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

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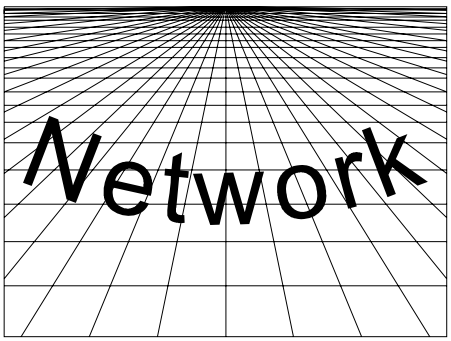
One of the observations made by the South American Technical Advisory Committee (SAMTAC) of the Global Water Partnership (GWP) in a study prepared as part of the project "*Global Study of Water Management Systems*" was that during the period 1985-1995, Chile enhanced the contribution of water to the socioeconomic development process, with a particularly visible role of irrigated agriculture, mining, aquaculture, wood and paper processing, and the sustainability of drinking water and sanitation



services. In Argentina, over the same period, the surface area under irrigation declined, and the country's drinking water services suffered to such an extent that some foreign investors withdrew from the country and filed claims with international arbitration tribunals. The reasons for the relative success of one system and failure of the other lie in the macroeconomic policies and the public policy decision-making criteria of the two countries.

The traditional focus of water legislation and of most lawyers specializing in this area has been to base all analysis on the texts of the laws, and to carry out descriptive-philosophical analyses, based on formal premises, of the soundness of the laws and institutions. The foundation of law, however, is experience, and any dynamic analysis of its impact must take into account its interaction with general economic policies. Indeed, it is the quality of these policies that determines the context in which the law plays its role.

If legal regulations are to serve the purposes of sustainable development, they must be supported by a healthy macroeconomic policy, although this is not the only prerequisite. More specifically, water law can contribute to realizing the potential of economic policies, but if those policies are defective, or offer incentives that do not encourage investment and resource conservation, the law can do little or nothing to remedy the situation. This concept, together with a definition of the relevant factors, was considered over fifty years ago by the North American economist Ciriacy-Wantrup, in his paper "*Dollars and sense in agriculture*", published in 1951.

The effectiveness of improvements in the water sector and the associated investments, as well as the relevant legislation and organization, is thus dependent on macroeconomic policies and the environment that they create. In the long term, they are so powerful and structurally significant that the best sectoral legislation cannot counteract their influence.

This has been evident in countries such as India, Oman and Yemen, and even in the provinces of eastern Argentina, where substantial subsidies for the use of groundwater were made a significant part of economic policy. There was no legal regulation that could prevent deterioration of the water situation when these policies offered such powerful incentives. When policies are counterproductive, as is the case in many developing countries, the unfavourable macroeconomic context erodes even the best institutional reforms.

A set of distorted macroeconomic policies, which typically include high inflation rates or artificial exchange rates, affect economic growth and distort income. When this happens, pressures arise for change, and water policy options are limited: more investment, more subsidies or more technological support. Such measures alone, however, cannot be sufficient to compensate for the general problems affecting sustainable water use that are caused by lack of economic growth and inappropriate incentives. Water policymakers must be aware of the impact of macroeconomic policy on their sector and encourage dialogue with the managers of the national economy.

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As the majority of water products and their inputs (whether in irrigated agriculture, hydroelectricity, drinking water supply and sanitation, mining or recreation) are sold in markets, they are affected by these secondary markets, which in turn are part of complex economies. This means that no acceptable answers can be obtained from simplifications.

Argentine macroeconomic policies of the 1990s serve as an example of simplification without consideration of the consequences. These policies kept the local currency at an artificially high level by injecting foreign money into the local currency market. Loans were required for this purpose, thus raising interest rates and making credit more expensive. Together with the artificial overvaluation of the local currency, this reduced the competitiveness of the products of irrigated agriculture. In areas strongly dependent on these products, the land area

under irrigation declined and water-related services were no longer sustainable because of the lack of economic growth.

The decisions of water users are affected by general economic forces, such as interest rates, uncertainty, prices, exchange rates, property rights and taxes. High interest rates reduce investment in all areas, not only in water-related sectors, and they also reduce environmental conservation and protection efforts. When capital is expensive, there is a natural tendency to overuse the resource or the environment. Users facing high interest rates are also likely to reduce their investment in improvements, works and equipment. The same occurs when markets are erratic in terms of price and demand.

The effects of adequate macroeconomic policies have been clearly apparent in the case of Chile (see Circular N° 20). This country's development model is based on macroeconomic balances and exports that make use of comparative advantages. Most of its export products use water as an input, either in the primary product or in processing. As the country's macroeconomic balances and realistic exchange rates keep debt under control, the credit systems and interest rates are relatively moderate and do not deter investment. Public policies, in addition to promoting an environment favourable to investment, have been changing in pace with social and environmental goals, while sound macroeconomic policies have helped to generate the resources needed to achieve them.

Miguel Solanes

The Natural Resources and Infrastructure Division has published a document entitled "***Entidades de gestión del agua a nivel de cuencas: experiencia de Argentina***" (*Water management entities at the river basin level: the experience of Argentina*) by Victor Pochat (see "***Publications***"). Its purpose is to review the experience of Argentina in the creation and operation of water management bodies at the river basin level. The conclusions of the study are presented below.

The idea of the river basin as a territorial and spatial unit for water management, and as a possible forum for resolving issues that cause or may cause conflict, is a technical concept that is used in Argentina by virtually everyone involved to some extent with water issues.

In fact, the concept of river basin has been present in technical analysis since the 1956 meeting of the five riparian provinces of the Colorado River to discuss how the shared resource should be used. It was applied in various organizational and regulatory experiences, both provincial and interjurisdictional, and more recently in the 2003 agreement on the Guiding Principles for Water Policy (see "***Internet and WWW news***"). In view of the climatic and hydrological diversity of Argentina, different approaches have been adopted according to the particular characteristics of the water resources involved and the resulting problems to be faced, whether of scarcity, excess, pollution, erosion and sedimentation, regulation needs, sectoral or multi-purpose use, and so on.

The federal political organization of the country has been a decisive element, as there is a constitutional provision that water resources are under the imminent domain of the provinces. This characteristic distinguishes Argentina from other Latin American countries with a unitary political structure, or even a federal country, such as Brazil, where rivers which go beyond state boundaries are under federal domain.

Provincial or state domain of water resources is strongly asserted, however, in other federal countries such as the United States. Strictly speaking, it is not the domain issue, but rather history and the content of federal and provincial initiatives, that determine attitudes to the institutional role of the technical concept of river basin.

This factor is a key element for the analysis and can be used to explain the variety of situations presented. Provinces such as Mendoza and Santa Fe have embarked on initiatives to resolve individually their respective problems with drainage or irrigation of productive lands. At the same time, interjurisdictional agreements have become a vital element for resolving issues when water resources are shared by two or more provinces.

Despite the variety of situations and individual characteristics referred to, there are general experiences which can serve as a reference for analysing similar cases. Although there are many diverse factors to be taken into account when considering river basin management issues, Argentina has made a very significant effort to apply stable and coherent criteria to resolve water problems. The signing of the Guiding Principles for Water Policy referred to above was a significant step in that direction.

The river basin entities have facilitated information exchange between the parties involved and have provided a way of dealing with the main interrelationships —water, environmental, economic and social— when assessing problems and opportunities. They offer a suitable forum for confronting and reconciling the individual visions of each party, in the effort to seek a common vision on which all can agree. Not only do all parties benefit from sharing their information, points of view and requirements, but this process has also reduced the likelihood of failure of initiatives that might have been less successful without such participation.

In water management, conflict situations often arise in which some parties can benefit only at the expense of the others. If confidence can be generated among the parties, they can be encouraged —as in the case of the Laguna La Picasa basin— to take a broader perspective on the problems and identify measures which would benefit all stakeholders, independently of potential conflict scenarios. Technical laboratory or field studies (such as monitoring hydrological variables; devising mathematical models for design, warning or management; studies and works; resolving emergency situations) have contributed to a healthy mutual understanding between the technical representatives of the jurisdictions which meet at the negotiation tables, who in general have fluid communication with the senior decision-making levels in the respective provinces. This cooperation helps generate a mutual knowledge of the aspirations and problems of the other jurisdictions, which is very important in terms of finding or designing solutions that are beneficial for all parties affected.

This confidence-building attitude offers a sharp contrast to the assumption that one particular jurisdiction can negotiate a better agreement with the others if it maintains an inflexible position. For example, in view of the vital role of water resource, it is fairly common in Argentina for citizens' groups to organize public demonstrations. Such initiatives tend to underestimate the flexibility of local interests and usually make it very difficult to have sincere negotiations, which are often essential for generating solutions that can resolve the conflicts.

Although in many cases the mass media have given full coverage to the controversial aspects, it has been understood that only a calm approach —taking account of the interests of all parties— can make it possible to reach agreements with a reasonable degree of legal security (an important issue in itself, but also vital for any financial arrangement).

A climate of confidence is strengthened if the discussions are supported by sound technical arguments based on the best available information. One example is given by the studies requested from the Institute of Technology of Massachusetts (MIT) for the Colorado River, which provided optimization and simulation models for analysing different options, and were used by the five riparian provinces to define a single programme for establishing irrigation areas and flow allocation for the Colorado.

Experience also shows that it is counterproductive to move forward with the definition of regulations or new organizations without a prior process of coordination and construction of specific agreements on existing and concrete situations. It is a mistake to think that complex problems can be resolved by the mere creation of new organizations and extrapolating from the experience of effective regulations and organizational structures that were achieved after a significant effort of coordination.

It is not sufficient to have laws, treaties, statutes or regulations that are drafted by experts: it is essential that such regulations are based on previous agreements as to what are the problems and how they should be tackled. If such agreements do not exist and no true climate of confidence has been created, then any draft regulations, or even adopted regulations, will never produce results. When such implicit agreements do exist, however, provision should be made for them in the relevant legal documents that can ensure the permanence of the agreements, independently of the actors temporarily involved. The high rate of staff rotation which tends to be typical of Latin American and Caribbean countries makes it even more necessary to have a clear and well-established legal framework.

The province of Mendoza, which has clearly established constitutional rules as a result of the local water culture, is a very important example, but also a rather exceptional case. There are others, such as the Interjurisdictional Authority for the Limay, Neuquén and Negro River Basins (AIC). As this authority had the legal capacity to deal with special circumstances —such as the accelerated process of privatization of public enterprises that took place in Argentina— it managed to gain some comparative advantages. This process, however, could not be reproduced in other areas of the country, as at that time they did not have the appropriate legal instruments or technical institutions.

Although there is no set formula for securing financial support of water management bodies at the river basin level, a flow of funds that is independent of short-term decision-making is undoubtedly an essential factor for ensuring their operation. The economic contribution from water users, regardless of the amount involved, is important not only in financial terms, but also for reflecting an awareness of the users' role in the management of a vital resource. The agricultural producers in the Mendoza and Santa Fe provinces are clear examples. The participation of the concession holders for the hydroelectric plants on the rivers Limay and Neuquén, although linked to the respective concession contracts, is also indicative of this direction.

It is difficult to reach precise conclusions concerning the most appropriate organizational form. A variety of forms have been considered, ranging from broad structures, such as that of the AIC, which is designed to cover most of the activities with its own staff; through smaller structures, such as the Interjurisdictional Committee for the Colorado River (COIRCO), which basically carries out supervisory, coordination and control functions, referring other tasks to third parties; and entities without a structure of their own, such as the proposed interprovincial basin committees of the Salí-Dulce and Pasaje-Juramente-Salado rivers, through which specific projects will be referred to the competent provincial organizations or other specialized agencies.

In general, provincial water management bodies play the main role in all river basin organizations, whether provincial or interjurisdictional. Although their role is fundamental and irreplaceable, the need to include the other stakeholders involved in management to a greater or lesser extent is increasingly clear.

It has been seen how users have played an active role at the provincial level in the cases of the users' organizations in Mendoza and the Santa Fe basin committees. In other cases, the various interest groups have been involved less directly, such as the basin committees of the Buenos Aires province, which have a consultative role. In the older interjurisdictional entities (such as COIRCO and AIC), there is virtually no participation by stakeholders, while they are gradually being included in the newest ones (such as the Interjurisdictional Commission of the Laguna La Picasa Basin and the proposed interjurisdictional basin committees for the Salí-Dulce and Pasaje-Juramente-Salado rivers).

All of the documents produced in the context of the international meetings consider the vital aspect of participation, and it is also reflected in the Guiding Principles for Water Policy. In Argentina, however, there is still a need for a more in-depth discussion on how to put this participation into practice in each individual river basin entity.

Prevention and reduction of the danger posed by natural disasters

The document entitled "***Elementos conceptuales para la prevención y reducción de daños originados por amenazas socionaturales. Cuatro experiencias en América Latina y el Caribe***" (*Conceptual elements for the prevention and reduction of the damages caused by natural disasters: four experiences in Latin America and the Caribbean*) is the final output of the project "***Prevention and reduction of the danger posed by natural disasters***" (see Circular N° 21). This project was executed by ECLAC over the period 2002-2004 through the Natural Resources and Infrastructure Division, with financing from the German Agency for Technical Cooperation (GTZ). There follows below a summary of the conclusions and recommendations of this document, which was compiled and edited by Eduardo Chaparro and Matías Renard, and will soon be published as N° 91 in the Cuadernos de la CEPAL series.

Conceptual elements for damage prevention and reduction

The efforts to reduce the long-term effects of disasters must meet two criteria:

- the resource allocation must be part of an economic and social development strategy, and risk management must be understood as a high-return investment that is indispensable for long-term sustainability; and

- post-disaster reconstruction projects and investments must be designed to reduce the vulnerability factors that gave rise to the disaster, in order to guarantee a progressive and non-regressive development cycle.

The specific objectives of disaster risk management are the reduction, prediction and control of risk-generating factors. This is a continuous, organic and cyclical process, and corrective measures for existing risks must be differentiated from preventive measures for

risks that may arise as a result of the investment and development decisions of any actor. It is extremely important to draw attention to and understand this difference in relation to the social, political and economic consequences of using particular models for regional development now and in the future; especially as the damage caused by disasters has increased significantly in statistical terms and the region's infrastructure and population are expected to double over the next 30 years.

Management as a process

As in the case of the environmental perspective, which is increasingly crosscutting and holistic, and is expected to influence all investment and development decisions, risk assessment should be included in every human activity in a conscious and practical way, with appropriate frequency and magnitude, in every society as an integral factor of the prevailing development style. This process includes:

- determining the acceptable risk level and its assessment in the cultural and social context of the territory in question;
- a study of the constituent factors of the present and future risk levels, and their relationship with the processes of productive transformation;
- participatory design of strategies and policies for a specific area and time, as well as for the political, economic, social and cultural context;
- the search for organizational, institutional and political support from the stakeholders, within and outside the local area; and
- the execution of activities with assignment of responsibilities.

Sound risk management requires that the stakeholders involved are informed and have concluded a kind of social pact or agreement; otherwise, the activities carried out will be isolated and ineffective.

The process is specific to each context of risk or potential risk. It needs to be seen as a cycle, which begins again when new risks or disasters occur or at the time when society considers that it has reached an acceptable and controlled risk level, on the understanding that a zero risk level cannot be achieved. It is also important to analyse the origin of the risk as it often originates in the private sphere while the effect is collective.

Approaching risk management as a process does not imply excluding the tasks of emergency preparedness and response, or rehabilitation and reconstruction work after the disaster, but it does help to ensure that such activities are increasingly less frequent and necessary. It also helps to establish connections between disasters, the humanitarian response and the development process.

Corrective management of existing risks

In most cases, the tendency has been to reduce risks through an isolated response to a specific situation, that is, to construct flood prevention works, irrigation channels in drought areas, containment walls for slopes, and other works. These are all structural measures, and they are mostly isolated efforts that do not form part of more integrated solutions.

In some countries and specific areas, a broader approach has been adopted which includes non-structural measures. These include integrated river basin management and the design of land-use plans that include reforestation programmes, agricultural and land-use management practices appropriate to the environment, training and education programmes in risk reduction, and early warning and evacuation systems. Tax incentives and property taxes are a very useful instrument which the authorities can use to offer incentives or disincentives for production activities and human settlements in specific zones that may or may not be appropriate for such uses.

The cost of the corrective work may be too high to be covered in a single period of government. Such measures therefore have little political visibility until another disaster occurs to prove their usefulness. Nevertheless, there are activities which, with the participation of the most vulnerable groups and the coordination and support of the local authority, can be established at low cost to reduce the disaster risk, including cleaning of channels and drains, elimination of liquid and solid wastes, and slope reforestation. These are decentralized activities which encourage the autonomy of the social groups involved and create community assistance mechanisms which strengthen risk management. Knowledge of existing risks in a community can help to direct assistance better in the case of a disaster —by helping to determine the needs to be met, which persons are in need and their location— and can become a development opportunity if a suitable management process has been established.

Preventive management of future risks

Unlike corrective management, preventive risk management is directly and permanently related to development and environmental management, of which it is an integral component. As in any planning process, it requires the agreement and coordination of goals and interests of the stakeholders involved in a particular area, whether or not they are present in the area studied. It is therefore essential to have a strong local authority with a sound knowledge of risk management that is capable of bringing together, guiding and coordinating the rest of the stakeholders.

If the affected community is not conscious of and does not internalize the disaster risk issues, and if there are no agreed solutions, any process will tend to be short-lived, lose its effectiveness or remain at the level of words. The activities that are planned must be part of the regular daily agenda of the stakeholders who live in a particular region. Moreover, any local initiative will be weakened if there is no institutional and regulatory framework at a higher level to support and promote it, and if necessary, provide financing. Significant national regulations have emerged from the local level, but unfortunately most of them have done so only after large-scale catastrophes.

The reduction, prediction and control of future risk-generating factors require consideration of regulatory, educational and financial aspects. A regulation is the result of a need felt by society, and it is respected to the extent that a collective awareness of the issue exists, together with education and training. Its implementation requires appropriate financing which is provided for in the regulation itself. The regulatory area covers, *inter alia*, land-use plans, regulations and methodologies for risk evaluation in investment projects, environmental and gender considerations, provisions for the use of construction materials and methods, tax incentives for the location of activities, fines for risk generation, regulation of the use of natural resources and production processes to ensure that they are environmentally sustainable, insurance requirements for dangerous production activities, and decentralization and deconcentration measures which favour local government and grass-roots organizations.

The educational sphere covers activities which encourage a culture of permanent risk prevention and management. These include applied research into construction materials and technologies, information and awareness-raising campaigns on the origins of risks and their control, training adapted to each territory and oriented to educators, the press and the local population and educational programmes which include risk analysis and response in society.

Adequate management of the economic and financial factors that encourage or discourage specific activities can change the future of a territory. Similarly, appropriate and

informed policy management can be a determining factor in minimizing future and present risks.

Conclusions

The case studies carried out as part of the project cover different cultural, geographical and socioeconomic contexts in the region. One of the main conclusions that can be drawn is the importance of disaster risk management being recognized by the authorities as an issue that must be a permanent and systematic part of a sustainable development policy. As for the prevention and reduction of the negative impacts caused by natural phenomena, whether naturally occurring or caused by human activity, the most significant progress has been achieved when the authorities make a policy decision to incorporate the risk management concept into the institutional framework of the State, as well as tools and activities that enhance awareness and management of the risks that each community faces.

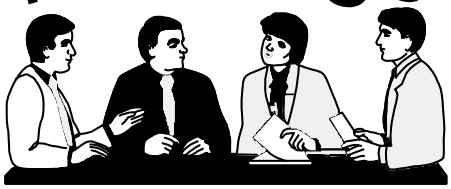
Disaster risks are inherent in each community and territory and are defined by the degree of vulnerability and exposure to natural phenomena. Risk management should therefore be autonomous and decentralized, as a responsibility of the local authority of the area at risk and the main stakeholders should participate in an active and informed manner.

The effectiveness of management depends on the level of governance and organization of the community. In the absence of non-structural or management- and planning-intensive measures, the structural measures and civil works aimed at mitigating or preventing the damaging impacts of natural phenomena will not have the desired effects. If the root causes of the disasters are not explored, no mitigating action or measure will be sufficient to protect the affected community.

The project's analysis of the different stages in disaster management and response indicates that events which have been labelled as "extraordinary" by the authorities and the community are in fact part of a historical pattern and have proved to have devastating long-term effects in terms of losses of human life and damage to infrastructure, and thus on opportunities for development and for improving the quality of life of the community affected. Efforts to recover the historical memory of disasters, the creation or strengthening of institutions, commitment from the political authorities and knowledge of existing risks, are the prerequisites for adequate risk management that is permanent and allows the local community to improve its quality of life. These factors depend on the degree of development or underdevelopment and the vulnerability of the community.

The region's progress in dealing with disaster risks is hampered by the lack of perspective and the low degree of electoral political interest in relation to disasters, poor governance and the lack of continuity of some policies owing to changes of authorities. Nevertheless, governance, institutions and the economic stability of a region or country can be seriously affected by a disaster, depending on the scale of the event and the size of the territory.

Meetings



Objectives and Scope of the Reform of the Chilean Water Code

Following almost 15 years of negotiations, an amendment to the Chilean Water Code was recently approved (see Circular N° 22). In this connection, the Natural Resources and Infrastructure Division, the General Department of Water of Chile and GWP organized the ***International Conference "Objectives and Scope of the Reform of the Chilean Water Code"***. The event took place at ECLAC headquarters on 4 and 5 July 2005.

The purpose of the Conference was to explain the meaning and scope of the amendments to the 1981 Water Code. The analysis of the reform focused on the following issues: the international context of the amendments to the Water Code; the meaning and scope of the reform; the issue of water rights allocation; the role of the State in water administration; the role of users and their organizations; and groundwater management.

More information on this event, and the texts of the presentations, are available from the web site of the Natural Resources and Infrastructure Division: *http://www.eclac.org/drni*.

International Seminar on Trade Agreements and Public Services

On 29 September 2005 the ***International Seminar on Trade Agreements and Public Services*** was held in Buenos Aires, Argentina, organized by the Office of the Attorney General of Argentina, the International Development Research Centre (IDRC) of Canada and a number of other organizations, with technical support from the Natural Resources and Infrastructure Division.

The goals of the seminar were: (i) to exchange views on issues raised by investment and trade protection agreements in connection with public interests relating to water and water services; (ii) to identify the principles applied by regulatory systems recognized as significant and efficient in the provision of public services by the private sector; (iii) to identify and recommend the minimum principles to be taken into account when resolving disputes relating to these services, in the context of the investment and trade protection agreements; (iv) to analyse the decisions of international arbitration tribunals in resolving disputes in these matters; (v) to present the commitments of each country in relation to water resources or related services in the context of the proposed Andean Free Trade Agreement, and the relevant legal provisions which are absent or would need to be amended in connection with it; (vi) to identify possible regulatory principles, clauses and strategies which would improve the design and implementation of free trade treaties in relation to water and the associated public services; (vii) to produce an agenda and a possible strategy for the development and dissemination of knowledge to help promote the application of appropriate regulatory principles; and (viii) to identify relevant issues for the session on water and trade at the Fourth World Water Forum (Mexico City, Mexico, 16-22 March 2006).

Seminar on the Regulation of Infrastructure Services: Water and Electricity

Infrastructure services are an essential aspect of an economy's competitiveness. They have a significant impact on companies' production costs, as well as the standard of living of households. Infrastructure services are capital-intensive activities. They require a physical infrastructure network that is expensive to establish and to maintain, which is one of the reasons why these services have been defined as natural monopolies.

Since the 1980s, and especially in the 1990s, as a result of restrictive fiscal policies and the liberalization of a number of markets, the private sector is playing an increasing role in investments. Innovative institutional models have been adopted, with competition introduced in some segments. The industrial reorganization of these economic sectors requires new regulatory policies, to ensure that the goals of social equity and economic balance are maintained. In addition, in the process of extending or ensuring access to services, the countries must conduct a critical analysis of public and private expansion options, and structure private options in such a way that they do not become a burden on the economy and citizens, and ultimately a regressive factor that hinders growth.

As a result of this process, there are various critical issues which should be taken into account in the regulation of public services, whether they are operated by the private or public sector. The Natural Resources and Infrastructure Division, together with the Institute of Sciences and Techniques of Equipment and Environment for Development (ISTED) of France and with support from the French Government, organized on 18 and 19 October 2005, at ECLAC headquarters in Santiago, Chile, a seminar on the regulation of infrastructure services of water and electricity.

The overall objective of the seminar was to discuss critical regulatory issues in the region in relation to local and international experiences, with a view to suggesting guidelines for dealing with them better in the future. The specific objectives were:

- to compare different experiences with policies for regulating public services;
- to enrich the discussion with different points of view and the perspectives of the local and institutional stakeholders; and
- to identify, at the regional level, critical issues requiring further reflection in order to suggest rules for dealing with them better in the future.

There follows below the section on the technological characteristics of systems and the introduction of competition in generation, from the document entitled "***La construcción de mercados de competencia en los sistemas eléctricos de América Latina: presupuestos y realidades***" (*Building competitive markets in electric power systems in Latin America: suppositions and realities*) written for this seminar by Hector Pistonesi, President of the Energy Economy Institute (IDEE) associated with the Bariloche Foundation, Argentina.

Building competitive markets in electric power systems

The first reform processes in Latin America were based on the "British model", which was the reference point for the recommendations of the multilateral banking system. Nevertheless, the technological characteristics of the electric power systems in the region are very different from the British case. While the United Kingdom's electrical system is essentially thermal (using conventional thermal and nuclear technologies), in Latin America hydroelectric generation plays a dominant role.

This difference, which was noted and extensively discussed at the time of the reforms, is of fundamental importance when attempting to introduce competition into the generation market. In fact, as a large number of countries depend on hydroelectric systems for over 60% of total generation, the contestability of the generation market could be seriously compromised in view of the high level of uncertainty faced by potential competitors.

It is interesting to consider the case of the privatization of thermal power plants in the metropolitan area of Buenos Aires. At the time of privatization, two hydroelectric power plants of very significant size for the Argentine system were about to come on line: Piedra del Águila (a reservoir power plant with a design power of 1 400 MW) and Yacyretá (a binational Argentine-Paraguayan run-of-river power plant, with a design power of 3 100 MW). It was estimated that the commissioning of these plants would bring the installed capacity to a level sufficient to ensure supply until the end of the 1990s.

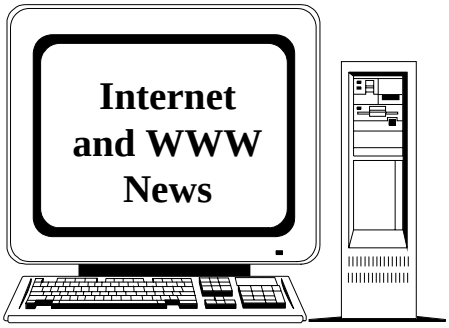
The privatization of the thermal power plants of the former Electrical Services of Greater Buenos Aires (SEGBA), essentially older thermal plants, required guarantees for the Costanera and Puerto companies, which were responsible for these plants, that all of their production would be purchased under eight-year contracts (until 2000). These contracts were allocated to the distribution companies of Greater Buenos Aires (EDENOR and EDESUR) at the time of privatization, and their clients were ultimately affected.

Another relevant case is that of Colombia, where the changing conditions of the hydroelectric supply result in high volatility in power market prices. The high degree of uncertainty for potential investors in thermal generation, which is an essential element for ensuring a more diversified composition of generation technologies, can be a significant entry barrier, leading to problems for market functioning. In order to resolve this problem to some extent, some regulatory amendments were introduced in 1999 in relation to payment for thermal power in order to offer an incentive for investment in the relevant technologies, especially those using natural gas. It is not yet clear whether this measure has been sufficient and there is still a problem with the modalities for natural gas supply contracts for potential investors in thermal generation.

The supply crisis of 1998 in Chile was clearly related to poor market functioning in systems with a high share of hydroelectric power and inadequate regulatory design. One dry year together with a delay in construction or commissioning of thermal plants, lack of transparency, and the absence of adequate coordination in reservoir management were some of the main factors leading to this crisis.

Although the characteristics are different, the very high share of hydroelectric power was also a factor in the crisis of the Brazilian electric power system in 2001. The State approach to power sector development had traditionally been to take the dry year situation as a reference level, in order to guarantee supply even in such cases. The attempt to introduce competition in the generation market, together with the abandonment of the coordination of the system by ELETROBRAS, the virtual prohibition on investment by public enterprises and the lack of interest of private investors in thermal generation projects, in a dry year, led to the supply crisis. The new government decided to reverse the reforms that had been made.

Whenever the appropriateness of competition in electric power systems with a high share of hydroelectric generation is discussed, reference is usually made to the successful case of Norway (100% hydroelectric generation). Nevertheless, the existence of the Nordic electrical market, NordPool, should be taken into account, as Norway does not need to install back-up thermal capacity. This is provided, when necessary, by Finland, Denmark and Sweden. Nor is this market free from potential and actual imperfections.



The web sites worth visiting for information on water resources management and use include the following:

- On 17 September 2003, in Buenos Aires, Argentina, most of the provinces signed the Federal Water Agreement in which the ***Guiding Principles for Water Policy in the Argentine Republic*** were adopted and it was agreed to submit them to Congress in order to establish regulations through a national water policy framework law. Express commitments were also made to harmonize and implement the principles referred to in the water policies, legislation and management of their respective jurisdictions. This document may be consulted on the web site of the Under-Secretariat for Water Resources at *http://hidricos.obraspublicas.gov.ar*.
- The web site of the ***Water Information Center*** of the United States National Academies offers over one hundred reports

on many water-related issues, such as "*Watershed management for potable water supply: assessing the New York City strategy*", "*Meeting the challenges of megacities in the developing world*", "*A new era for irrigation*", "*Privatization of water services in the United States*", "*Valuing ground water*", "*Water transfers in the West*", "*Valuing ecosystem services*" and "*Risk analysis and uncertainty in flood damage reduction studies*" at *http://water.nationalacademies.org*. The National Academies are non-governmental, non-profit organizations that were set up to provide independent scientific and technological advice to the United States government and nation.

- The ***Patagonian Ecosystems Research Centre*** (CIEP) of Chile is carrying out scientific research to identify and study the structure, processes and interactions between river basins, and aquatic, lake, estuary and marine systems (*http://www.ciep.cl*).

- The ***Regulatory Entity for Drinking Water and Sanitation Services*** (ERSAPS) of Honduras was created as one of the basic institutions of the new institutional system for the drinking water supply and sanitation sector as established in the framework law of November 2003, in order to achieve a separation of functions between sectoral governmental organizations (*http://www.ersaps.gob.hn*). The regulatory framework of the sector allocates the provision of services to municipal governments and to the Rural Water Supply Administration Boards, and the function of regulation and control of such providers to ERSAPS.

- In Ecuador, the institutional organization of the water sector was reformed by executive decree N° 2224 of 25 October 1994, which established the ***National Water Resources Council (CNRH)***. This Council is in charge of the functions previously assigned to the former Ecuadorian Institute of Water Resources by the law establishing that Institute and by the water law, except for the functions relating to the execution, operation and maintenance of irrigation works, which are assigned to the Regional Development Corporations that were created by the same decree. More information on the water sector in Ecuador may be found on the web site of the National Water Resources Council at: *http://www.cnrh.gov.ec*.

- The ***International Federation of Private Water Operators (AquaFed)*** is a not-for-profit federation representing the private operators of water supply and sanitation services (*http://www.aquafed.org*). It intends to fulfil three missions: (i) to provide a communication channel between private operators and key international actors; (ii) to make a constructive contribution to solving world water challenges in partnership with others; and (iii) to promote private sector participation in water and wastewater management.

- To celebrate World Water Day on 22 March (see Circular N° 22), the ***UNESCO Courier*** has published, in six languages including English and Spanish, a collection of articles on this precious resource, that is increasingly threatened by population growth, pollution and poor management (*http://portal.unesco.org*).

- The web site of the organization ***Social Participation Options and Processes*** (*http://www.alternativas.org.mx*) of Mexico contains a number of interesting documents, including "*Nuevos descubrimientos en hidroagroecología prehistórica*" (*New discoveries in prehistoric hydrological agricultural ecology*), "*Agua para siempre: regeneración de cuencas para el desarrollo regional sostenible*" (*Water for ever: watershed regeneration for sustainable regional development*), "*Evolución de la tecnología hidro-agro-ecológica mesoamericana desde su origen prehistórico*" (*The development of Mesoamerican hydrological agricultural ecological technology since its prehistoric origin*) and "*Tecnologías de regeneración de cuencas para la obtención de agua*" (*Watershed regeneration technologies to obtain water*).

- The most recent edition of ***Revista Agua***, whose objective is to report on initiatives in the drinking water supply and sanitation sector in Peru, disseminate points of view and provide information on training and human resources, may be consulted at: *http://www.wsp.org/publications/Revista_agua19.pdf*.

- New training and dissemination material on ***disaster mitigation for drinking water supply and sewerage systems*** is available from *http://www.disaster-info.net/watermitigation/i/introduction.html*. It includes a slideshow and a compilation of technical papers on the subject that describe the theoretical and practical aspects of vulnerability assessment and introduce basic mitigation measures that can be taken in response to each of the natural hazards common in Latin America and the Caribbean.

- On 26 October 1998, in Brasilia, Brazil, the governments of Ecuador and Peru signed the Comprehensive Ecuadorian-Peruvian Agreement on Border, Development and Neighbourhood Integration, which includes the Binational Development Plan for the Border Region. The Binational Plan consists of four programmes with a shared goal: to foster development of the border region. One of these programmes pertains to binational projects, in which context priority is given to the implementation of the ***Binational Plan for Land-use, Management and Development of the Catamayo-Chira River Basin***. The objective of the project is to formulate a land-use plan for integrated and shared management of the Catamayo-Chira river basin, to promote rational use of the resources and to contribute to sustainable socioeconomic development to benefit the population in that area (*http://www.catamayochira.org*).

- A number of interesting documents may be consulted on the web site of the ***Central American Technical Advisory Council (CATAC)***, also known as ***GWP-Central America***, such as "*Valoración económica del servicio ambiental agua. Caso ESPH*" (*Economic value of the environmental service of water, the case of ESPH*), "*Propuesta para un esquema de cánones para el aprovechamiento del recurso hídrico en Nicaragua*" (*Proposal for a fee system for the use of water resources in Nicaragua*), "*Protección de la calidad del agua subterránea*" (*Protection of groundwater quality*) and "*Régimen del recurso hídrico: el caso de Costa Rica*" (*Water management: the case of Costa Rica*) (*http://www.gwpcentroamerica.org*).

Publications

Recent publications of the Natural Resources and Infrastructure Division related to water resources management and water utility regulation:

- "***Entidades de gestión del agua a nivel de cuencas: experiencia de Argentina***" (*Water management entities at the river basin level: the experience of Argentina*) (LC/L.2375-P, October 2005, *Natural resources and infrastructure series* N° 96) by Victor Pochat (available in Spanish only) (see "***Open discussion***"). A general trend that is observed in many Latin American and Caribbean countries is the interest in creating governance capacities for areas delimited by natural factors (river basins and aquifers), which do not normally coincide with traditional political-administrative boundaries (provinces, states, regions and

municipalities). As a result of this interest, both in the recently approved water laws (Brazil and Mexico) and in almost all the legal proposals under consideration in the countries of the region, there is an explicit reference to the intention to strengthen and complement the management capacity of central, national or federal water authorities, with the creation of participatory and multisectoral structures for coordination and collaboration at river basin level. It is therefore important to systematize the experiences of the region's countries with the creation and operation of water management entities at river basin level. The purpose of this study is to consider the experience of Argentina with these issues. The document is divided into two parts, the first of which is devoted to a description of the physical, legal and institutional aspects of water resources management in Argentina. The second part of the study contains an analysis of the main examples of river basin organizations that exist in Argentina, including interjurisdictional entities (River Azul Basin Authority (ACRA), AIC, Interjurisdictional Commission of the Laguna La Picasa Basin, Regional Commission of the Bermejo River Basin, Interjurisdictional Technical Commission of the Salí-Dulce River Basin and COIRCO) and provincial entities (Buenos Aires, Mendoza and Santa Fe provinces).

- "***Integrando economía, legislación y administración en la gestión del agua y sus servicios en América Latina y el Caribe***" (*Integrating economics, legislation and administration in water and water services management in Latin America and the Caribbean*) (LC/L.2397-P, October 2005, *Natural resources and infrastructure series* N° 101) by Miguel Solanes and Andrei Jouravlev (available in Spanish only). This document aims to identify developments in water legislation which promote the sustainable integration of water into socioeconomic development. As this clearly does not depend only on formal institutional factors, such as legal texts and the administrative organization, there are also references to dynamic factors, such as socioeconomic circumstances and the quality of the administration, summarized in the concept of governance. The authors are very familiar with situations in which the water managers attempt to use legal mechanisms to control situations that are unsustainable, or where there is a lack of investment, when in fact the relevant factors are economic forces, against which the laws are of no or little value. The specific objectives of this paper are: (i) to contribute to focusing the regional debate on those aspects of water governance, water legislation and macroeconomics which are particularly critical for the Latin American and Caribbean countries; (ii) to promote the formulation of a regional position that genuinely reflects its situation, visions, aspirations and problems; (iii) to promote a critical and balanced analysis of legislation, public policies and the institutional framework for water and its services; and (iv) to provide a basic conceptual framework that is consistent with the debate that is taking place in the world in preparation for the Fourth World Water Forum. In accordance with the above, the paper does not represent a complete diagnosis of the regional situation, nor does it claim to offer a set of "authoritative" prescriptions, but rather seeks to encourage an active debate and to generate questions and suggestions that are valuable in relation to the goals mentioned.

The publications of the Natural Resources and Infrastructure Division are available in two formats: (i) as *electronic files* (PDF format only) which may be downloaded from *http://www.eclac.org/drni* or requested from *Andrei.JOURAVLEV@cepal.org*; and (ii) as *printed (hard) copies* which must be requested from the ECLAC Distribution Unit by e-mail to *publications@eclac.cl*, by fax to (56-2) 2102069, or by mail to ECLAC Publications, Casilla 179-D, Santiago, Chile.

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