strategies, regionally and subregionally, between regulatory bodies and the entities that are promoting competition.

The full text of the document "*Equity, development and citizenship*" and other information about the twenty-eighth session of ECLAC, are available in English and Spanish on the ECLAC website, <http://www.eclac.cl>, or its mirror sites at <http://www.eclac.org>, <http://www.cepal.cl> and <http://www.cepal.org>.



The *Institutional Reform for Irrigation and Drainage Workshop* was held in Washington, D.C., the United States of America, 11 December 2000, organized by

the World Bank. The main objectives of the workshop were: (i) to serve as a major input to the formulation of the rural Vision to Action strategy update and the Water Strategy of the Bank; and (ii) to respond to the main issues raised in the evaluation of the implementation of the Bank's water strategy.

Miguel Solanes, Regional Advisor on Water Law and Public Service Regulation, participated from our Division. He presented a note on institutional issues in the provision of profit-oriented irrigation services. This note intends to identify some of the institutional issues that may be posed by privatization of irrigation management facilities, to supply irrigation water to the public, for a profit. Privatization in this context means private development, or management, or both, of irrigation facilities, with a view to serve customers with irrigation water or drainage or both. We present this note below.

Introduction

Empirical evidence of private sector taking on the risk of developing systems for the provision of irrigation services to third parties does not abound. Documented experiences in the United States, discussed later, point out that the capital requirements of large scale irrigation, coupled with the economic characteristics of the subsector did not, in the past, create an environment favorable to private risk taking in service-oriented irrigation development. Other documented experiences, such as the Bas-Rhône-Languedoc in France, consist mostly of public shareholders integrating a national development company. In Northern Africa, ongoing attempts to involve outside corporations in service-oriented irrigation development have demonstrated, at least in the initial negotiation, that contractors are tacitly reluctant to bear investment risks.

If this reluctance results from perceived risks specific to the countries in question, or to the nature of the activity, or both, is an open question.

Organizational alternatives for the provision of water-related services

Organizational alternatives for the provision of water related services include privately owned stock corporations providing services for a reasonable profit to the public at large. Privatization of state-owned enterprises has expanded the possibilities of private corporations to provide water related services to customers outside their membership. These are private corporations subject to public regulation to assure the quality of the services, reasonable rates, non-discrimination, adequate capitalization,

financial viability, etc. They are particularly active in drinking water supply and sanitation and hydroelectricity generation and distribution. However, private organizations, to provide irrigation services, including corporations organized under the Carey Act and Carrier Ditch Companies in the United States, have faced some problems. These problems include, *inter alia*, inability to finance, overestimation of available water resources, cost overruns, and engineering mistakes.

Private provision of irrigation services: regulation

Carey Act Corporations intended to promote the development of irrigation through private investment. They were "beset with problems". Private investment was not enough for the massive development of irrigation in the western states of the United States. The Carey System intended to work through a combination of construction and operating companies. In addition to the problems mentioned above, companies oversold their stock, and where unable to collect dues from beneficiaries. To solve this problem, farmers debts were liens on the properties in arrears, the end result being a tangle of litigation on the properties. As of 1958, land patented to settlers under the system was about an eighth of the land applied for under the Act.

Carrier Ditch companies were created to provide water to consumers for a profit. They are entitled to a decreed amount of water and subject to regulations and price approvals. They are "virtually relics of the past". Consumers dealing with carrier companies have a right of service and are protected from arbitrary actions.

In this respect irrigation companies are somehow subjected to a public utilities regime, although irrigation is not usually included into the notion of public utility activities, probably due to the availability of a wide range of global and local markets providing agricultural commodities.

Should any irrigation service be subjected to a public utilities regime, it would be important to pay attention to the following: service of acceptable quality and quantity; reasonable rates; information; access to key facilities and natural resources; and binding rules for accounting, procedural matters and dispute settlement, to ensure transparency and impartiality. Such regulations should be relaxed only if market structures are clearly able to ensure effective competition.

Little information is available on the protection of the interests of farmers served by commercial or public utility irrigation

companies, the reason being the dearth of such companies in virtually all countries of the world. Yet, some cases in the United States illustrate the experience of the western states. The issue was important enough to have been addressed by the California Constitution of 1879, providing that all distribution of water by a public utility was subject to regulation. In application of this provision, the California Courts have declared that water rights acquired from ditch companies are subject to regulation.

Consumers have a right to service, which is afforded substantial legal protection. There is a right to continuity of service, except in cases of droughts for which the company is not responsible. Fair water apportionment have also been considered an important element, particularly at times of scarcity. Public utilities commissions may extensively regulate rates. Such regulation "*in extenso*" is a logical consequence of the monopoly position of the company providing services. The structural rigidities of irrigation and the risks specific to this activity have resulted in that there are few cases of for a profit provision of irrigation services to the public. Consequently, both in the past and in the future, the monopolistic position of the supplier is a fact to be reckoned with.

In the case of the Bas-Rhône-Languedoc Company in France, the Government exercises close supervision, through a Commissioner, whom it appoints, who has the right to veto decisions of the company. Charges are approved by the National Government. A requirement for the application of public utilities regulation to irrigation companies is that they should provide services to the public generally.

Regulatory experiences are not limited to private and stock companies. Cases of regulation of non-commercial water users associations and public irrigation districts may also provide useful indicators on regulatory needs. Thus, Mendoza Province in Argentina, regulates and controls the appointment of the authorities of the associations, their budgets and accounts, and also the performance of their functions. In Belgium, Wateringue organizations are required to obtain authorization for certain water works. Irrigation districts in the United States are increasingly subjected to command and control regulation, with particular attention being paid to financial issues.

Ownership of water rights and water markets

Another important aspect is ownership of water rights. While in some states of the United States, water rights are owned by the server company, in others rights belong to

farmers, while states such as Colorado admit the existence of a joint appropriation (i.e., the farmer plus the company).

These examples show that there are several alternatives to the ownership of water rights, including the eclectic. Arguments favorable to giving the rights to the companies emphasize that this approach consolidates the patrimony of the investor and reduces transaction costs. On the other hand, it could also be argued that giving the rights to farmers promotes social empowerment and confidence building at the level of the users, and may serve to boost their confidence to demand better services and to invest in farming activities. In any case, there is ample empirical evidence that stable, properly regulated water rights are a significant institutional incentive for water development and conservation. Water markets (i.e., the private transfer of water rights) are also an institutional means to improve the efficiency of water allocation, between and within sectors.

Marketing of agricultural products

The economic environment where irrigation companies operate is crucial to their eventual success. An important institutional element in the improvement of this economic environment is the marketability of agricultural products. In Pakistan, for example, while water users associations have generally been successful, they face problems that, although not primarily related to water management, affect performance, such as marketing. The development of irrigation infrastructure requires the consideration of at least the following factors: markets, infrastructure and productive options. Without proper commercial conditions agricultural development is not sustainable.

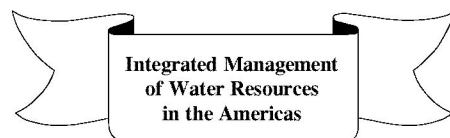
Conclusions

- There are not many examples of private companies engaging in provision of irrigation facilities and services to the public for a profit.
- The few existing cases indicate that they were affected by constraints related to the economics of irrigated agriculture and the financing of the organizations.
- This type of services, when in existence, have been subjected to close government regulation.
- The inception and development of private for-profit irrigation services will require careful design of economic and institutional strategies and financing alternatives, with careful attention being paid to regulatory issues.
- Performance improvements require holistic approaches with a systemic consideration of, *inter alia*, economic and

financial factors, legal and institutional alternatives, design and allocation of water rights, and marketing strategies.

Future activities

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To foster effective communication and collaboration between early-career natural and social scientists from the Americas, the Inter-American Institute for Global Change Research and the University of Miami are implementing the third Summer Institute on Interdisciplinary Science in the Americas, to be held in Miami, Florida, the United States of America, from July 15 to August 3, 2001. The theme of the Summer Institute 2001 will be "*Integrated Management of Water Resources in the Americas: Challenges and Emerging Issues*". It will explore issues related to water supply (climate variability and change, land use/cover change, health of aquatic systems) and demand (population growth, urbanization), with the central focus being on water management as the arena where supply and demand issues converge, within the additional context of governance matters (institutions, regulatory frameworks).

Additional information is available from:

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WWW: www.rsmas.miami.edu/IAIUM/



Internet sites worth visiting for information on water resources management and use, and related subjects include the following:

- *Agua Latina* (www.agua-latina.com) is an on-line monthly technical magazine for companies, engineers, specialists,

consultants and agencies throughout the world that are involved in promoting and improving the use of water in Latin America. The magazine covers water-related subjects which include supply, treatment, pumps, pipes, wells, treatment, contamination, storage, irrigation, and hydroelectricity.

- The recently created **WaterForum** is a new discussion list, which is possibly the largest in the world on the topic. It is intended to facilitate the exchange of information among interested parties on surface water and groundwater resources issues, including drinking water, wetlands, wastewater, irrigation and drainage, recreational use, fisheries and wildlife use, aquaculture, coastal studies and oceanography, environmental and public health issues, contamination, computer modelling, and any other relevant water resources topics. To subscribe, send a blank e-mail to waterforum-subscribe@egroups.com.
- The **Latin American Water Tribunal** (www.tragua.com) is an organization that strives to stimulate the creation of tribunals with strongly based ethical values dedicated to defending the continent's water resources. Its website provides information about the Central American Water Tribunal, treaties and declarations, previous water tribunals, etc. It also offers direct access to several publications such as "*El agua: realidad y utopía*", "*Tribunal Centroamericano del Agua: fundamentos éticos y jurídicos*", "*Tribunal Centroamericano del Agua: declaración centroamericana del agua*" and "*Los proyectos hidroeléctricos y el equilibrio ambiental*".
- **ABRH-Gestao** has been created by the Water Resources Management Commission of the Brazilian Association of Water Resources. This is a new discussion list specializing in water management and related issues in Brazil. For more information and to subscribe see www.egroups.com/group/ABRH-Gestao.
- Rivers and lakes provide unique benefits both to people and to nature. Most rivers, river banks and watercourses, however, have been seriously affected by a wide variety of human activities, including canalization, dredging and other flood-control measures. In many countries, thousands of hectares have been drained to create high-productivity agricultural land. Communities have also grown up along riverbanks and within river basins, which has given rise to concentrated urban development along rivers and lake shores. An excellent and very detailed document,

of over 500 pages in length, entitled "**Stream corridor restoration: principles, processes and practices**" is available at www.usda.gov/stream_restoration/newgra.html. It aims to provide a common technical reference on stream corridor restoration. Recognizing that no two stream corridors and no two restoration initiatives are identical, this technical document provides broadly applicable guidance for common elements of the restoration process, but also provides alternatives, and references to alternatives, which may be appropriate for site-specific restoration activities.

- The **Regional Water and Sanitation Network for Central America** (RRAS-CA) and its affiliated National Water and Sanitation Networks link up programmes of governments, non-governmental organizations, municipalities and external agencies that are active in the drinking water supply and sanitation sector in El Salvador, Guatemala, Honduras and Nicaragua (www.rrasca.un.hn).
- The European Commission has recently passed a **White Paper on Environmental Liability** (<http://europa.eu.int/comm/environment/liability/index.htm>). The objective of the Paper is to explore how the "polluter pays" principle can best be applied to serve the aims of Community environmental policy.
- The **Natural Resources and Environment Secretariat** (SERNA) of Honduras is responsible for preparing, coordinating and evaluating policies related to the protection and use of the environment, water resources, energy sources, mining activity, protection of ecosystems, the national system of protected areas and national parks, flora and fauna. The Secretariat also provides investigation and control services for all kinds of pollution. Its website provides information on its main activities (<http://ns.sdnhon.org.hn/miembros/serna>).
- The **Office of Economic Analysis** of the Colombian Environment Ministry is responsible for designing and implementing economic instruments for pollution control and environmental conservation. Its website (www.minambiente.gov.co/oea) provides a lot of interesting information (legislation, research, articles, etc.) on: (i) Colombian pollution charges, which are an economic instrument designed to minimize the total cost of compliance with a regional pollution control goal that is agreed with the community; (ii) Regional Investment Funds, which are a mechanism for financing regional investment in water

pollution control; and (iii) climate change, including the United Nations Framework Convention on Climate Change, the Kyoto Protocol and related topics.

- The **Latin American Observatory of Environmental Conflicts** advises communities in situations of conflict, seeking to empower them so that they can enforce their environmental rights, by boosting their management capacity. The Observatory also carries out research and disseminates information on environmental protection and citizens' rights, compiles sectoral registers, carries out specific investigations and promotes methodology transfer in conflict management. Its website (<http://relca.net/oca>) provides information about its activities, environmental conflicts, news, events, etc., as well as direct access to several publications, such as "*Guía metodológica para la gestión comunitaria de conflictos ambientales*".
- The **Binational Commission for the Development of the Upper Bermejo River and Grande de Tarija River Basins** was created by means of an agreement signed between the governments of Argentina and Bolivia on 9 June 1995. The Commission is responsible for the administration of the Upper Bermejo River and Grande de Tarija River Basins, in order to promote sustainable development in its area of influence, optimize its natural resources development, contribute to its socioeconomic development, and allow rational and equitable management of water resources. Its website (www.cbbermejo.org.ar) contains information on the river basins (description, maps, hydrological information, etc.), the Strategic Action Programme for the Binational Bermejo Basin, etc.
- The **Corporation of Sanitary Works** (CORPOSANA) of Paraguay is responsible for the provision of drinking water supply and sanitation services in all communities of over 4 000 inhabitants. Its website (www.corposana.gov.py) offers detailed information about its background and services, the sanitation situation in Paraguay, current service coverage, investment programmes, sources of funding, tenders, rates, drinking water legislation, etc.
- The **International Council for Local Environmental Initiatives** (ICLEI) is the international environmental agency for local governments. ICLEI members consist of over 350 cities, towns, counties, and their associations all over the world. Its mission is to build and serve a

worldwide movement of local governments to achieve tangible improvements in global environmental and sustainable development conditions through cumulative local actions. One of ICLEI's main services to its members is to serve as an information clearinghouse on local environmental initiatives. Much of this information is available on-line at its website (www.iclei.org/), which also provides detailed information on ICLEI's activities.

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

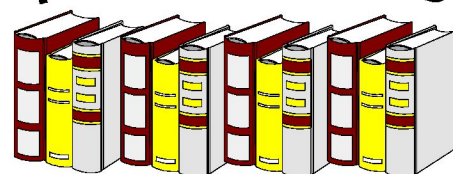
- The website of the **Colombia Field Office** of the Pan American Health Organization (PAHO) (www.col.ops-oms.org) offers a publication entitled "*Guía latinoamericana de tecnologías alternativas en agua y saneamiento*". This is a short document presenting simple, well known and low-cost methods and instruments which have gained substantial user credibility. Other available publications include "*Alcantarillados condominiales: una alternativa para los municipios saludables*".
- The **Latin American Network of Technical Cooperation in Watershed Management** (REDLACH) was created in 1980 with the support of the Regional Office for Latin America and the Caribbean of the Food and Agriculture Organization of the United Nations (FAO). Its purpose is to further progress in watershed management and the promotion of sustainable development in Latin America and the Caribbean. REDLACH is a technical instrument, consisting of public, private or autonomous institutions in the Network's member countries. The general objective

of the Network is to gradually increase the countries' technological capacity and exchange experiences and knowledge in order to augment horizontal technical cooperation and promote watershed management programmes and investment projects. Information on the Network's activities, bulletin, bibliography, etc. is available on its website at www.fao.org/Regional/LAmerica/redes/redlach/.

- The mandate of the **National Superintendence of Sanitation Services** (SUNASS) of Peru is to regulate drinking water supply and sanitation services, supervising their provision to ensure the best possible quality and price. Its website (www.sunass.gob.pe) provides detailed information about its activities, organic structure, legislation, publications, news, etc.
- The **Itaipu Hydroelectric Power Plant** is a binational project, developed jointly by Brazil and Paraguay, on the basis of the Treaty of Itaipu, which was signed in 1973. The dam was built on the stretch of the River Paraná that forms the border between the two countries. Its website (www.itaipu.gov.py) offers information about this joint project, with interesting data on its history, environmental aspects, news, financial aspects, technical data, tenders, etc.
- The **Sistema Español de Información sobre el Agua** (Hispagua) has recently been launched at <http://hispagua.cedex.es>. The objectives of this system are: (i) to become the main reference for freshwater related information in Spain; and (ii) to offer users an interactive communication medium to exchange ideas, collaborate on projects, request information, make suggestions, allow authors to publish on line, etc. Hispagua provides access to existing information on water knowledge in the following fields: institutions, documentation, research, training, water

data, and the history and culture of water in Spain. Hispagua is part of the Euro-Mediterranean Information System on the Know-How in the Water Sector (EMWIS). EMWIS is a cooperation tool between European Union's countries and its Mediterranean partners which aims to: (i) facilitate access for the Euro-Mediterranean countries to existing information on know-how in the water sector; (ii) develop the sharing of information while permitting everyone to make known its responsibilities, activities, concerns and topics of interest; and (iii) elaborate common outputs and cooperation programmes to develop available information and promote the collection of missing information.

Publications



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

- "*Gestión de cuencas y ríos vinculadas con centros urbanos*" by Axel Dourojeanni and Andrei Jouravlev (LC/R.1948, 16 December 1999) (see "*Open discussion*").

The publications of the Natural Resources and Infrastructure Division are available in two formats: (i) as printed documents, single copies of which are sent free of charge by airmail, and (ii) as electronic files (Microsoft Word or PDF formats) which are distributed over the Internet as attachments. Requests should be sent to ajouravlev@eclac.cl or the **Natural Resources and Infrastructure Division, CEPAL, Casilla 179-D, Santiago, Chile**.

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