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Water governance for development and sustainability

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Abstract

This document aims to identify characteristics of water institutions which promote the sustainable integration of water, both as a resource and as service, into socioeconomic development. As this does not depend only on formal institutional factors, such as legislation and organizational structure, there are also references to dynamic conditions, such as socioeconomic circumstances and the quality of the administration, summarized in the concept of governance, understood as the capability of a social system to mobilize energies, in a coherent manner, for the sustainable development of water resources. As human society becomes ever more complex and the intensity of human impact on natural resources becomes more severe, the need to integrate the different elements of water management becomes imperative. It is for this reason that effective water governance will be more and more closely linked to integrated water resources management. The specific objectives of this paper are: (i) to contribute to focusing the regional debate on those aspects of water institutions and macroeconomic policies which are particularly critical for 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, regulatory frameworks and public policies for water resources management and provision of related public services; and (iv) to make available in English a summary of the water-related research carried out by the Division of Natural Resources and Infrastructure of the Economic Commission for Latin America and the Caribbean (ECLAC).

I. Introduction

In the document "Towards Water Security: A Framework for Action", prepared by the Global Water Partnership (GWP) for presentation at the Second World Water Forum (The Hague, the Netherlands, 17 to 22 March 2000), it was stated that "The water crisis is mainly a crisis of governance. Working towards effective water governance requires an enabling environment and appropriate institutional structures that allow stakeholders to work together for effective water management. Financial practices must be realigned to support the sustainable use of water resources" (GWP, 2000a). The Ministerial Declaration made at the same event highlighted this point of view and demanded "Governing water wisely: to ensure good governance, so that the involvement of the public and the interests of all stakeholders are included in the management of water resources".

At the United Nations Millennium Summit (New York, 6 to 8 September 2000), the heads of State and government resolved to adopt in all environmental actions a new ethic of conservation and stewardship, and, in particular, decided "To stop the unsustainable exploitation of water resources, by developing water management strategies at the regional, national and local levels, which promote both equitable access and adequate supplies". In the Ministerial Declaration adopted at the International Conference on Freshwater "Water: a Key to Sustainable Development" (Bonn, Germany, 3 to 7 December 2001), the ministers with responsibilities for water affairs, environment and development agreed that "Each country should have in place applicable arrangements for the governance of water affairs at all levels and, where appropriate, accelerate water sector reforms".

In the Plan of Implementation of the World Summit on Sustainable Development (Johannesburg, South Africa, 26 August to 4 September 2002), it is emphasized that "Good governance within each country and at the international level is essential for sustainable development". The Plan also called to "Promote priority action by Governments, with the support of all stakeholders, in water management and capacity-building" and to "Develop integrated water resources management and water efficiency plans".

In the Ministerial Declaration made at the Third World Water Forum (Kyoto, Shiga and Osaka, Japan, 16 to 23 March 2003), the ministers and heads of delegation declared that "Whilst efforts being undertaken so far on water resources development and management should be continued and strengthened, we recognize that good governance, capacity building and financing are of the utmost importance to succeed in our efforts. In this context, we will promote integrated water resources management".

Finally, in the Ministerial Declaration adopted at the Fourth World Water Forum (Mexico City, Mexico, 16 to 22 March 2006), the ministers reaffirmed "the critical importance of water, in particular freshwater, for all aspects on sustainable development" as well as their "commitment to achieve the internationally agreed goals on integrated water resources management …, access to safe drinking water and basic sanitation, agreed upon in Agenda 21, the Millennium Declaration and the Johannesburg Plan of Implementation". They emphasized in particular "that Governments have the primary role in promoting improved access to safe drinking water, basic sanitation, sustainable and secure tenure, and adequate shelter, through improved governance at all levels and appropriate enabling environments and regulatory frameworks, adopting a pro-poor approach and with the active involvement of all stakeholders".

ECLAC has long maintained that "reference to a water shortage in our region in the absolute physical sense is not very appropriate … There is no denying, however, that water management systems are often poorly organized if not non-existent" (ECLAC, 1997), and that "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" (ECLAC, 2001a). According to Dourojeanni and Jouravlev (2001), "Initiatives that are intended to create governance capacities for water resources management form an unavoidable part on government agendas. All of the countries of the region are facing constant challenges, and as a result need to come up with legislative and organizational answers that can prevent and resolve growing conflicts over water use, as well as mitigate extreme natural phenomena. Paradoxically, while conflicts stemming from water are on the increase, it appears that in some countries of the region, there has been a reduction in the relative ability that used to exist to resolve them. This state of affairs is described by this study as a 'crisis of governance' in water management".

A. Water governance

1. Theoretical framework

The concept of governance as applied to water refers to "the capability of a social system to mobilize energies, in a coherent manner, for the sustainable development of water resources. The notion includes the ability to design public policies (and mobilize social resources in support of them) which are socially accepted, which have as their goal the sustainable development and use of water resources, and to make their implementation effective by the different actors/stakeholders involved in the process" (Rogers, 2002). In order to be effective, governance must be transparent, open, accountable, participatory, communicative, incentive-based, sustainable, equitable, coherent,

efficient, integrative and ethical. The degree of governance within a society in relation to water management is determined, among other factors, by the following:

- The degree of implicit or explicit consensus regarding the nature of the linkages between society and water.
- The existence of consensus regarding the bases for public policies that express these linkages.
- The availability of management systems that enable effective policy implementation within a framework of sustainable development.

Thus, governance implies the capacity to both generate and implement appropriate policies. These capacities are the result of having established consensus, having devised coherent management systems (regimes based on institutions, laws, cultural factors, knowledge and practices), as well as adequate administration of the system (based on social participation and acceptance, and capacity building). As can be seen, a core element of governance is the capacity of constructing (that is, introducing and developing) institutional arrangements in harmony with the nature of the abilities, limitations and expectations of the system or area under consideration.

The importance of the term "governance" in the region is currently associated, to a large extent, with both the limitations and the possibilities of societies in implementing the profound institutional changes that have been characteristic of the past decades. These changes have often implied the creation of a new institutional structure, which has meant the design and recognition of new ground rules, the creation of organizations and the development of new forms of relationships, both formal and informal, of public and private actors. Any process of reforming a social order is the result of the radical transformation and dismantling of the previous social order. In fact, what may lie at the heart of the problems or the crisis in governance in many countries is the incompatibility of previous institutional arrangements with the new ones.

The crisis will be more acute and extensive according to the scale of the changes undertaken, the pre-existing skills and capacities and their usefulness in dealing with the challenges posed by the transformation, and, in particular, according to the coherence of the new institutional arrangements *vis à vis* the structure and nature of the society and the possibilities and restrictions in place for effectively dealing with the proposed new ground rules (Corrales, 2003). From a proactive perspective, the crisis can be regarded as a process in which there will always be gaps to be filled, contradictions to be resolved and opportunities to be taken advantage of.

It is also necessary to bear in mind that, although the situation in the region has improved compared with the past, there is still a long way to go, as governance is not a predefined solution, but a process that needs continuous refinement as a function of new challenges, experiences and problems. Even when there are general guidelines, there are no set models, and issues are resolved as they arise; consequently flexibility and adjustments to time and place are of great importance. Governance is influenced by globalization and by each country's national situation, the lack of adjustment of legal systems and institutions, and the existence of special legal arrangements, as well as by pressures from special interest groups.

2. The importance of the issue to Latin America and the Caribbean

Governance comes under the spotlight when its limitations manifest themselves (Olson, 1982). The growing awareness within the region of concerns such as the unsustainable use of water, its scarcity, pollution, monopoly control and the lack of access to water-related public services of significant sectors of the population, all illustrate the relevance of the issue.

The importance of water governance in Latin America and the Caribbean is clearly reflected in the series of experiences, proposals for and processes of reform of water legislation and management in most of the countries in the region, as well as in the current programmes and proposals for reforming water-related public services, particularly urban drinking water supply and sanitation utilities. In some cases these programmes and proposals have been developed locally, with significant local input, while in other cases they have been proposed by external agencies.

Some countries have implemented significant reforms. For example, Brazil has adopted a new water legislation and a national water management policy; Chile has reformed its water law and the water supply and sanitation sector, and privatized all water-related utilities; Argentina has privatized both the hydroelectric sector and the water supply and sanitation utilities in several cities; Colombia and Bolivia have also privatized some water supply and sanitation services; and Mexico reformed its water legislation and also privatized some water-related services. The water supply and sanitation sector has been subject to extensive reforms in the majority of the region's countries. In addition, a number of countries, including Bolivia, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Paraguay, Peru and Venezuela, are currently discussing modifying or reforming their water-related legislation.

The specific contents of these processes have been determined by various perceptions of the problem, ranging from those where there is a reductionism of criteria that do not necessarily correspond to the nature of the question at hand (tending to emphasize private property rights, minimizing the character of water as a public good) to those that assume conditions of perfect competition, which in practice do not exist (as is sometimes the case with some public utility regulations; see Box 1). In some cases, these restricted or very optimistic visions of water management and water-related services have resulted in the monopoly control of water resources and in inadequate regulatory frameworks. There are also examples of reform proposals that are based on the vision of external actors and do not respond to the real needs of the sector; when certain interests are excluded from the discussion or a small group has a disproportionate influence; and when the supposed aim has more to do with circumstantial problems of a special interest group than with achieving integrated water management. Hence the importance of processes that foster dialogue and consensus at the national level, with the full involvement of all sectors of society.

The issues outlined above illustrate the significance of the concept of governance. Essentially, if governance is to be understood as the capacity to address concrete problems in the region, then it is clearly relevant to emphasize it, given that the challenges presented by water management and the accessible provision of public services to the population are not being met (Corrales, 2003).

B. Macroeconomic environment

One of the observations made by the South American Technical Advisory Committee (SAMTAC) of the 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 export-oriented irrigated agriculture, mining, aquaculture, wood and paper processing, and the sustainability of drinking water supply and sanitation services (Peña and Brown, 2004). In Argentina, over the same period, the surface area under irrigation declined, and the country's drinking water supply and sanitation services suffered to such an extent that some foreign investors withdrew from the country and filed claims with international arbitration tribunals (Diaz and Bertranou, 2003). 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.

Box 1

THE TECHNOLOGICAL CHARACTERISTICS OF ELECTRIC POWER SYSTEMS AND THE INTRODUCTION OF COMPETITION IN GENERATION

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 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.

Source: Pistonesi (2005).

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 analyzes, 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 policies, 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 (1951) (see Box 2).

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: “macroeconomic policy has a pervasive influence on the structure of incentives and performance in the entire water sector” (Donoso and Melo, 2004). 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 public 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, but water policy options are limited: more investment, more subsidies or more technological support (Donoso and Melo, 2004). 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.

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 (Ciriacy-Wantrup, 1951).

Argentine macroeconomic policies of the 1990s serve perhaps 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 (Diaz and Bertranou, 2003).

The decisions of water users are affected by general economic forces, such as interest rates, uncertainty, prices, exchange rates, property rights and taxes (Ciriacy-Wantrup, 1951). 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

Box 2

DOLLARS AND SENSE IN AGRICULTURE

A farmer must change his/her conservation decisions according to changes in economic forces. An understanding of how economic forces affect conservation decisions is highly important for the farmer and for the public.

Interest and conservation

Interest rates and economic forces related to them are among the most powerful factors that influence conservation. When the interest rates a farmer uses in discounting go up, the present value of his/her future profits goes down. More distant profits are lowered more than those nearer to the present. Therefore when interest rates go up, a farmer will try to shift profits to years closer to the present. He/she can do this by:

- Shifting gross returns toward the present. Except by reducing storage, he/she can do this only by increasing production in years closer to the present at the expense of production in the more distant future.
- Shifting costs further toward the future. He/she can do this only by reducing sunk costs. But any such reduction in sunk costs means that future costs will be increased or future production decreased.

Thus a rise in the interest rates discourages conservation.

Income and conservation

The lower a farmer's income, the more each dollar of income now means to him/her. Therefore:

- A farmer with a low income level needs money now more than does one with a higher income.
- If a farmer's income goes down (as during a depression), his/her time-discount rate will go up; he/she will be less willing or able to wait for income. And the change in his/her rate will be greater if his/her income was low to start with.

Conservation is discouraged when income goes down. Economic forces that affect farm incomes (farm products, subsidies, costs, taxes and charges) will be especially important for conservation decisions if they bear differently on low and on high farm incomes.

Uncertainty and conservation

A farmer is more uncertain, for example, when demand, technology or public policies are changing rapidly. He/she may make allowance for uncertainty in any of five ways:

- He/she may discount for uncertainty. A change in his/her uncertainty discount works just like a change of time discount or interest, a rise in it leads to depletion; a lowering of it encourages conservation.
- He/she may make his/her plans more flexible by keeping a larger part of his/her assets in liquid form; by getting land, buildings and equipment on short-time leases rather than ownership; by buying less durable equipment; and by postponing investment in improvements; in short, by reducing his/her sunk costs. A reduction in sunk costs results in depletion.
- He/she may hedge against uncertainty. Hedging is not very helpful in farmers' conservation decisions, but in a limited way, it encourages conservation.
- He/she may pool uncertainties with other farmers. For hazards that lend themselves to its use, pooling (insurance) is effective in reducing farmers' need for uncertainty allowance through flexibility; hence it encourages conservation.
- He/she may spread uncertainties in his/her own business. In farming, spreading usually means diversifying. Whether diversifying is conserving depends on the farming system resulting from it. It often is conserving, but not always.

Box 2 (Concluded)

Prices and conservation

There are so many possible ways that farmers may expect prices to change in the future that it is impossible to make any general statement about how expectations of price changes affect conservation. If farmers expect product prices to go up and stay up, conservation is encouraged. On the other hand, if he/she expects product prices to be lower in the future, he/she will tend to deplete his/her farm. If farmers expect high prices to last only a short time, conservation may be discouraged. The effects of price changes depend not only on their time distribution but also on whether they encourage practices that are specifically conserving or specifically depleting. These effects are highly complex in their relation to conservation.

Price supports and conservation

Price supports do not always encourage conservation. Farmers know that such supports depend on the political fortunes of a government, a party, or a pressure group. They are uncertain whether price supports will be continued after another party comes into power. Hence, farmers will try to shift their use toward the present, when they are surer of price supports. This means depletion. If the government states that price supports will be discontinued at a certain date, this will tend to encourage depletion still more.

Property rights and conservation

Indefinite, unstable and unbalanced property rights lead to depletion.

Tenancy and conservation

Tenancy may discourage conservation through instability of tenure, through unbalanced distribution of costs and returns between owner and tenant, and through fixed rents.

Credit and conservation

The credit system may discourage conservation through instability of tenure (of owners as well as tenants); through fixed interest and amortization payments; and through imperfections of the loan market.

Taxation and conservation

The tax system has important effects on farmers' conservation decisions. Often these effects are not intended nor recognized by tax authorities. Time relations must be considered with taxes as with prices. If farmers expect tax rates to be higher in the future than they are now, they will try to shift gross returns toward the present and costs toward the future resulting in depletion; if they expect them to be lower later on, in conservation. From a conservation standpoint, income and profit taxes are much more desirable than property taxes. Estate and inheritance taxes tend to discourage conservation. Yield taxes are generally neutral toward conservation.

Direct tools for conservation policy

The economic forces discussed above are largely determined by laws and customs that are not primarily aimed at influencing farmers' conservation decisions; they influence these decisions because they affect costs and returns in production plans. Tools that are directly aimed at influencing farmers' conservation decisions are education and zoning ordinances and regulations that require certain conserving practices or prohibit certain depleting ones.

- Education is important, but it is no cure-all. If dollars and sense considerations keep a farmer from adopting conservation practices, education is not the answer.
- Zoning and regulation are useful, but have economic (these are determined by a farmer's opportunities in using his/her resources under zoning restrictions and regulations; if use must be too greatly restricted, zoning and regulation are not feasible) and legal (interference with private rights must be reasonable and not arbitrary) limits.

Source: Ciriacy-Wantrup (1951).

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 (Peña, Luraschi and Valenzuela, 2004). This country's development model is based on macroeconomic balances and exports that make use of comparative advantages (see Box 3). 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.

What are the implications for water administration? In much of Latin America and the Caribbean, reductionism, the preoccupation with local issues and the short-term, and the political interference in the authority and responsibility of water management institutions have led to the development of what has been described as a passivity in confronting the broader macroeconomic and political forces which affect water management (ECLAC, 1989): "It must be recognized … that many factors which impinge on operations are external to any reasonable definition of the area of direct responsibility of water system management. Nevertheless, the impact of many of these 'external factors' can be mitigated or magnified by management action. Only too commonly, management actions, or the lack thereof, have exacerbated rather than reduced the influence of unfavourable external conditions …While management may be no more responsible for inflation than it is for wet or dry years, it nonetheless does have a responsibility to protect the water system from negative external impacts. All too often, however, water managers remain passive … in the face of the threats posed by external forces to the effective operation of the water systems for which they are responsible … The existence of factors over which water managers have no direct control does not mean that management should be passive towards them. It appears to be true that the managers of water systems are rarely passive in response to the impact of natural events on water systems, although the damage caused is not always repaired. In the same way, management must not be passive in the face of disinterested or short-sighted government policies and decisions" (Lee, 1990).

So, at the very minimum, those in charge of water resources management and service provision must continuously analyze the impact of existing and proposed macroeconomic policies on the development of the water sector, and maintain a fluid, frank and active dialogue with those responsible for economic and social policies. They should also pay careful attention to the macroeconomic effects of water policies, in order to ensure that their decisions enhance, rather than limit, the contribution of water resources to socioeconomic development and macroeconomic stability. This presupposes that water administration has a certain degree of autonomy and independence of political and sectoral interests, an active attitude, stability and resources (professional, financial, information, etc.) in line with its responsibilities, and maintains a close contact with water users and backward- and forward-linked sectors.

Box 3

WATER, DEVELOPMENT AND PUBLIC POLICIES IN CHILE

The economic development model adopted in Chile is based principally on maintaining macroeconomic equilibria and on specializing in exports for which the country has comparative advantages. Broadly speaking, this model has produced very buoyant export development, primarily for products such as copper, fresh fruit, cellulose fibre, wood, salmon and wine, among others.

In the case of agriculture and that of aquiculture, Chile has specialized in the seasonal supply of quality products and varieties. The availability of effective means of transport has also been a key factor in export success. In the cases of copper and cellulose, the country has specialized in exports with clear comparative advantages, particularly with respect to the availability of raw materials and to production costs. Lastly, in the final stage of the period, Chile has begun to show an upward trend in value-added exports and industrialization, as demonstrated by the exports of wine and other products associated with lumber, fish, fruits and processed vegetables.

It should be emphasized that most of the goods on which the Chilean export model is based involve the use of water resources at some stage in their production. In other words, sectors of the economy that depend heavily on water resources produce a high percentage of national exports.

In the case of copper, mining processes use water during many metallurgical processes that must be carried out once the minerals have been extracted from the deposits. In the north of Chile, water resources are very scarce due to the arid climate of the Atacama Desert, which is precisely where the most Chilean copper is produced.

In the case of fresh fruit, irrigation water has been fundamental for production, which mainly occurs in areas where plants would otherwise not be able to develop properly. In the case of wood, although plantations can grow with rainfall alone, water is used in processes carried out after the wood has been obtained, as in the case of the cellulose production industry. Lastly, in the case of farmed salmon, fresh water is needed during the initial stages of life of this species. In conclusion, it may be said that water resources have been pivotal in the overall success of the export model.

The strong growth of export production has prompted significant increases in the demand for water resources and has thus given rise to great challenges for water management. History shows that when a country is not developing economically or socially, the water issue is not a challenge for the society. On the contrary, the situation radically changes when the country begins to grow. In fact, the information available shows a clear correlation between the growth of a country and its water demand and the emergence of environmental issues linked to natural resources exploitation.

As for the impact of globalization, in many cases competition in global markets presupposes a high degree of technical skill in water management, not just because of the dynamics of water, but also because of the competitive advantages it contributes to the product. This is obvious with agricultural modernization. For example, the high degree of sophistication in water management in vineyards, which presupposes very high efficiencies, aims at producing high quality wines (of high value). The water savings are not relevant in taking investment decisions. Use technologies have also been affected by the need for access to global markets, given the necessity of international certification to assure access to other markets. For this reason, producers frequently go far beyond national requirements. This is why clean production programmes have been agreed to by some sectors (mining, agriculture, etc.).

Another dimension of the globalization process is also closely related to the flow of capital and the building of stable non-discriminatory normative frameworks to protect foreign investment. In some sectors related to the water resource. this process has reinforced foreign investment (public services) significantly accelerating the realization of certain water policies and at other times even changing the water demand situation, as is the case with the impact of the import of natural gas, which has led to a substantial change in the energy matrix.

Source: Peña, Luraschi and Valenzuela (2004).

II. Water governance and the social and economic background

Water management problems, both in respect to the resource itself and to water-related public services, neither originate nor can be solved within the confines of water resources alone. For this reason, water resources governance cannot be either analyzed or understood outside of a general frame of reference to governance and its related problems in the global society. A lack of awareness of this reality, coupled with an ignorance, on occasion deliberate, of contextual differences, can result in the proposal of greatly over-simplified, uniform and generalized solutions that are simplistic, or ideological, and eventually counterproductive (Arbor and Giner, 1996).[1]

A. Social, economic and political challenges

Latin America and the Caribbean is characterized as belonging to the developing regions of the world:

- **Rapid population growth and urbanization**. The region's total population increased from 167 million in 1950 to 520 million in 2000, and is expected to reach 628 million by 2015 (United Nations, 2003). As the population has grown, it

[1] "Decisions were made on the basis of what seemed a curious blend of ideology and bad economics, dogma that sometimes seemed to be thinly veiling special interests. When crises hit, the … prescribed outmoded, inappropriate, if 'standard' solutions, without considering the effects they would have on the people in the countries told to follow these policies. Rarely did I see forecasts about what the policies would do to poverty. Rarely did I see thoughtful discussions and analyses of the consequences of alternative policies. There was a single prescription. Alternative opinions were not sought. Open, frank discussion was discouraged … Ideology guided policy prescription and countries were expected to follow the … guidelines without debate" (Stiglitz, 2002).

has become increasingly concentrated in urban areas: the proportion of urban residents rose from 42% in 1950 to 75% in 2000, and is projected to reach 81% by 2015. Some of the region's cities are already among the largest in the world. Latin America and the Caribbean is the most urbanized region in the developing world, yet the scarcity of affordable land and housing in the region's urban areas has led to high rates of informal and irregular tenure among poor families (ECLAC, 2001b).

- **Low but heterogeneous levels of economic development**. The region's per capita gross domestic product (GDP) (at constant 1995 prices) is almost 3,800 dollars, but it ranges from less than 1,000 in Bolivia, Haiti, Honduras, Nicaragua and Guyana, to more than 6,000 in Argentina, Chile, Antigua and Barbuda, Barbados, Saint Kitts and Nevis, and Trinidad and Tobago (ECLAC, 2005c).

- **High levels of poverty and indigence**. According to ECLAC (2006), 40.6% of Latin America's population is living in poverty, and 16.8% of these people are extremely poor, or indigent.[2] This means that 213 million people in the region are poor and 88 million people are extremely poor. These levels of poverty suggest that the region is 51% of the way towards meeting the first target of the Millennium Development Goals, which is to halve, between 1990 and 2015, the proportion of people who are living in extreme poverty. This progress is encouraging, but it also falls short of what is required, since 60% of the period set for achieving this target has already elapsed.

- **Important deficits in health** (infant mortality level of 25.6 per 1,000 live births), **education** (nearly 92 million Latin Americans aged 15 and over (around 25%) have not completed their primary education; even more disturbingly, 36 million of these people describe themselves as unable to read or write, which effectively prevents their integration into society), **housing** (there are approximately 128 million slum-dwellers in the region (ECLAC, 2005b)[3] and a high percentages of its population lives in overcrowded dwellings: more than 30% of the population in 9 out of 14 countries lives in overcrowded conditions (that is, three or more people to a room) (ECLAC, 2006)), and **food security** (by the start of the current decade, about 10% of the Latin American and Caribbean population (52.9 million people) suffered from undernourishment (ECLAC, 2006)).

- **Human development**. Latin American and Caribbean countries are ranked between 30 (Barbados) and 153 (Haiti) in the Human Development Index; only Barbados, Argentina, Chile, Uruguay, Costa Rica, Saint Kitts and Nevis, Bahamas, Cuba, Mexico, Panama, and Trinidad and Tobago are classified as having high levels of human development (UNDP, 2005).

- **Political and social instability**. Latin America's political history, with the exception of certain periods, has frequently suffered long periods of instability and interruptions in the

[2] According to ECLAC (2004a), the marked degree of income concentration is one of the hallmarks of Latin America's social panorama. This has earned the region the dubious distinction of being the most inequitable region on the planet in terms of income distribution, even when compared with less socially developed regions with higher poverty rates. On average, households in the first four income deciles (the poorest 40%) receive about 13.6% of total income. Households in the fifth, sixth and seventh deciles, the ones in the mid-range of the income distribution, receive 23.0% of total national income. Meanwhile, the eighth and ninth deciles receive an average of 27.3% of monetary household income. Lastly, the richest decile takes in an average of 36.1% of all household income in the Latin American countries, although the percentage can exceed 45%, as is the case in Brazil.

[3] The term "slums" encompasses a broad spectrum of low-income settlements, ranging from dilapidated inner-city dwellings to informal settlements, frequently in peripheral, high-risk areas (ECLAC, 2005b). They are characterized by substandard housing, infrastructure and services, overcrowding, and irregular forms of tenure, but in many cities they are the only form of shelter available to the urban poor.

processes of democratic development that reflect an endemic incapacity to meet the social needs of the population.

The greatest source of frustration regarding the economic performance of Latin America and the Caribbean has been the growing divergence between the region's and the developed world's per capita GDP levels (ECLAC, 2005b). This trend first appeared in the early 1970s, and the gap has been widening in recent years. Renewed economic growth in 2003, 2004 and 2005 is a positive sign, but has not brought about any radical change in the situation. What is more, this trend has been accompanied by increasing income-distribution disparities within the region and —when the early 1980s are used as a basis for comparison— by rising poverty and indigence levels in practically all of the region's countries.

Economic growth has not only been slow, but volatile as well: in the 1990s, the coefficient of variation for GDP growth in Latin America and the Caribbean was more than twice as high as it was for the developed countries and the developing nations of Asia (ECLAC, 2005b). Although the region was making considerable headway in controlling inflation and fiscal deficits, the macroeconomic fluctuations of the 1990s generated a great deal of instability.[4]

Since the 1980s, the role of the State and the governance of society have been vigorously debated in the region. Most countries have undertaken significant reforms designed to reduce the role of the State in entrepreneurial activities and in the provision of public services, which, in some cases, have been accompanied by privatization and the liberalization of markets and trade. One of the consequences of these reforms has been that the role of the State has changed from direct investment and delivery of services to one of controlling, regulating, fomenting and supervising the activities of third parties (ECLAC, 1994a).

The political and social instability resulting from recent economic crises in the region has led to strong questioning of the economic reforms implemented, especially of the ability of the State to create and regulate markets in defence of the public interest. The outcome remains uncertain, and some perspectives suggest that a variety of responses and adjustments will be required.

B. Issues facing the State and civil society

Studies carried out on the public perception of government institutions in Latin America and the Caribbean often show that these have an alarmingly low level of credibility. Various factors have influenced this, which are not always attributable to the institutions themselves. However, these include the failure of the institutions themselves to solve the more critical problems that afflict society, either due to the limitations of the environment in which they operate, or as a result of a lack of resources, authority, or access to political power. Other factors that influence credibility are ideological prejudices and opinions about the role of the State and its regulation of the private sector, weaknesses of the institutions of civil society, the perceived capture of institutions by special interest groups, and problems arising from increasing globalization.

[4] It is important to add that the pattern of economic development of the region has accentuated the structural heterogeneity of the economies and, most importantly, has created a situation in which many economic agents have been left by the wayside as these economies make the transition to a modern production structure (ECLAC, 2005b). The Latin American and Caribbean region thus displays a substantially higher degree of heterogeneity than other regions; this characteristic interferes with the transmission of the productivity gains realized in some sectors and firms to the rest of the production apparatus (ECLAC, 2004b). The persistence of these differences has led to the emergence of three segments of production (large corporations, small and medium-sized enterprises, and informal micro-enterprises) which are progressing at very dissimilar rates.

1. The inefficiency of public administration

A fundamental reason for the loss of credibility by public institutions is their incapacity to meet the basic needs of the population in terms of public services. Suffice it to say that some 60 million persons in the region lack access to drinking water supply services and almost 140 million to sanitation services (WHO/UNICEF, 2006). In many cases the inefficiency of public administration is the result of: (i) outdated and inefficient management practices; (ii) politicization, understood as the intervention of political interests in management, operational or economic decisions for short-term or opportunistic ends;[5] and (iii) the lack of financial and human resources, or a weak institutional structure (lack of clear roles and power relationships, the absence of effective conflict resolution mechanisms, among other factors).

Thus, organizations responsible for managing water resources and providing related public services often do not have adequate information and administrative capacity, a problem that frequently becomes worse as a result of decentralization processes implemented without a critical analysis of the general culture and the capacities and resources available at the local level. In some Latin American and Caribbean countries, this had led to institutional arrangements in the water sector that are not in tune with the significance of water allocation and the regulation of water-related public services. To a large extent this is the result of prejudice in respect of the role of the State, a prejudice that has negatively affected public institutions at the global scale (one only needs to think of the accounting practices applied in large companies that have led to their collapse).

2. The weak regulatory role of the State

The management of a public good, such as water, as both a resource and a service, is problematic and precarious when regulatory institutions do not adapt to the nature of the thing they are regulating. In this respect, the procedures for institutional change in Latin America and the Caribbean have often neglected the fact that markets need laws and regulations to function properly, and that the State is the most appropriate regulator. Markets do not function properly without free flows of information, competition, protection of property rights, and control of externalities: "The libertarian utopia of complete laissez-faire does not give you prosperity … Markets … are human institutions, with human imperfections. They do not necessarily work well, and they are too important to be left to the ideologues" (McMillan, 2002). According to Stiglitz (1999), this ideology "sees the … [State] as being irredeemably corrupt … while the private sector is viewed through rose-colored glasses". In some cases, the result of this distorted vision has been that administrative structures for water management and the regulation of water-related public services have been deliberately designed with *ex profeso* limitations on State power or with a distortion of their information base (see Box 4).[6]

[5] "The main reason for the persistence of inadequate tariffs is the tendency of governments, and sometimes operating companies, to consider tariff increases inopportune due to political or macroeconomic policy reasons. Consequently, tariff levels have been usually kept low … In addition, attempts to accommodate various special interest groups have sometimes led to complex and distorted pricing policies, taxation and regulations, which coupled with frequent tariff and policy revisions provided little incentive to save water or energy and to reduce costs, but a strong incentive to exert political pressure" (ECLAC, 1990).

[6] For instance, Sappington (1993) suggested that, to facilitate private investment in public services, it might be advisable to make it more difficult to measure the true level of profits, for example by developing accounting systems that reduce the visibility of profits or encouraging vertical integration of the regulated company in order that "creative" transfer prices may be used for reducing observable profits. These are surprising opinions, especially considering that this is a real and worrying problem affecting private infrastructure investment in many countries: "In order to compensate for risk … investors often insist on high rates of return. But … managers often recognize that high rates of return can, in politically sensitive industries, actually increase the risks. As a result, investors often try to lower visible returns by transferring profits to affiliated entities through prices charged for inputs, loans from related companies, expenses for home office, and technical and management fees" (Wells, 1999). "The general point is that cross subsidization between regulated and non regulated activities, the handling of common costs and transfer pricing in intra company transactions, risk shifting and cost shifting, and the hiding of profits in costs are not abstract bugaboos dreamed up by academic industrial organization theorists or Veblenian institutional economists. They are real and troublesome problems" (Jones, 1992).

Box 4

THE WEAKNESS OF CURRENT REGULATORY FRAMEWORKS

There are grounds to believe that the regulatory frameworks adopted by Latin American and Caribbean countries are generally weak. There are various structural reasons for this situation:

- The first explanation is linked to a **prejudiced view of governments as inevitably inefficient and corrupt and whose powers must be limited, whereas private participation is perceived as an end to be achieved at any cost**. Furthermore, there are reasons to believe that the design of regulatory frameworks may have been influenced by ideological factors.

- The second reason is that **regulatory frameworks were often designed at a time when, for various reasons, the need to ensure efficient regulation was not high on the list of governments' priorities**. In Argentina, for instance, "the policy of asset divestiture was more a macroeconomic tool to stabilize the economy than part of a structural reform policy aimed at increasing economic productivity in the long term" (Gerchunoff and Cánovas, 1993). More specifically, the government's haste to transfer public utilities to the private sector —closely linked with the need to give clear signals concerning the direction of its economic policy— "was given priority over any other criterion, especially over factors concerning the subsequent regulation of the markets involved" (Azpiazu and Schorr, 2001). In Chile, regulation by means of a "model company" was devised at the beginning of the 1980s in response to the "concrete problems of public companies at the time" (Bustos and Galetovic, 2002), hence regulatory procedures were not designed for the need for regulation in the context of private participation. This was one of the factors behind the need to strengthen the regulatory framework prior to privatization by means of Law N° 19.549 of 19 January 1998.

- Third, **the formulation of regulatory frameworks in many countries of the region have taken place in a context of weak or poor institutions and problematic State finances**. This "has limited the bargaining power of government structures in their dealings with transnational economic groups that provide considerable funds to finance the sector. Institutional weakness, sometimes aggravated by corruption, encourages a waterfall effect in which large economic groups, often supported by the government in their countries of origin, press government structures and limit the independence and impartiality of regulatory bodies to carry out their mission of improving efficiency and balancing the private and social benefits of the services provided" (Lentini, 2004).

- The fourth aspect worth mentioning is **the mistaken belief, often related with the strict and inflexible application of ideological models, that regulators in modern systems, such as price-cap regulation, can use relatively limited and simple information** on costs and demand and have no need to measure the rate base or rate of return or to allocate common costs. There is therefore thought to be no need to develop information access methods (such as regulatory accounting and controlling transfer pricing in transactions with associated companies) that are usually applied in traditional regulation (particularly rate-of-return regulation in the United States). This assumption has had a huge influence on the definition of regulatory frameworks in many countries of the region.

- Another factor worth mentioning is **another mistaken belief, mainly created by ideological visions, that competition (whether competition for the market through tendering contracts as in many Argentine provinces, direct market competition or contestable markets) will reduce the need for regulation** and therefore will do away with the need to develop conventional regulation procedures. In many cases, that assumption has turned out to be excessively optimistic and lacking any empirical basis, while other attempts to implement that system have been plagued by serious difficulties.

Source: Jouravlev (2004); Solanes (2002a).

3. The weakness of civil society

In developed countries with robust corporate structures representing various interest groups (such as industrial associations, public and user organizations, trade unions, and environmental groups), with a high degree of pluralism, with a relatively even balance of power among them and with effective support structures (such as adequate systems for the delivery of justice and education), consensus and self-regulation are tools that are increasingly used with the consequent reduction of transaction costs. However, this system, when transferred to societies in which there is both an imbalance of power and inequality of access among the various groups, leads to the group with the greater capacity of *de facto* political leverage managing to manipulate the political system for benefits that are not necessarily in the common interest. In this context, reference to civil society loses part of its *raison d'être*, because the *de facto* principles on which it functions are absent.[7] For example, in many countries, as in Chile, "due to their sheer economic size, utility companies have acquired an influence in the political system and in society as a whole, against which it is hard for regulators to contend" (Bitrán and Serra, 1998).

This asymmetry may lead to outcomes such as: unjustified allocation of water rights; ignoring the water uses of traditional and indigenous groups; support for projects with an overall negative economic impact, but which yield benefits to one particular sector; regulatory regimes that fail to induce efficiency in the provision of water-related public services, to mention only the most notorious examples. This need for balance in water resources management and provision of water-related public services has been a subject of fundamental importance, because imbalances between environmental variables, economic sustainability and the socio-political dimension, lead to a crisis in governance (Corrales, 2002). In addition, the weak presence of civil society often can be exploited by small but active groups, unrepresentative of society as a whole, that are unable to generate comprehensive visions of current problems, often therefore only managing to reproduce ideas out of context, ideas which originated within very different realities. The implication is that water governance in the region may require stronger regulatory and management organizations, as well as better mechanisms for decision-making, public participation and conflict resolution.

4. Capture and corruption

Associated with the situation discussed above, on occasion, the public perception of the capture of the State apparatus by a particular special interest group contributes to the view that the public administration itself is to the detriment of the community as a whole. Also notable is the capture of regulatory bodies, which, combined with poor regulatory design and a lack of operational capacities and resources, erodes institutional credibility.[8] For instance, in the

[7] Laws are social products to which lawyers merely attach a certain technical content. What underlies the law and the institutional framework in this context, is the result of a variety of social inputs and interests. Water laws in countries where there is a balance between institutional, social, economic and environmental elements, tend to reflect this structural equilibrium. In other countries, water laws reflect the basic imbalance of the underlying system, in water and in other natural resources (Solanes and Getches, 1998).

[8] Since regulatory decisions affect the regulated companies' welfare, there is an incentive for them to use resources at their disposal to try to influence regulators. The companies are almost always better organized, motivated, and financed than any other group, and so are often viewed as the single greatest threat to regulatory decisions being made in the public interest: "Their tenacity and creativity in pursuing favourable regulatory decisions is driven by their knowledge of the substantial impact of regulatory decisions on their income and quality of life" (Zearfoss, 1998). Regulated companies have various instruments at their disposal to influence regulators: (i) monetary payments (bribes) are feasible, although not common due to their illegality; (ii) much more common are the hoped for future employment opportunities for the regulatory agencies' staff with the regulated industry (in many countries, there is a long history of regulators and high-ranking public officials subsequently finding attractive careers in industries for which they formerly exercised responsibility); (iii) personal relationships provide incentives for the regulatory agencies' staff to treat their partners from the regulated companies kindly; (iv) the regulated industry may cater to the regulatory agency's bureaucratic desire for a quiet life or for larger resources (for example, by refraining from publicly criticizing it); and (v) the regulated industry can make indirect transfers through a few key elected officials who have influence over the agency (for example, monetary contributions to political campaigns, the votes and lobbying of employees, shareholders, suppliers, etc.) (Laffont and Tirole, 1991 and 1993). In addition, in

privatization of drinking water supply and sanitation services in the city of Buenos Aires, the "poor information base, lack of transparency in regulatory decisions and *ad hoc* nature of executive branch interventions make it harder to reassure consumers that their welfare is being protected" (Alcázar, Abdala and Shirley, 2000). "The regulation model (framework, rules of the game, and regulatory body), has been inefficient, fragile and weak. The capture of the regulator and/or the government has been mentioned as one of the main reasons for the governance problems of the concession" (Rogers, 2002).

Furthermore, frequent mention has been made of serious corruption problems in the region. According to Transparency International (2005), based on the Corruption Perception Index (CPI),[9] only 3 countries of the region, Chile (7.3), Barbados (6.9) and Uruguay (5.9), score over 5, while 3 more, Costa Rica (4.2), El Salvador (4.2) and Colombia (4.0), do not fall below 4.0.

5. The emergence of new issues

Over the last few decades, the State has had to pay particular attention to issues that previously were often given only marginal attention. This is the case where there are profound ethnic and cultural differences within the countries of the region and where importance has been given to environmental issues. Growing awareness of these issues at both the global and national levels has led to various modifications being introduced to both legal and institutional frameworks in some countries, but, although meaning improvements in the attention paid to these questions in comparison with previous conditions, they have frequently failed to live up to expectations of the population. Thus, both issues are increasingly visible on the political agenda and sometimes lead to serious differences of opinion and conflicts.

6. Problems associated with globalization

A subject relevant to the governance of water resources and related public services is the effect that international trade and investment agreements may have on national capacities to manage natural resources and to regulate public services. Few have paid attention to the fact that these agreements, which override national laws, may affect the roles and functions of national and local governments, as national agreements prevail over local authority.

As a consequence of globalization, many services are provided and water rights held by companies within foreign investment protection systems or special conflict resolution regimes, which means that external jurisdictions can intervene in local matters. The effects of this situation have yet to be fully analyzed. Furthermore, it can also subject activities and resources to legal regulations that are not within the field of expertise of local managers or regulators of natural resources or public services involved and they are often unaware of these and of their implications. Examples of such regimes include foreign investment protection treaties, common throughout the region, or the regulations that may eventually be implemented via the Free Trade Association of the Americas (ALCA), many of which would be based on the North American Free Trade Agreement (NAFTA). However, many analyzes of NAFTA, undertaken outside Latin America and the Caribbean, have been critical of the treaty (DePalma, 2001) (see pages 63-64).

In this context, States are loosing authority to regulate private companies in the public interest.[10] This has weakened the role of the State, and as yet no universally accepted mechanism

the political arena, regulated utilities often support candidates sympathetic to their point of view, lobby governments and legislatures, and attempt to manipulate the public through the media and sometimes their own bill inserts (Zearfoss, 1998).

[9] CPI score relates to perceptions of the degree of corruption as seen by business people and country analysts and ranges between 10 (highly clean) and 0 (highly corrupt).

[10] According to IISD (2001), "While challenges to government actions are inevitably part of providing legal protection for foreign investors, the implementation of Chapter 11 [of NAFTA] to date reflects a disturbing lack of balance between the protection of

has been devised for dealing with this erosion of power. There is, however, the growing notion that the arbitration mechanisms so popular today are not particularly suited to dealing with matters pertaining to the public interest. The way in which some international institutions work adversely affects democracy, as they dictate policy based on very restricted terms to governments.

C. Factors favouring the search for solutions

Faced with the scenario of difficult social and economic conditions outlined above, of the high level of political instability prevailing in most countries and the problems facing the State and civil society, it must be considered whether it is feasible to effectively address the problem of water governance in the region.

In this regard, it is important to remember that, historically speaking, when societies have had to face major challenges in water management, they have been able to create effective governance systems, arising from the need to control water both for protection and for use, both nationally and locally. Ancient China and Egypt are notable cases. More recent examples include the development of the American West, the creation of local authorities in the Netherlands and of the river basin institutions in Spain.

In the Americas, the need for water management, particularly in arid areas under irrigation, has led to the creation of management bodies and the consolidation of user organizations, which have assumed some of the activities associated with effective water governance. The cases of user cooperatives in countries like Argentina and Ecuador are also well known.

These experiences seem to indicate that the water sector has the potential, derived from its own need for management and the vital nature of its services, of generating its own system of governance, even within contexts of severe general governance problems. It is also important to consider the following points:

- The last decades have seen a growing awareness in public opinion in the region, as reflected in the many declarations made both nationally and internationally, regarding the importance of water and its services for future human development and protection of the environment. This awareness has been influenced both by the dissemination into the public domain of the conclusions reached at the various international conferences and other events (ECLAC, 1998), as well as the growing number of conflicts over water resources of which the public is aware. Such a situation did not exist a couple of decades ago, as can be seen by comparing the results of the United Nations Conference on Environment and Development (Rio de Janeiro, Brazil, 3-14 June 1992) with those of the World Summit on Sustainable Development.

- A second element contributing positively to the efforts aimed at improving water governance is the growing conviction of the need for a reform of the State, resulting from greater demands from citizens as beneficiaries of State actions and users of water-related public services.

- Finally, it must be mentioned that water management, because of its undeniably social character and close link to the fulfilment of basic needs, is also an appropriate means for strengthening social structures from the bottom up and often, in the medium or long term, can be a catalyst for cooperation, transcending ideological conflicts that make problem-solving difficult in other areas of society.

private interests and the need to promote and protect the public welfare. The nature of the challenges brought so far has even surprised many of the agreement's authors".

III. Governance of the water sector: key issues

A. The legal nature of water, water allocation and reallocation, and the role of the State

In Latin America and the Caribbean, the issues of the legal nature of water resources, water rights, their conditionalities, and the creation of water markets have led to significant controversies, which in turn have affected the governance of the water sector.

1. Ownership of water resources

Property is to law, what scarcity is to economics. Law and economics are not separate and mutually exclusive, but interdependent regarding form and content, and ends and means. Traditionally, law has not been interested in granting rights to the use of resources plentiful enough so as not to have any economic value.[11] In European-based western law, as resulting from Roman law, these resources were known as "common resources". The typical examples were the high seas and the atmosphere: of such magnitude that they were deemed neither appropriable nor vulnerable; of such abundance that they were not owned by anybody, because no restrictions applied to the use of unlimited supplies, which were free for all.

[11] According to Demsetz (1967), "the emergence of property rights can be understood best by their association with the emergence of new or different beneficial and harmful effects … property rights develop to internalize externalities when the gains of internalization become larger than the costs of internalization … property rights arise when it becomes economic for those affected by externalities to internalize benefits and costs".

In China, water apparently was an element within the concept of universal harmony, subject to public control. Fulfilment of individual duties in relation to water would satisfy the greatest good for the social system. In earliest Muslim Law water was the common entitlement of all Muslims. Similarly, in early Hindu law water had a fluid and purifying nature, and could not became an object of appropriation. Curiously, in Roman Law, terrestrial waters were not included within the concept of common resources. They were either public or private. The distinction was based on magnitude, perenniality and the opinion of local inhabitants. However, whatever the categorization of any specific body of water, the main fact for the purpose of this discussion is that in Roman Law water was considered sufficiently important, scarce and useful to be publicly or privately owned. Here we find an early indication that water was granted, albeit implicitly, an economic value.

However, water has unique features, which distinguish it from other natural resources (mobility, variability and uncertainty in supply, bulkiness, indivisibility, diversity of productive, social, cultural and environmental functions, sequential and multiple use, interdependency among uses and users within a given river basin or other common integrated system, conflicting cultural and social values, etc.) (see Box 5). These characteristics of water give rise to multiple market failures (vulnerability to monopoly control and natural monopolies, imperfect competition, externalities, public good characteristics, risk, uncertainty and imperfect information, potential for social and environmental inefficiencies and inequity, etc.) that must be addressed by institutions in order to ensure efficient resource use and allocation. Water also plays an essential role in sustaining life, socioeconomic development and the environment.

This usually results in legal systems in which water belongs to the public domain, a terminology resulting from the notion that the particular characteristics of water resources and their importance to economy, environment and life, do not allow private ownership of water as a resource,[12] but rights to use it are granted to economic agents and legally protected. It also has a bearing on management systems, as the characteristics of water require a degree of technical capacity to understand and administer the resource, and settle conflicts.

Traditionally and since Roman times, groundwater has been considered part of the land, so that the owner of the surface property has had an absolute and exclusive right to its use. Gradually, as the interdependence of surface water and groundwater is confirmed, together with the possibility of groundwater depletion, protective measures are being included in legislation (Solanes, 2003). Modern legal frameworks tend to regulate the use of this resource, either through the public domain or by exercising State police powers. State regulation is a necessary consequence of modern exploitation techniques. Earlier techniques did not involve large-scale assaults on the resource. With exploitation on a limited scale, the impact was marginal, and as a consequence, legal regulation was not essential. Modern techniques allow large-scale exploitation, practically on an industrial scale. The impact of this, as well as the impact of the resulting pollution, can be serious. The need for regulation is therefore generally accepted. The United States offers us an example of a clear and sequential development of public-interest, pragmatic and preservationist legislation, that works towards the sustainable use of groundwater (see Box 6).

2. Water rights

While in most countries water belongs to the public domain, water use rights granted to economic agents are protected under the property provisions of national and, in the case of federal countries, state or provincial constitutions. A system of secure and stable water rights is an incentive to invest in the development and conservation of water resources. Furthermore, the

[12] It is important to note that the term “national patrimony” does not have the same precise legal meaning as “public domain”. If the intent is to include water within the public domain of any given country it is advisable to use the traditional terminology. Otherwise, an element of uncertainty would be introduced in new legislation.

Box 5

PHYSICAL AND ECONOMIC CHARACTERISTICS OF WATER IMPORTANT FOR SELECTING MANAGEMENT INSTITUTIONS

- **Mobility**. Water tends to flow, evaporate, seep, precipitate, and transpire. Mobility presents problems in identifying and measuring the resource. As a result, the exclusive property rights are relatively more difficult to establish and enforce in water than in most other natural resources.
- **Variability and uncertainty in supply**. The nature of the hydrologic cycle determines water supply, which is variable in time, space and quality. Supply peaks ordinarily do not coincide with the high demand periods, so storage facilities are needed to smooth out supplies. Specification of property rights for a stochastic renewable resource presents particular problems. The mitigation of problems associated with the extremes of the probability distributions of availability (floods and droughts) has public good characteristics.
- **Natural monopoly**. Significant economies of scale are present in water storage, conveyance and distribution. Therefore, water infrastructure often provides the preconditions for a classic natural monopoly. Hence, it is generally supplied publicly or under regulation.
- **High transportation costs**. Costs of water transportation and storage tend to be large relative to the marginal value of the resource.
- **Indivisibility**. The fact that water is naturally concentrated into site-specific, common pools or streams, and is not perfectly divisible in terms of storage and transportation, means that water allocation and use must necessarily involve group decisions and actions.
- **Diversity of uses**. Water is used in a wide variety of ways. Among and between most types of users, usually consumptive, water use is rival, and exclusion of competing users is possible and perhaps desirable. In other instances, usually associated with amenity and recreation values, consumption is non-rival.
- **Conflicting cultural and social values**. Even where economic efficiency might be best serviced by market forces, cultural and social goals may oppose the result dictated by pure willingness to pay.
- **Interdependency among users**. Only rarely is water fully consumed by any particular user. The water that is not consumed returns at some point to the stream, either directly, by surface return flow, or indirectly, through groundwater. Users who are downstream or interconnected through an aquifer are greatly affected, positively or negatively, by the quantity, quality and timing of the releases, return flows and losses by upstream users. This characteristic of water causes a unique but unpredictable degree of interrelation (externalities) among water users. These externalities make security in water rights difficult to establish, and preclude simple property right systems.
- **Solvent properties**. Because water is a universal solvent and a major geomorphological transport mechanism, the externalities are caused not only by direct water uses, but also by other natural and human activities occurring upstream, such as land-use changes occasioned by agriculture, forestry and urban development.
- **Pervasive unidirectional and asymmetric externalities**. Both positive and negative externalities always have their effect only in the downstream direction. Since rivers flow in only one direction, an upstream user affects the quantity, quality or timing of a downstream user's water by diverting, using, storing or polluting it, but the downstream user cannot do the reverse. This unidirectional and asymmetric nature of water externalities means that conflict resolution through negotiation or mutual control is usually ruled out.

Source: Young (1986); Young and Haveman (1985); Rogers (1993); Livingston (1993).

Box 6

GROUNDWATER LEGISLATION: BACKGROUND AND MODERN TRENDS

Absolute dominion. At first, English Law was applied, which fully accepted the Roman principle of the extension of dominion above and below the surface. The unrestricted dominion of the overlying land was accepted, and the owner could make free and individual use of the water if able to extract it. According to this rule, even malicious or destructive use of water was protected by law. The excesses arising from this rule of absolute dominion resulted in significant changes towards more equitable perspectives, as it did not prevent aquifer depletion, and thus came to be seen as a form of ecological and economic suicide.

Reasonable use. According to the reasonable use principle, water may not be wasted, or removed from the area overlying the aquifer. As water is used, the equal rights of those owning the land above the aquifer must be taken into account. Equality of rights can only be fully enjoyed with the understanding of the correlation of obligations and rights, in that the rights of ownership are always limited and never absolute. “Reasonable” in this context only means that the use is appropriate, but within such limits, a reasonable user may take all the water available, provided that such use is not malicious or wasteful, and does not involve exporting the water out of the area.

Correlative rights. According to the principle of correlative rights, owners of the overlying lands of an aquifer have a preferential right to make use of it, in proportion to the extent of their properties. This principle is in fact just one aspect of reasonable use. The distinction between the two is that even when applying the reasonable use principle, the flow of neighbouring wells may be reduced, whereas in the case of correlative use, such rights are proportional to the area overlying the aquifer, and the principle of proportionality must constantly be respected. When there is insufficient water, it is allocated on a pro-rata basis. There is thus an element of obligation to share among all the landowners. According to the principle of correlative rights, it has been resolved that the installation of wells and pumps with sufficient power to extract water from an entire region and to prevent its return by means of commerce, is unreasonable with regard to those whose lands are being clandestinely deprived and which are thus losing value.

First appropriation. Other western states of the United States apply another rule: first or prior appropriation. There is a physical limit beyond which no new drilling is tolerated. These states have included groundwater in the public domain, with limits on exploitation. This limit, as in the case of surface water, is determined by water availability. In these states there is a sustained trend towards integrating the use of surface water and groundwater. In view of the economic disaster that could result from poor management of groundwater, there has been an increase in the administrative control of such water with regard to the reciprocal impact of surface water and groundwater. In parallel, these states have increased controls on groundwater and the requirement for permits for its use, with regulation of drilling activities and drillers, and the recognition of pre-existing rights. The granting of permits is entirely dependent on the informed judgement of the administration. The administrative judgement may not be reversed, unless there is clear proof of abuse of power or arbitrariness. The judiciary is strongly inclined to defer to the technical conclusions of the administration. In the process of granting or denying a permit, importance is attached to effective notification of potentially affected parties and to not causing damage to pre-existing rights. There are no rights without use, and non-use results in the loss of rights. Rights depend on use and are of indefinite duration. Reasonable pumping levels must be defined and respected, and the extraction methods must be reasonable. The transfer of rights is permitted, but actual historical use, aquifer boundaries, well levels and hydrostatic pressure must be taken into account, as determining elements and externalities inherent to the transfers. In this way, transfers may not be denied unless they affect the public interest or the interests of third parties.

In all cases the regulatory schemes are evolving into permit systems, regardless of whether in the past they applied the English rule, reasonable or correlative use, or first appropriation. Permits are recorded and administrators decide on the location and construction of wells, the volumes of water to be pumped, allocation in times of scarcity, and the penalties and loss of rights upon violation of the permit conditions.

Source: Solanes (2003).

stability and certainty of water rights and the uses arising from them, provide recognition to existing economic activities and prevent the social unrest that would result from ignoring uses existing at times of change in water legislation. This is a basic legal element present in the systems that have successfully promoted private investment in the development of the economic potential of the resource.[13] A water right usually is a right to use, and ownership of a water right normally means a usufructuary power, and not ownership of the corpus of water itself.

3. Conditions on water rights

When considering the topic of water rights, it is helpful to distinguish two groups of norms (ECLAC, 1995):

- **Structural norms** that refer to the stability and flexibility of water rights granted to economic agents, and aim to ensure private investment in the development of the economic potential of the resource.
- **Regulatory norms** that relate to the characteristics of water as a natural resource and an integral part of the environment, and aim to ensure its equitable and efficient use, making it possible to adequately control it in line with economic, environmental and social goals of the society as a whole.

The challenge is to find an appropriate balance between the two types of norms. On the one hand, the application of structural norms should not result in monopolies or speculation, nor cause social or environmental deterioration; while regulatory norms, on the other hand, should not suffocate the economic system nor perpetuate antiquated patterns of use that conflict with efficient water allocation.

The most important regulatory element is the requirement of effective and beneficial use. However, it is important to note that, in addition to this requirement that will be discussed below, there is a general trend to condition the use of water (Solanes and Gonzalez-Villarreal, 1999). This conditioning includes formal (obtaining a permit) and substantive requirements (for example, no harm to third parties, environmental protection, reasonable efficiency and payment of common control costs). It is usually possible to impose new conditions after a water right, permit or license has been granted.

In virtually all jurisdictions, the allocation and retention of water rights are contingent upon putting them to a socially recognized beneficial use (ECLAC, 1995). While the terminology is not uniform, the notion that water rights risk forfeiture if not used, or if not used according to the terms of a license or permit, is found in water laws of virtually all the countries of the world. A typical formulation of the rule of beneficial use, as applied in the United States, is that beneficial use is the basis, measure and limit of all rights to the use of water, consistent with the public interest in the best utilization of water resources.

The beneficial use doctrine emerged when unappropriated water existed along side rapid economic growth. Without the obligation to apply water beneficially, the first user on a stream could lay claim to all the water. The idea behind the requirement is that the quantity of water granted in use should be no more than needed and that the right may be retained only as long as the water is put to a generally recognized socially beneficial use, the concern being with the possibility of monopolization of access to the resource and encouraging speculation. It is often summarized as

[13] In Chile, the legal security of water rights has encouraged significant investments in water-intensive productive activities (particularly export-oriented agriculture and mining) and improving water-use efficiency, helped strengthen the autonomy of water users organizations, and has led to a search for new alternative water sources (Dourojeanni and Jouravlev, 1999). However, specific evidence is elusive and other contributing factors, particularly favourable macroeconomic environment and government support policies, have probably played an equally important role.

the "use it or lose it" principle. The tenets of the doctrine of effective and beneficial use are: water is not to be obtained for speculation or let run to waste, the end use must be a generally recognized and socially acceptable use, water is not to be misused, and the use must be reasonable compared with other uses.

Under forfeiture and abandonment provisions of the beneficial use doctrine, a water right can be lost and become available for appropriation by others after a period, typically three to five years of continuous non beneficial use, when water is over applied and not used beneficially for a certain time period, due to intent to abandon the right, or when the right has fallen into complete disuse. If not used, the water right ultimately reverts to the reallocation through the State. This is the general approach adopted under water laws of the United States, Argentina, Mexico, Spain and many other countries. The water needs of the projects that take a longer time to complete are often accommodated with the help of conditional or reserved water rights. In order to maintain a conditional right, an applicant normally must demonstrate reasonable diligence in developing it.

In 1981, Chile with its new Water Code departed from the beneficial use doctrine, and this was also proposed in the new water laws under discussion in Peru and in some other countries of the region. In Chile, the granting of water rights without the requirement of beneficial and effective use had given rise to various situations that were detrimental to the country, such as the accumulation of water rights for hoarding and speculation, as important barriers to entry for competitors in various markets, particularly electricity generation, and in order to block allocation of water rights for those who actually needed them for productive projects (Dourojeanni and Jouravlev, 1999). The existence of water markets did not alleviate the situation, since the incentives for selling water rights, in the absence of penalty of forfeiture for non-use, were minimal compared with the strategic advantages of controlling a key production input.

In response to these problems, the Constitutional Court has acknowledged the State's right to regulate the conditions that are imposed on water rights, and the antimonopoly agencies have recommended that no further water rights be allocated in the hydroelectric sector until the Water Code has been modified to include provisions that guarantee effective water use. Finally, in 2005, the Water Code was reformed and now (Peña, 2005):

- A license fee will be charged for unused water rights, to act as a deterrent against hoarding and speculation. This fee will be charged in cases where there are no water abstraction works and will be governed by a table of areas, given that water is scarcer and therefore more expensive in the north of the country.
- Requests of new rights will be limited to actual project needs. This means that all incoming requests will have to include an explanatory note for applicants to explain how the water will be used. The authorities have the power to limit the amount requested if this does not correspond to the intended use (on the basis of a pre-established table of uses and demands).
- The President will now have the authority to protect the public interest by excluding water resources from economic competition when they need to be reserved for public supply in the absence of other means of obtaining water or, in the case of non-consumptive rights, in the event of exceptional circumstances of national interest.

4. Water markets

If water allocation is important, even more fundamental is reallocation as resources become scarcer in relation to demand. Historically, new users could obtain water through appropriating water rights to which no previous claims had been established. At present, in the countries of Latin America and the Caribbean, although overall supply is plentiful, in many areas with concentrated

economic development, all surface water and much of groundwater is appropriated. Alternatively, historically, new water supplies have been obtained through the construction of storage and conveyance facilities, projects usually undertaken with the help of substantial public investments. In many areas, as the best and the least expensive water sources have been developed and attention increasingly turns to the more expensive and locationally disadvantageous sources, the costs of new project has begun to escalate. Consequently, as the options for increasing water supplies through the manipulation of surface flows diminish and the subsequent increases in storage require larger and larger investments, the costs of new projects begin to rise dramatically. This is occurring as public investments have been significantly curtailed in many countries as a result of limited public budgets, changing social priorities, lack of political support for traditional methods of financing water resources development, and growing concerns about the environmental costs of new projects.

On the other hand, due to population growth, urbanization and economic development, per capita water availability is decreasing. Concurrent with growing demand from agricultural, drinking water supply and sanitation, industrial, and environmental uses, there have been significant structural changes in national economies. At the same time that demands for both instream and consumptive water uses expand with economic and population growth, water pollution diminishes the available quantities of good quality water and increases the costs of treatment. It can be expected that there will be increasing demands to reallocate supplies among uses and users.

In this situation, countries have to decide whether to use administrative mechanisms or water markets to achieve water reallocation. The choice between these alternatives has been the cause of numerous debates in the region. While acknowledging the importance of appropriate water management, the debate reflects, on the one hand, the poor performance of a conventional response (administrative reallocation) and, on the other, the difficulty of implementing a different alternative (water markets), which, on occasion, produces a profound contradiction to traditional practices and ideas.

Since water is a scarce resource with an economic value, the ability to trade it is an important element in making sure it gets used in an economically optimal way. Consequently, in principle, countries should allow the transfer of water rights both within and between sectors (see Box 7). It should be remembered, however, that the introduction of water markets in no way represents a blanket solution to every conflict that water management must solve. The market is but one of a series of management tools, and it needs to be appropriately designed, adequately regulated and correctly used.

The creation of a water market offers many potentially significant advantages, the main one being a better allocation of water in terms of economic returns. Other potential advantages include the following: (i) the market would encourage water conservation, more efficient water use and wastewater treatment, and it will rationalize consumption of the resource; (ii) it would confront — by setting an equilibrium price and making current and potential market participants aware of the possibility of buying and selling at that price if they so wish— water users with the opportunity costs of their water use and transfer decisions; (iii) by reallocating existing water supplies, the market would provide mechanisms to delay undertaking costly civil water works; and (iv) it would offer a continuous incentive for the adoption, investigation and development of more advanced technologies for using and conserving water (Lee and Jouravlev, 1998).

Of course these advantages will only be materialized insofar as the market approaches the competitive paradigm. The efficiency of competitive markets is based on many restrictive assumptions, and market failures (such as externalities, market power, public good characteristics, risk, uncertainty and imperfect information) raise the possibility that the transfer of water rights may be beneficial for the buyer and the seller, but inefficient from a overall economic, social

Box 7

THE EXPERIENCE OF CHILE WITH WATER MARKETS

What are the indispensable conditions for establishing a market system for water rights in a specific society?

- A resource shortage. That is, when water has a scarcity price.
- Protection of the intangibility of water rights.
- Clearly defined water rights.
- Free transferability of water rights.
- Adequate regulations to cover externalities, damage to third parties and the public interest, among others.
- A social and cultural context that is in harmony with the economic and market system.
- An inventory of water resources.
- The water should have a sense of individuality that is separate from the land.
- Security of rights: (i) physical security (management, knowledge and control of the source); and (ii) legal security.
- Infrastructure that allows for transfer of water rights.
- A flexible mechanism for conflict resolution.

Has the market facilitated the reallocation of water rights from lower valued uses to higher valued ones and in what circumstances has this occurred?

- In general, transfers have taken place from those who value the resource less to those who value it more.
- However, the information available is insufficient for a formal response to this question.
- In the drinking water supply and sanitation sector, the highest level of activity has been in Santiago, but the quantity of water transferred from one sector to another has scarcely changed historically and has been proportional to the growth of the city.
- Drinking water supply and sanitation companies have an open purchasing power; conditions have been created for the transactions.
- Transfers from agriculture to the drinking water supply and sanitation companies have involved water in the agricultural sector that had been used only marginally or had fallen into disuse or had been covered by urban growth.
- There has been no case of a transfer from intensive agricultural use, unless the land was sold or there was excess water.
- The exceptions to the above statement are: (i) the case of the river Loa: mining companies have made significant purchases, so that water previously used in the agricultural sector has been transferred to the mining sector, but agriculture is not very significant in the Loa area; and (ii) the case of the Paloma system: the short-term market (leases) is very flexible and significant.
- Transactions take place when there is no water available for the State to provide free of charge, hence the element of scarcity is fundamental for the existence of the market.

Box 7 (Concluded)

What type of issues have been resolved through the market and in what situations?

- The market has made it possible to place a value on raw water.
- It has facilitated mining development in areas of scarcity (for example, in the river Loa).
- Drinking water supply and sanitation companies have resolved problems relating to high demand (for example, Agua Potable Cordillera).
- The market has helped to resolve scarcity problems when a rapid response was needed (as for example in the case of the mining company Manto Verde in Copiapó).

Which issues have not been resolved through the market?

- The need to enhance the efficiency of water use in all sectors, not only in the agricultural sector.
- Environmental problems, such as maintaining ecological (minimum) flows.

What elements have hindered reallocation through the market?

- The lack of an obligation of use, which encourages monopolistic behaviour (resolved in the 2005 reform of the Water Code (see page 27)).
- The lack of a register of water rights owners (resolved in the 2005 reform of the Water Code).
- Lack of a flexible mechanism for conflict resolution.
- Lack of a clear definition of water rights.
- Little flexibility for temporary transfers (leases).
- Rigid infrastructure that does not facilitate market operation.

Have there been problems of monopolization of water rights (this problem was resolved in the 2005 reform of the Water Code)**?**

- This behaviour is not a problem relating to the market, but rather one of initial free allocation without obligation of use.
- It has happened, but not because of the market. It is because of the initial allocation and the structure of water rights. It is also due to the way in which water rights were allocated by the administration.
- There is evidence of monopolization of water rights granted under the 1981 Water Code, in specific river basins, for consumptive and non-consumptive uses.

Source: Donoso (2003).

and environmental perspective. To the extent that the conditions of the competitive paradigm are not satisfied, market prices will diverge from the true opportunity cost of water and will therefore neither convey precise market signals, not encourage efficient water use and transfer decisions.

In the situations of market failure, economic theory prescribes that governments should intervene to correct distortions and restore the necessary conditions for economic efficiency. As water markets tend to diverge considerably from the competitive model, mainly because of the external effects (return flow, instream flow and area-of-origin effects) that water right transfers usually cause, they must be regulated by the State. This has been confirmed by the experience of water markets in the western United States, where markets arose spontaneously at first and then

were adjusted on the basis of experience.[14] The market can indeed act as an effective means of water reallocation, but always provided it operates in an institutional framework capable of correcting the distortions that the nature of the resource inevitably generates, and thereby fulfilling the function of the State and civil society in safeguarding the public interest and the resource itself.

It is beyond the scope of this report to enter into a detailed discussion of this issue (ECLAC, 1995; Dourojeanni and Jouravlev, 2001; Lee and Jouravlev, 1998); nevertheless, it is important to comment briefly on how water markets are created and operate:

- It is necessary to have an institutional and legal system that is compatible with water marketing (secure and well-defined water rights, infrastructure, transferability of water rights, their registers, conflict-resolution system, etc.) as well as with the nature of the water resource. The economic and cultural context must also be appropriate for the development of water markets.
- The sustainable and efficient functioning of water markets depends on the institutional framework established by the State. A market without regulations to guarantee sustainable water supply, protection against impacts on third parties and the environment, and to prevent monopoly control, is a mechanism that leads to uncontested appropriation of a scarce and valuable resource rather than an instrument of efficient water reallocation.
- Experience has shown that the following rules are important for the adequate functioning of a water market: (i) water must be put to beneficial use and continue to be used beneficially after reallocation; (ii) reallocation should not affect other users and must be in the public interest; (iii) in many jurisdictions, the transfer of water from one river basin to another can only occur with due consideration of local interests (see Box 8).

It is important to point out that there are countries in which the water management system is insufficiently mature for the implementation of water markets. In these cases, emphasis has to be placed instead on the implementation and improvement of appropriate systems for the allocation and registration of water rights.

B. The institutional structure for water management

One of the main issues in national debates on reforming the legal framework of the water sector is the institutional design of the administrative system for water management. A series of analyses of water resources administration in the region has concluded that these systems have traditionally been, and in many cases still are, characterized by an essentially sectoral approach (INELA, 1976; ECLAC, 1985 and 1994a). In the current conditions of growing water scarcity, rising externalities, and increasingly drastic and ruthless competition between water users, this approach is leading to ever-more disputes and inefficient water use, and also diminishes the authority of water administration, that are mainly a result of the following:

- A lack of objectivity and impartiality, and often absence of technical criteria in the decisions-making process, as each interest group tends towards supporting water projects

[14] A comparative study of water markets in the western United States (Arizona, California, Colorado, Nevada, New Mexico and Utah) demonstrated that: (i) these markets are an important water allocation mechanism and are likely to become more widespread; (ii) they appear to be relatively efficient in allocating water among consumptive water users, with transfer patterns clearly indicating a movement from lower to higher valued uses; (iii) return flow impacts on surface water users generally are incorporated into market decisions, but impacts that changes in groundwater pumping may have on surface water rights are not consistently accounted for in water transfers, and instream flow and water quality values are also poorly considered; and (iv) water markets deviate substantially from the competitive market model, and observed market prices may serve as only a rough indicator of the marginal value of additions to regional water supply and they do not reflect non-market water uses and third-party impacts of market activities (Colby and Bush, 1987; Colby and others, 1987; Colby, 1987).

Box 8

THE REGULATION OF WATER RIGHT TRANSFERS IN THE WESTERN UNITED STATES

Whenever one seeks to change the point of diversion, or the place, purpose or time of using a water right whether or not a transfer of the right is involved, special protections for other water right holders apply. A water right holder who seeks to change a use or to transfer a right to another for a changed use must apply to the appropriate administrative body or court for approval. In order for a transfer to occur, the water right must have been beneficially used before the transfer and must continue to be beneficially used following it.

All states require public notice to alert parties who may be adversely affected by the transfer. State water laws specify both who can legally file a protest with the state and the reasons for which a protest may be filed. It is the possibility of harm, and not a certainty that it will occur, that must be proved. The most common legal basis for protesting a proposed transfer is impairment of existing water rights. All water right holders have a right to the continuation of stream conditions as they existed at the time of their respective appropriations.

When protests are filed, transfer approval is delayed as the applicant and protestants argue over the magnitude of transfer impacts and the extent of mitigation or compensation. State water agencies encourage resolution of conflicts among the parties and generally will approve an agreement that has been reached by the applicant and objectors. When unresolved protests remain, the state agency will hold hearings and rule on the transfer application. A transfer will not be denied if conditions can be imposed sufficient to protect other parties from harm. The ruling may approve the transfer as requested by the applicant, grant conditional approval with modifications to satisfy protestants' concerns, or deny the transfer altogether. Parties dissatisfied with the state's decision may appeal to the courts.

To assure maintenance of stream conditions on which others are entitled to rely, water available for transfer is usually restricted to water that would have been consumptively used (in the case of irrigation, the portion that is actually consumed by evaporation or by being drawn into plants and retained or transpired into the atmosphere) and water irretrievably lost to beneficial use, rather than the historic quantity diverted. The definition of the water irretrievably lost to beneficial use clearly would include percolation to unusable groundwater, but not water percolating to usable groundwater, and almost certainly does not include water draining to wetlands or used by vegetation that provides significant wildlife habitat. Historical consumptive use may be shown by actual records, expert testimony or evidence (for example, soil conditions, proximity to the stream, crop water requirements minus average rainfall and efficiency of irrigation) of the amount of water that would have been required for the purposes to which it was devoted.

In general, the transfer must be in the public interest. The relevant considerations may include environmental, economic and social effects of the transfer (such as benefit to applicant, effect of resulting economic activity, effect on fish and game and public recreation, public health effects, possible loss of future alternative uses, harm to others, intent and ability of applicant, effect on access to navigable or public waters, and factors of local relevance).

Although removing water from one watershed to be used in another is generally permitted, many states limit interbasin transfers by placing certain requirements on the diverter to protect the equities and interests of the area of origin. The relevant factors include harm to the economy, ecology, lifestyle and potential for future growth of the area where the water originates. Additional considerations may include the assessment of the impacts that a transfer may have on the environment and the tax base or the local economy of the area of origin.

Other possible restrictions on water transfers exist, such as environmental and water pollution control legislation, minimum and maximum streamflow requirements, land use restrictions, and anti-export statutes. Some states also restrict transfers of water rights apart from the land.

Source: Colby (1995); Colby and Bush (1987); Getches (1990); DWR (1993).

or allocations according to their functional interests without considering the sustainability of the source of supply or the economic evaluation of the project.

- A separation of management functions (for example, issues related to the quantity and quality of water are often considered separately, as are matters related to surface and groundwater) that does not reflect the physical characteristics of water and its optimum use, thereby making it difficult to achieve an integrated vision of the resource.

In order to avoid such problems, many jurisdictions assign responsibilities for policy formulation, water allocation, and programme and project evaluation to an agency that does not have responsibilities for the use of the resource (agriculture, energy, etc.). In Latin America and the Caribbean, when water administration has been separated from sector ministries, this has often been a matter of dispute within the government itself. The most frequent solution to this issue has been linking water management to ministries of the environment, natural resources or public works.

The technical specifications and the environmental and social functions of water make it inappropriate to place water management within the remit of purely economic ministries or even environmental agencies, as in either case there is the risk of neglecting relevant considerations. It is for this reason that it is usually recommended that, when water administration is part of the general system of environmental or natural resource ministries, it should have some degree of functional autonomy to make it easier to carry out its functions (Solanes and Getches, 1998). Such autonomy would include the administration of funds collected from water charges.

The most interesting experiences in the region over the last few decades have been in Mexico, where water resources are managed by the National Water Commission (CONAGUA); and in Brazil, which recently set up the National Water Agency (ANA) with the principal objective of overcoming traditional conflicts and limitations imposed by a system in which, until recently, water had been under the responsibility of functional ministries. Other examples of non-user organizations, or at least of those that are not linked to specific water sectors, are the Ministry of Environment, Housing and Territorial Development in Colombia, the Water Resources Authority in Jamaica, the Ministry of Environment and Natural Resources in Venezuela, and the General Water Directorate of the Ministry of Public Works in Chile.

World Bank (1993) emphasizes the need to separate policy-making, planning and regulation functions from operational functions at each level of government. Thus, the World Bank agrees with the United States National Water Commission which, back in 1972, already recommended that policy planning and sectoral planning must be separated from functional planning, design and construction, and operation by executing agencies (NWC, 1972). This functional separation is fairly uncommon in Latin America and the Caribbean, yet its application in practice has proved successful. One case has been Chile, which since 1969 has maintained a clear separation of roles in the institutional structure of the State. This has avoided distortion of the regulatory and management functions and has generated a system that gives clear signals to the different economic agents, in both the public and the private sectors, about the relative scarcity of water.

Other important characteristics that are considered essential for a water authority, if it is to provide adequate governance to the sector, are that the authority should have a sufficiently high position within the government hierarchy, that it consolidate the multiple responsibilities related to water management, that it enjoy real administrative capacity, and that it be effectively autonomous. Another relevant consideration is that, given the technical complexity of water issues, a number of countries respect the administrative criterion in issues that require specific professional knowledge. This means that finding of fact must be determined in the first instance by the administration in charge of water resources management, and this finding of fact must be final unless it appears unreasonable or arbitrarily (Trelease, 1974).

However, some countries have decided to limit the administrative role of the State in water management. For example, one of the main features of the management system set up as a result of the Chilean 1981 Water Code was the reduced role of the State in water-related matters, which strengthened property rights and transferred functions to users and user organizations (Ballestero and others, 2005). This situation and the increasingly intense and complex impacts that society has on water resources have given rise to many conflicts concerning water. It has not been possible to resolve these conflicts through existing user organizations or negotiations between parties. This proves that users cannot govern themselves and that user organizations cannot replace the State.

Many such conflicts have ended up in ordinary courts, the results of which have not been particularly effective due to a lack of technical capacity and expertise (Bauer, 1998). One important lesson to be gleaned from the Chilean experience is that, given the technical complexities of water management, it is advisable to respect the administrative criteria in matters that require specific professional knowledge. Briscoe (1996) suggests that the administrative jurisdiction in Chile should have greater powers, akin to those in the province of Mendoza, Argentina. In California, it has been suggested that the increased effectiveness and neutrality of the supervising institutions is one of the conditions that leads to the formation of water markets (Haddad, 1996). Another lesson of Chilean experience is that water markets need an active and non-formalistic judicial system which is capable of resolving private conflicts through simple, fast and low-cost procedures with predictable and consistent results (Bauer, 1998).

C. Economic rationality and social demands

In countries similar to those of Latin America and the Caribbean, it is common to find tensions between the expectations of the population of improving their quality of life and economic limitations. This tension has repercussions on the decision-making process and results in controversy over the application of certain economic criteria and, on occasion, in serious difficulties regarding effective governance of the sector and the maintenance of social order.

1. Drinking water supply and sanitation

Many Latin American and Caribbean countries face a critical problem in this area, reflected in the chronic under-funding of water supply and sanitation services, low service penetration in poor areas, and an increasingly expensive supply (see Table 1). In many cases, tariffs adjustments are restricted by the low payment capacity of large groups of the population (see page 18), which in turn leads to inefficient management and lack of investment. Additionally, when there are subsidies, these are geared towards the supply side, leading to cross-subsidies, with negative consequences for efficiency, fairness and competition (see Box 9). All these elements make up a vicious cycle that pushes towards low service quality. Chile has successfully implemented subsidies geared towards demand and focused on the poor (see Box 10), yet in many other countries this would be difficult to achieve due to the debilities of the State itself. This is because the national financial, tax and administrative systems must meet certain minimum conditions if such subsidies are to be implemented. These conditions, which are far from being achieved in most countries of the region, include: (i) political will; (ii) a fiscal system capable of generating sufficient resources, even during crises; (iii) administrative capacity in terms of beneficiary identification and subsidy distribution and allocation; and (iv) legal capacity for follow-up and monitoring and possibly accountability and compulsory compliance (Solanes, 1999).[15] The cases of

[15] It should also be borne in mind that, in Chile, these subsidies are an integral part of a wider system for social programmes financed with public funds. A similar system limited exclusively to drinking water supply and sanitation services might not prove cost effective (Yepes, 2003) or justifiable in areas with high levels of poverty.

Table 1

LATIN AMERICA AND THE CARIBBEAN: ACCESS TO DRINKING WATER SUPPLY AND SANITATION SERVICES, 2002

(Percentage)

Country	Drinking water supply			Sanitation		
	Total	Urban population	Rural population	Total	Urban population	Rural population
Anguilla	60	60	60	99	99	99
Antigua and Barbuda	91	95	89	95	98	94
Argentina	a	97	a	a	a	a
Aruba	100	100	100	a	a	a
Bahamas	97	98	86	100	100	100
Barbados	100	100	100	99	99	100
Belize	91	100	82	47	71	25
Bolivia	85	95	68	45	58	23
Brazil	89	96	58	75	83	35
Chile	95	100	59	92	96	64
Colombia	92	99	71	86	96	54
Costa Rica	97	100	92	92	89	97
Cuba	91	95	78	98	99	95
Dominica	97	100	90	83	86	75
Dominican Republic	93	98	85	57	67	43
Ecuador	86	92	77	72	80	59
El Salvador	82	91	68	63	78	40
Grenada	95	97	93	97	96	97
Guatemala	95	99	92	61	72	52
Guyana	83	83	83	70	86	60
Haiti	71	91	59	34	52	23
Honduras	90	99	82	68	89	52
Jamaica	93	98	87	80	90	68
Mexico	91	97	72	77	90	39
Montserrat	100	100	100	96	96	96
Nicaragua	81	93	65	66	78	51
Panama	91	99	79	72	89	51
Paraguay	83	100	62	78	94	58
Peru	81	87	66	62	72	33
Saint Kitts and Nevis	99	99	99	96	96	96
Saint Lucia	98	98	98	89	89	89
Suriname	92	98	73	93	99	76
Trinidad and Tobago	91	92	88	100	100	100
Turks and Caicos Islands	100	100	100	96	98	94
Uruguay	98	98	93	94	95	85
Venezuela	83	85	70	68	71	48
Total	**89**	**95**	**69**	**75**	**84**	**44**

Source: WHO/UNICEF (2006).

[a] Not available.

Box 9

PROBLEMS ASSOCIATED WITH THE IMPLEMENTATION OF CROSS SUBSIDIES IN LATIN AMERICA AND THE CARIBBEAN

In many Latin American and Caribbean countries, tariff adjustments aimed at self-financing are limited by the extremely low payment capacity of large groups of the population. The traditional response to this problem was cross subsidies between high- and low-income users within the same service area. This redistribution is usually carried out through price discrimination based on users' socioeconomic characteristics (such as, place of residence, when the residents of "rich" areas subsidize those in the "poor" areas; housing characteristics, such as surface area below a certain threshold; or economic activity) or levels of consumption.

Although the tariff policy of many countries (Argentina, Bolivia, Brazil, Colombia, Costa Rica, Nicaragua, Panama, Paraguay, Peru, Uruguay, etc.) is still based on cross subsidies, it is an approach that has been criticized partly for failing to ensure an efficient allocation of economic resources, but mainly because it has resulted in a chronic under-funding of services. This is often due to the fact that, in order for cross subsidies to be compatible with the financial sufficiency of service providers, the rates of those groups financing the others have to be increased to levels that are politically and economically unfeasible, failing which the deficits must be covered using resources from other components of rate formulae (investment in expansion and asset replacement, and in some cases even operation and maintenance expenses):

- The number of users benefiting from subsidies is higher than the number of users financing the system. This is partly due to high levels of poverty, small service areas with homogenous socioeconomic characteristics which are often a result of decentralization to the municipal level, political and social pressures, design errors, and often due to the administrative difficulties of accurately identifying the users to be subsidized with the indicators available. For instance in Bogotá, Colombia, the system is based on solidarity pricing, where the users with the lowest incomes (stratum 1) pay 82% of the cost of service, while the high-income groups (stratum 6) pay 253%. Yet the system is not sustainable because about 90% of users are subsidized.
- Also, an extremely unequal income distribution in most service areas means that the medium- and high-income groups are not yet large enough to generate the necessary resources to subsidize the consumption of the poor: according to Delgado (1999), "payments received for drinking water and basic sanitation services in most Colombian cities are insufficient to cover subsidies. This results in shortfalls that departments and municipalities have often been unable to cover … Much of the market … is made up of strata 1, 2 and 3 [low-income groups], which means that expanding the systems requires resources from the official budget".
- As for business and industrial users, they can usually: (i) transfer rate adjustments to the price of their products and services, with the resulting effects on competitiveness and employment; and (ii) withdraw from the official services and use cheaper alternative sources of supply (direct extraction of water from rivers, lakes and other surface sources or from aquifers), which in many cases are available free of charge or at a nominal cost and with little regulation.

Source: Yepes (2003); Jouravlev (2004); Rozo (2003).

Box 10

THE SYSTEM OF TARGETED SUBSIDIES IN CHILE

In order to help low-income families, the Government introduced Law N° 18.778 (2 February 1989) establishing a subsidy system for drinking water supply and sewerage services. The subsidy system is financed by the Central Government and run by the municipalities. The latter are responsible for the registration and selection of applicants and for informing the water companies of the list of beneficiaries, so that users' bills detail the amount due from the user separately from the sum that the municipality will pay directly to the company.

The selection system consists of socioeconomic characterization through proxy means testing to ensure that the State's social action is focused on the poorest sectors of society. This is carried out using the CAS Survey, named after the Spanish for the Social Assistance Committees (*Comités de Asistencia Social Comunal*) set up during the 1970s. These Committees highlighted the need to create a standardized instrument to prioritize those State programmes aimed at the most needy sectors of society: thus the "Ficha CAS" (Social Assistance Card) was introduced in 1980.

At first, the subsidy system was not fully operational owing to administrative difficulties and the fact that the subsidies were not adapted to the different tariff levels existing in the various regions of the country. In 1991, the first legal amendment was made (Law N° 19.059) to facilitate the registration process and authorize the drinking water supply and sanitation companies to identify possible beneficiaries. The amendment also increased the subsidies and eliminated the consumption limit of 20 m^3.

The Government continued research into how to enhance the subsidy system, particularly with a view to guaranteeing effective allocation. Subsidy needs were established for each region and tariff level, on the condition that a 20 m^3 bill could not represent more than 5% of family income. This led to a new amendment in 1994 (Law N° 19.338) that extended subsidy coverage, increased the maximum percentage subsidy to 85% and also increased the consumption covered by the subsidy from 15 to 20 m^3.

The subsidy is currently applied to the first 20 m^3 of fixed and variable charges billed to users' permanent residences (the remainder is paid by the user at the normal rate). The subsidy covers between 25% and 85% of total consumption. The percentage subsidy must be the same for beneficiaries who live in the same region, are subject to the same maximum rates and who are in a similar socioeconomic situation. The subsidy is compatible with any other municipal subsidy awarded by the respective mayors.

Subsidy applicants must:

- be unable to pay for the service;
- be up to date with service payments; and
- request the subsidy in writing from the municipality corresponding to the residence concerned.

The socioeconomic level of the family group is determined using the information from the Social Assistance Card, on the basis of which each family group is allocated with points. The municipality then compiles a list of applicants from lowest to highest socioeconomic level according to the points system and allocates the available subsidies. The subsidy ceases when:

- eligibility requirements are no longer met;
- three bills for the unsubsidized service remain unpaid;
- information for the municipality to review socioeconomic conditions is not provided; and
- when the subsidy period expires (maximum 3 years) (families are free to reapply once the subsidy ceases).

Source: Ángel (2003); Orphanópoulos (2003).

the social conflict in Cochabamba, Bolivia (see Box 11), and the failure in the city of Buenos Aires, Argentina to consider from the start the issue of service for the poor, illustrate these issues.

These problems, together with the reappearance of cholera in the region at the beginning of the 1990s, have led governments to give high priority to the water supply and sanitation sector. As a result, over the past two decades, this sector has been reformed in the majority of the countries: "Efforts have been made for more than fifteen years to promote … the establishment of a new institutional arrangement for the provision of public services through networks designed to introduce the market dynamic as an ordering element in the sector, redefining the working areas and practices in both the public and private sectors. This transformation has affected the sectoral agenda in almost all of the countries of Latin America and the Caribbean" (Corrales, 2003).

In general terms, it may be said that the reforms relating to modification of the institutional and industrial structure of the sector, the formulation of new legal and regulatory frameworks, the setting up of the designated institutions and, in some cases, private participation, have made relatively rapid progress. There are still significant lags, however, in reforms associated with tariff readjustments to levels that guarantee the self-financing of services, the creation of effective subsidy systems, implementation of the regulatory frameworks and modification of the behaviour of public service providers. As a result of these gaps, and also the macroeconomic instability and structural deficit of public finances, the reforms have not achieved the expected degree of success. "Despite the efforts made, the region still shows a high level of exclusion from services, and even more worrying is the fact that the rate of overcoming coverage problems has diminished while the numbers of the socially excluded have been growing in many countries" (Corrales, 2003).

2. State support for irrigated agriculture

From the social and productive point of view, irrigation allows for a substantial increase in agricultural employment and significantly increases its competitiveness.[16] In consequence, in general, the agricultural sector lobbies for public investment in irrigation and drainage development. However, in most cases, *ex-post* evaluation of the results of investments in the sector show few gains in productive efficiency and even social inequity. Furthermore, the agricultural sector faces international trade influenced by a generalized distortion due to the subsidies provided in more developed countries.[17] Under these conditions, government-supported irrigation policies can end up being questioned, especially with regard to matters such as competition for limited financial resources with other activities that may have greater social and economic returns, the recovery of the investment through payments by farmers, subsidies for the poor, and monitoring to ensure effective project completion in accord with the original conception.

3. Priorities in water allocation

A common feature of water law is to establish preferences among uses in order to allocate water at times of scarcity, or to grant water rights in case of competing applications. The allocation of water resources in areas of water scarcity generates tensions between social interests (such as drinking water supply and agricultural use) and economic benefits (mining, industry, export-oriented agriculture, etc.), which often cannot be easily resolved. In some systems, this conflict is solved by declaring drinking water supply and sanitation services to be a priority, sacrificing to a

[16] For example, ECLAC (2005a) emphasizes the important role of irrigation in economic and social development of Central American countries. The results obtained using the panel data analysis to identify common characteristics among these countries in terms of the link between irrigation and agricultural improvements reveal that irrigation is indeed an important factor in explaining total production performance for a given country.

[17] "Producer support to farmers in developed countries currently adds up to more than US$230 billion per year, almost 30 times the amount provided as aid for agricultural development to developing countries" (FAO, 2004). According to Rosenberg (2002), in the United States corn is subsidized to sell overseas at 20% less than the cost of production.

Box 11

ATTEMPTED PRIVATIZATION OF THE DRINKING WATER SUPPLY AND SANITATION SERVICES IN COCHABAMBA, BOLIVIA

In September 1999, the Aguas del Tunari consortium was awarded a 40-year concession contract to provide drinking water supply and sanitation services in the city of Cochabamba, Bolivia. This award was made by negotiation, as the tender process was declared void. In October of the same year, Parliament adopted (despite a lack of consensus) Law N° 2029 (drinking water and sewerage services law) to provide the legal framework for sector regulation. In addition to dealing with sectoral matters, the Law N° 2029 also included provisions on water resources management. In Bolivia, water legislation is based on the 1906 water law, whose provisions "are mainly irrelevant" (Mattos and Crespo, 2000). The Law N° 2029 gave broad powers to allocate water rights to the sectoral drinking water supply and sanitation authority. In addition, despite the advanced nature of discussions and analyses concerning the recognition of the rights of indigenous peoples and farmers in the formulation of a new legislation, Law N° 2029 included no such provisions. The contract and the law, combined with irregularities in the tender process, brought about a strong reaction among the public in the form of protests against rate increases in urban areas without any prior improvement of services, foreign-currency indexing and the new legislation's effects on traditional rights in rural communities. Social unrest broke out in February 2000 and again in April that year, when there were several days of violent clashes between police and protestors followed by the declaration of a national state of emergency. The economic factors that played a role in the conflict include:

- The concession was linked to the implementation of a costly, long-delayed and possibly unviable Misicuni project, which had a significant effect on rates.
- The concession involved taking on considerable debt from previous administrations, which also pushed up the project costs.
- Shortcomings in the public consultation and participation process and poor media management.
- Lack of confidence in the financial and institutional capacity of the consortium, plus suspicions of corruption.

Social discontent was such that it was only quelled when the contract signed with Aguas del Tunari was terminated and over 30 articles (almost half) of Law N° 2029 were amended to subsequently become Law N° 2066. Aguas del Tunari applied to the World Bank's International Centre for Settlement of Investment Disputes (ICSID) for US$ 25 million in compensation for the breaking of the contract. In January 2006, the consortium agreed to withdraw the claim; in return, Bolivia has absolved the foreign investors of any potential liability. The main lessons to be learned from this experience are:

- There is a need to be flexible about the principle of complete cost-recovery in certain cases, especially in poor countries where the drinking water supply and sanitation sector requires public investment including subsidies.
- The sector's regulatory framework should be strengthened. Otherwise, any weakness allows companies to impose conditions that eventually affect users. On the other hand, there should also be social control mechanisms to increase transparency in the regulation of public services.
- Social participation, public access to information and transparent management of services and of the resource itself are clearly fundamental. Excluding the public from the decision-making process creates a breeding ground for problems and conflicts.
- It is important to invest time, effort and resources into dialogue and consultation in order to avoid conflicts with incalculable costs in both social and economic terms. This conflict might have been avoided if the process had included more participation, dialogue and consultation between all those involved.

Source: Bustamante (2002); Crespo (2000); Vis-Dunbar and Peterson (2006).

certain degree the search for an allocation system that emphasizes economic criteria. Moreover, defining priorities fails to provide a clear signal of the degree of scarcity of available water resources and favours inefficiency in the privileged activity. On the other hand, public opinion often finds little justification for market competition for the use of water resources. This is particularly true where there are no mechanisms for protecting traditional or indigenous water uses, or, when they are present, these mechanisms, due to technical or legal reasons, lack credibility in the view of those involved. It ought to be noted, however that, from a technical point of view, it can often be extremely complex to determine the secondary effects of new extractions.

In Chile, with the 2005 reform of the 1981 Water Code, without prejudice to environmental considerations and the reserving of water resources in accordance with the public interest,[18] the allocation criterion for choosing between various requests will continue to be strictly economic, given that it is considered to be in the national interest to allocate scarce resource to those activities with the highest productivity per cubic metre of water (Peña, 2005). The reform therefore includes the need to increase levels of competition by increasing the number of cases involving allocation through bidding and improving levels of information and raising the number of participants. It is important to note that, unlike in other countries, there is a general consensus in Chile that it would be unwise to give preference to the requirements of a particular sector, on the basis that this would encourage inefficiency and fail to signal to users the relative scarcity of the resource.

4. Water charges

Many systems charge for the cost of administering water resources. There are also examples of charges intended to recover costs of water works, pay for water-related services and treatment of wastes, cover administrative expenses and induce water conservation and environmentally sound behaviour. However, in spite of considerable interest, legislation charging for water as such, is not so abundant. Nevertheless, some countries of the region have already implemented or are implementing systems of charges for water as a resource. For example, in Brazil, charges for the use of water resources are one of the instruments of the National Water Resources Policy. In Mexico, the Federal Dues Law stipulates that those who use water are required to pay a volumetric charge, according to the zone of water availability where the diversion takes place.

Charging for water use with financial criterion has many benefits and can be recommended. However, it is important to have extreme caution with the proposals to charge according to the opportunity cost or full economic and environmental value of water. Apart from the practical difficulties that this would entail, the main problem is the devastating effect that such charges are likely to have on the competitiveness of many economic activities which use water as an input: “Raising water charges to the long-run marginal cost would result in prices that would bankrupt many farmers — an option that is usually politically and socially unacceptable” (Thobani, 1995). In addition, it is important to bear in mind that, no system of charges will be effective in managing the demand for water or the protection of water quality, in a context of generalized subsidies.

D. The role of the State and the regulation of public services

1. The weakness of current regulatory frameworks

One way or another, since the 1980s governments in the region have been transferring public enterprises and other State institutions to the local and transnational private sector. The process has

[18] The reform provides that the water authority is obliged to consider environmental aspects in the process of establishing new water rights, especially in terms of determining ecological water flows and protecting sustainable aquifer management (Peña, 2005).

been spreading across the region, although the rate of advance, level of coverage and depth vary from one country to another. Two important lessons can be drawn from this process (ECLAC, 2000):

- Privatization should not 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.
- It is best to establish clear divisions among the various institutional 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.

Until recently, this massive transfer of public services to the private sector has been based largely on ideological or philosophical concepts, short-run economic considerations, pressure from abroad and a belief that the "private sector will fix everything". In this process it has very often been forgotten that while private-sector participation does provide potentially significant efficiency improvements, it does not, in itself, guarantee a lasting improvement in social welfare in the absence of a competitive market. Without this, the outcome depends on the regulatory regime in which industries operate, the efficiency of which depends on the capacity of governments to create appropriate institutional and regulatory conditions to oblige firms to be efficient and responsive to their customers' needs. Unfortunately, there are grounds to believe that the regulatory frameworks adopted by Latin American and Caribbean countries are generally weak (see page 21).

The formulation of weak regulatory frameworks occurs within a rigid approach to rights, legislation and contracts. The difference between the rigid approach employed in the region, where profits are specified, and the pragmatic, empirical approach, based on rationality and balance, as used in countries with a long tradition of public utility services being provided by the private sector, such as the United States, is notable.[19] One of the best examples available of this type of balanced approach is that employed in the decision by Judge Holmes in 1912: "An adjustment of this sort under a power to regulate rates has to steer between Scylla and Charybdis. On the one side, if the franchise is taken to mean that the most profitable return that could be got, free from competition, is protected by the 14th Amendment, then the power to regulate is null. On the other hand, if the power to regulate withdraws the protection of the Amendment altogether, then the property is nought. This is not a matter of economic theory, but of fair interpretation of a bargain. Neither extreme can have been meant. A midway between them must be hit" (United States Supreme Court, 1912).[20]

[19] Rogers (2002) observes that "We often find a marked difference between the philosophical … Latin American approaches and the pragmatic British schools of thought, whose empiricism recommends them when addressing water resources governance. For example, a relatively clear original demarcation of property rights and experimentation with these rights over time has led the … [United States] to flexible approaches to water governance. This approach allows for adjustments when economic and social conditions change, because it does not aspire to build institutions that cover all possible eventualities".

[20] According to Troxel (1947), "the concept of reasonable returns as used by the Supreme Court is in fact a notion relating to zones of reasonability. Confiscation is the lower limit. User exploitation is the upper limit. If profits are to be reasonable, it ought to fall in between these limits. Clearly, the required profits cannot be represented by a specific sum, nor defined by a certain formula. They will vary in accordance to the economic conditions of both the company and the economy itself". In the United States, a regulator is not bound to use any single approach in determining rates. It is the end result, not the method employed, that matters: the allowed rate of return must be fair and reasonable. This practice is in sharp contrast to that prevailing in some Latin American and Caribbean countries where not only the specific approach but also the definitions of the variables to be used in determining the allowed rate of return are spelled out in great detail in the legislation. As Holtram and Kay (1994) note: "But what is a reasonable return on capital? This is inherently a matter of judgement — it would be difficult to argue that 6.5 per cent was a reasonable return on capital but 6 per cent and 7 per cent were not — and, moreover, a matter on which judgements will quite properly vary over time. The law could prescribe a formula for determining the appropriate return — choosing, for example, between the capital asset pricing model and the dividend growth model and specifying how coefficients were to be calculated. But any such law would be rapidly overtaken by events". Yet, this is exactly what are doing some countries of the region (Jouravlev, 2000).

This type of reasoning has deep structural implications for the interpretation of rights and conflict resolution. It provides long-term stability and trust. It contributes towards sound social structure creating an effective constitutional characteristic of social sharing both in good and bad times. A perception by society of fair sharing is important for governance, preventing social frustration and inequity. This concept of stability goes beyond the fulfilment of a contract or the interpretation of a law. It means long-term social stability even at the expense of having to create variables in the implementation of a contract or in the extension of a right, bearing in mind that rationality must be preserved and that there should be no confiscation, that is, that companies will not be forced to work at a loss.

Unfortunately, the current situation in the region does not seem to grant this type of reasonable, pragmatic, understanding and flexible approach to rights and contracts. To the contrary, current legislation relating to water, public utilities and investment protection emphasizes unilateral and contractual security. In this system, some argue, there is confiscation when someone has to accept lower than expected benefits even if profits are still in the blue. Thus, it is not unusual to find that public utilities have guaranteed returns and special exchange rates (see Box 12). This situation prevails despite the fact that such "guarantees threaten to undermine the benefits of privatization. First, if a government assumes the risk of project failure … private investors have little incentive to choose financially sound projects and to manage them efficiently. Second, guarantees may impose excessive costs on the host country's taxpayers or consumers. Because a government's guarantees rarely show up in its accounts or budgets, [21] it may be willing to assume risks that should be borne by investors and may not even know the extent of its exposure. At worst, the issuance of guarantees could lead to a fiscal crisis by encouraging investors to take excessive risks ('heads I win, tails the government loses')" (Thobani, 1999).

It is important to add that, although the region has received a significant amount of specially designed international technical assistance on economic matters and *ad hoc* manuals on how to deal with various problems, there has been little information on operational interdisciplinary regulation, particularly on the domestic legal dynamics of regulation in countries with a long tradition of public utility services being provided by the private sector, such as the United States, France and the United Kingdom. As a result, it is curious to note that many of the theories that have been the most influential in the formulation of regulatory frameworks in the region (such as the supposed superiority of price cap regulation, the convenience of regulation by contract, bidding on the basis of lower rates, scant concern for the need to create and strengthen a regulatory agency prior to privatization, etc.), have generated constant renegotiations and regulatory conflicts (see Table 2).

2. Public services

Market regulation grew by leaps and bounds in the 1990s (ECLAC, 2000). 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

[21] For this reason, fiscal authorities need to disclose the nature of commitments assumed, estimate their possible magnitude and quantify the probability that they will materialize (ECLAC, 2000). It is also essential to make the estimated cost of these commitments available to the public in the annual national budget debates in congress. In fact, the annual cost of such contingent liabilities should actually be incorporated into the budget, as this is a form of "insurance" coverage that the government has acquired on behalf of private investors.

Box 12

WHO SHOULD BEAR EXCHANGE RATE RISK IN INFRASTRUCTURE PROJECTS?

Until January 2002 the Argentine peso was pegged to the dollar, and utility tariffs were effectively indexed to the foreign exchange rate, thus protecting investors with foreign currency debt from the risk of currency depreciation. Between January 2002 and January 2003, the peso lost 70 percent of its value following the removal of the peg. The government initially banned implementation of tariff indexation mechanisms for utilities, freezing tariffs at their January 2002 peso levels (with the intention of reducing inflationary pressures and protecting consumers amid a sharp economic downturn). For project sponsors and lenders to infrastructure projects, this case has provided a particularly instructive lesson in the interplay of currency risk and regulatory risk. The conclusion is that, whatever benefits fixed exchange rates may have, because they have not proven sustainable, they represent perhaps the worst choice of exchange rate regime for the successful financing of infrastructure projects. The consequences of the collapse of fixed exchange-rate regimes are likely to be severe because of the magnitude of ensuing depreciation. So, who should bear exchange rate risk in infrastructure projects?

Three parties can bear the risk of exchange rate movements in the first instance: the private investors (whether foreign or local equity-holders or creditors), the host country government (ultimately, its taxpayers), and customers of the service. The principle of optimal risk allocation can be defined as follows: exchange rate risk should be allocated according to the parties' ability and incentives to influence the exchange rate, change the sensitivity of the value of the project to the exchange rate, and hedge or diversify away the risk.

The government's influence over the exchange rate is one factor that, other things equal, argues in favour of allocating project and financing-related exchange rate risk to the government. But this argument should not carry too much weight. Allocating the risk to the government is unlikely to improve the quality of its decisions affecting the exchange rate, both because the relationship between the exchange rate and the government's financial position is affected in complex ways by many factors unrelated to the project and because governments do not respond to financial incentives in the same way as firms and individuals do. It is important to add that governments typically carry a lot of foreign exchange risk (for example, foreign debt) and in a currency crisis foreign currency obligations to infrastructure projects may fall due at a time when the government is least able to manage them.

Customers are in a poor position to manage the risk because they have no influence over the sensitivity of the value of shareholders' interest in the project to the exchange rate (they have no control over whether the investors decide to use financing that creates exchange rate risk). Moreover, most customers have no good natural hedges against the risk of currency fluctuations and in most developing countries no realistic opportunities to acquire hedges or diversify away the risk. Indeed, because exchange rates tend to fall during macroeconomic crises, their ability to pay higher tariffs is likely to be lowest just when the exchange rate has fallen.

Investors choose financing and thus control the extent of financing-related exchange rate risk. And their ultimate shareholders are well placed to diversify away much of the risk they choose to take on. So, there are strong grounds to argue that investors should: (i) share with customers project exchange rate risk, according to their ability to respond in value-enhancing ways to changes in the exchange rate, but erring toward investors; and (ii) take on all financing-related exchange rate risk, even though this may mean higher tariffs for consumers as a premium for bearing that risk.

The problem with many deals is the mix of foreign capital: many projects have too much dollar-denominated debt, which drives the demand for allocating exchange rate risk to governments and consumers. While allocating the risk this way keeps the initial financing costs low, it risks a blow-up in the longer term. Reducing reliance on foreign debt may mean that the volumes of private finance will be lower and that the initial costs of finance will be higher. But the benefits may be longer-lived and more robust investments that can weather the vagaries of emerging markets.

Source: Gray and Irwin (2003); Matsukawa, Sheppard and Wright (2003).

Table 2

LATIN AMERICA AND THE CARIBBEAN: CONCESSION RENEGOTIATIONS AND CHARACTERISTICS OF THE REGULATORY FRAMEWORKS

(Renegotiated concessions as a percentage of the category)

	All infrastructure sectors	Drinking water and sanitation
All concessions	29	75
Award criterion		
• Lowest rate	60	82
• Highest payment to government	11	67
• Multiple	34	0
Regulatory framework		
• In law	17	56
• In decree	28	84
• In contract	40	71
Regulatory entity		
• In place	17	41
• Not in place	61	88
Rate regulation		
• Price cap	38	89
• Rate-of-return	13	14
Regulatory obligations		
• Regulating by means (investment obligations)	51	85
• Regulating by objectives (performance indicators)	24	25

Source: Estache, Guasch and Trujillo (2003).

reorganizing industry structure 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, namely requirements of coverage, quality and affordability.

New options need to be found for seizing the advantages of private investment and management (ECLAC, 2000). 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 (see pages 63-64). Thus, 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.

Practically no country in the region has general legislation on utilities regulation (ECLAC, 2000). 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 with a long tradition of public utility services

being provided by the private sector, 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 behaviour 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 and management of natural resources, such as water. For instance, in electricity generation, the defective design of a water rights allocation system, as in Chile until the 2005 reform of the 1981 Water Code, may lead to a concentration of rights in a few companies, facilitating their market power and creating barriers to market entry and hindering fair competition.

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 obligatory and uniform rules for regulatory accounting, procedural matters and dispute settlement, to ensure transparency and impartiality (ECLAC, 2000). 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 or it was extremely limited (see page 46). A useful principle for the countries to adopt 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 (Solanes, 1999).

Regulatory frameworks do not always clearly recognize the importance of essential facilities, or the need to guarantee fast, adequate access to them (ECLAC, 2000). 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-holding transactions and transfer pricing,[22] 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 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 companies 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 and participation (ECLAC, 2000). Deficient regulation is tantamount to

[22] In the case of Aguas Argentinas, according to SIGEN (2002), the works of the first three years of the first five years plan were generally directly contracted with companies related to Aguas Argentinas.

charging users an additional tax, which strikes a blow against equity.[23] Indeed, some authors have claimed that service providers in developing countries are reaping excessive profits.[24]

The countries of the region 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 (ECLAC, 2000). 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. The regulatory frameworks in the countries of the region do not guarantee adequate access of the regulators to the information that they need for the performance of their functions and some of their design features tend to exacerbate the information advantage of the regulated companies (Jouravlev, 2003). In the region, greater attention has been given to the development of theoretical procedures for access to information, which are based on the promotion of some form of competition, that have not worked in practice and have ignored the experiences of countries with a long tradition in the provision of public services by the private sector. For example, few countries in the region have obligatory uniform regulatory accounting systems (see Box 13).

Finally, an issue that needs to receive 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. Some progress has been made in this respect. The First Meeting of Regulatory Agencies of the Americas (Cartagena de Indias, Colombia, 16-19 de October 2001) set up the Association of Water and Sanitation Regulatory Entities of the Americas (ADERASA).[25] The priorities of ADERASA include cooperation on the following four critical issues for the provision of drinking water supply and sanitation services in the region: users attention, benchmarking, regulatory accounting, and rates and subsidies.

3. Irrigation and drainage

Empirical evidence of private sector taking on the risks of developing systems for the provision of irrigation and drainage services to third parties does not abound (Solanes, 2002c). Documented experiences in the United States point out that the capital requirements of large scale irrigation and drainage, coupled with the economic characteristics of this sector did not, in the past, create an environment favourable to private risk taking in service-oriented irrigation development. For example, Carey Act Corporations and Carrier Ditch Companies experienced serious problems,

[23] One example is afforded by a study of the macroeconomic and distributional impacts of the privatization of public utilities in Argentina. Chisari, Estache and Romero (1997) found that the gains from efficient regulation are non trivial: "ineffective regulation is equivalent to a 16% implicit tax on the average consumer paid directly to the owner of the utilities' assets … How serious governments are about the fair distribution of gains of reform is revealed by how serious they are about regulation".

[24] "Private sector companies working in water have made excessive profits in some of the poorest countries in the world by exploiting the twin evils of corruption and lack of knowledge … Through the lack of knowledge of host governments … the contracts are often biased towards the contractor … In general such contracts have been negotiated with institutions incapable of supervising the performance and behaviour of the contractors. … companies … have developed robust marketing techniques, often playing on the endemic corruption in the host country and the influence greed can have" (Booker, 1999).

[25] The objectives of ADERASA are to: (i) facilitate the exchange of information on market regulation and control and the provision of drinking water supply and sanitation services in member countries; (ii) promote effectiveness and efficiency in service regulation and control processes; (iii) identify and defend the interests of member countries in international events with a view to achieving regional integration; (iv) exchange experiences on regulatory and control processes in member countries; and (v) promote the development, recognition and sustainability of regulatory processes of the water supply and sanitation sector in member countries.

Box 13

THE DEVELOPMENT OF REGULATORY ACCOUNTING IN CHILE

The Superintendency of Sanitary Services (SISS) of Chile dispatched instructions on 12 April and 10 May 2002 to the country's drinking water supply and sanitation companies in which they were ordered to present, as of March 2003, specific, detailed and standardized information on their income and expenses relating to water supply and sanitation services activities. This was to enable the SISS to produce an objective and realistic description of the model company, a basic concept for establishing tariffs in the Chilean regulatory framework.

Aguas Andinas filed a complaint on the grounds of illegality, basically disputing the capacity of the SISS to request such information and objecting to the fact that the request would require the implementation of a special system of accounting in addition to the existing required system. The First Chamber of the Court of Appeals of Santiago unanimously rejected this complaint. This decision established a precedent regarding the ability of the SISS to request accounting information on the costs and income of regulated activities and also of non-regulated activities that shared the same infrastructure. The decision took into account the principle of economic freedom together with the community's legitimate general interest of being provided with drinking water at fair prices.

Although in Chile this was a significant decision, it was not a new phenomenon in comparative public services law. In the United States, at the end of the nineteenth century and at the beginning of the twentieth century, little attention was given to the accounting of regulated companies. This lack of attention led to serious abuses of both consumers and investors. At that time, accounting irregularities were a frequent occurrence: operating expenses were overstated in the accounts, it was impossible to establish accurately the investments in plant and equipment, no distinction was made between activities related and unrelated to the provision of regulated services, and overcapitalization, often at the expense of the investors, was common.

Since that time, it has been generally recognized that the regulators cannot carry out their task effectively if they do not have the necessary authority to define the accounting system to be used by the companies under their jurisdiction. In the United States, this capacity of the regulators was recognized by the Supreme Court in 1912: "If the Commission is to successfully perform its duties in respect to reasonable rates, undue discriminations, and favouritism, it must be informed as to the business of the carriers by a system of accounting which will not permit the possible concealment of forbidden practices in accounts which it is not permitted to see, and concerning which it can require no information". It is surprising, in view of this information, that very few countries in the region have regulatory accounting systems. This fact leads to various significant problems:

- The impossibility of having standardized and consistent information, as at present, each company classifies its income and expenses essentially according to its own definition (and convenience), which can change from year to year or case to case in a strategic manner.
- In the case of companies which, in addition to providing drinking water supply and sanitation services, participate in non-regulated activities and share facilities and resources between both businesses, it is difficult to ensure that the tariffs are financing only the expenses related to providing the regulated services and thus determine the true level of profitability of the regulated activity.
- In view of the limitations of conventional accounting, it is difficult: (i) to disaggregate expenditure at the level required for regulatory purposes (for example, by activity, stage, location and installation of infrastructure); and (ii) to measure correctly certain types of expenses (for example, capital replacement costs) separately from those of routine repair and maintenance (that is, maintaining equipment that is fully operational, and usually within its expected technical useful life).
- The fact that the information available is neither consistent nor comparable between the different companies and over time, essentially obstructs the practical implementation of benchmark or yardstick competition.

Source: Phillips (1993); Rodríguez (2002); SISS (2002); Jouravlev (2003).

including, inability to finance, overestimation of available water resources, cost overruns, and engineering mistakes. 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 negotiations, that contractors are tacitly reluctant to bear investment risks.

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 (Solanes, 2002c). Yet, some lessons emerge from the experience of the western states of the United States. 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. 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; in addition, charges are approved by the Government.

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, the province of Mendoza in Argentina, regulates and controls the appointment of the authorities of the associations, their budgets and accounts, and also the performance of their functions. Irrigation districts in the United States are increasingly subjected to regulation, with particular attention being paid to financial issues.

Another important aspect is ownership of water rights (Solanes, 2002c). While in some states of the United States, water rights are owned by the server company, in others rights belong to farmers, while some states admit the existence of a joint appropriation (that is, the farmer plus the company). These examples show that there are several alternatives to the ownership of water rights. Arguments favourable 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 private investment in the development of the economic potential of water and its conservation. Water markets are also an institutional means to improve the efficiency of water allocation, between and within sectors.

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. The development of irrigation and drainage infrastructure requires the consideration of at least the following factors: markets, infrastructure and productive options. Without proper commercial conditions agricultural development is not sustainable.

E. The issue of the appropriate level of government

Which administrative level is best suited for managing water and its services is a particularly complex and conflictive matter, given that the resource is not limited either by administrative or by institutional boundaries (see Box 14): "God has laid down the lines of separation of the waters as the natural limits of river basins. Man, for his political and administrative needs, has drawn other

Box 14

THE IMPORTANCE OF RIVER BASINS AS TERRITORIAL UNITS IN INTEGRATED WATER RESOURCES MANAGEMENT

All the key international conferences on water resources have emphasized and recommended the area formed by a river basin, or interconnected river basins, as the most appropriate territorial unit for integrated water management. Accordingly, at the United Nations Water Conference (Mar del Plata, Argentina, 14 to 25 March 1977), it was recommended that the countries consider "as a matter of urgency and importance the establishment and strengthening of river basin authorities". At the International Conference on Water and the Environment "Development Issues for the 21st Century" (Dublin, Ireland, 26-31 January 1992), it was emphasized that "the most appropriate geographical entity for the planning and management of water resources is the river basin".

At the International Conference on Freshwater "Water: a Key to Sustainable Development" (Bonn, Germany, 3-7 December 2001), it was noted that "watersheds are the appropriate frame of reference for water resources management". At the United Nations Conference on Environment and Development (Rio de Janeiro, 3-14 June 1992), it was emphasized that "integrated water resources management … should be carried out at the level of the catchment basin or sub-basin". The Plan of Implementation of the World Summit on Sustainable Development (Johannesburg, South Africa, 26 August-4 September 2002) contains the recommendation to "adopt an integrated water basin approach".

Why are river basins considered the appropriate territorial unit for integrated water management? **First of all, it is simply because, in the hydrological cycle, they are the main land forms that collect and concentrate the water supply from precipitation**. Apart from this basic physical factor, there are at least three other reasons.

The main reason is that the physical characteristics of water generate an extremely high, and in many cases unpredictable, degree of interrelationship and interdependence (externalities or external effects) between uses and users of water in a river basin. Surface water and groundwater, especially rivers, lakes and aquifers, as well as catchments, recharge areas, water extraction sites, hydraulic infrastructure, and also coastal margins, form an integrated and interconnected system in relation to a river basin. These interrelationships and interdependencies, in the case of both consumptive and instream uses, take place within the river basin (or group of interconnected river basins). This makes the river basin the appropriate territorial unit of analysis for water management decision-making, especially with regard to multiple use, (re)allocation, and pollution control.

The second reason is that river basins are an area where water is interdependent and interacts with the physical (natural resources) and biotic (flora and fauna) systems, in a continuous and dynamic process. Changes in the use of natural resources upstream, especially land, alter the hydrological cycle within the river basin downstream in terms of quantity, quality and time. This is why it is best to work in the area of a river basin to achieve integration between water management and use, on the one hand, and management and use of other natural resources that have repercussions on the water system, on the other hand. These considerations help explain the importance attached to watershed management activities within water resources management.

Third, a basic characteristic of river basins is that they form the territory within which the interrelationship and interdependence arises between the physical and biotic systems on the one hand, and the socioeconomic system, consisting of the users of river basins, whether as inhabitants or external actors, on the other hand. In mountainous areas, river basins form natural axes for communication and trade integration, along the rivers or the ridges that separate them. In river basins with heavy flows of water and extensive and relatively flat valleys, the axis of the rivers also provides a zone of connection for the inhabitants, especially for use in navigation, transport and communication. The territory of the river basins facilitates interaction among the individuals living there, although they are grouped within the basins in territories defined for political and administrative reasons. Their dependence on a shared and integrated water system and on access roads and routes, and the fact that they have to face similar risks, give the inhabitants of a river basin common socioeconomic and cultural characteristics.

Source: Dourojeanni, Jouravlev and Chávez (2002).

lines which generally intercross and do not coincide with the natural lines" (Cano and Lopez, 1976) and, as a service, is subject to economies of scale and scope. Water also has a direct impact on commercial activities, on transport, and on services, such as electricity generation, which are managed at a national scale. Problems become more complicated still in federal countries, in those that have chosen to assign responsibility for drinking water supply and sanitation services to the municipal level, and in unitary countries with marked regional differences.

Experiences with centralization and decentralization of activities appear to show that, rather than a problem of radical alternatives, it is more importantly a question of structuring balanced systems, where legal and political powers are assigned to the appropriate level of government and where the roles of the private and public sectors, at the various levels, are complementary. In this respect, it is important to mention that, in Colombia, implementing decentralization without first conducting a thorough activity analysis has led to the loss of economies of scale, and that assigning responsibilities to local organizations lacking technical training and subjecting river basin authorities to political pressures are not conducive to sound resource management (Solanes and Getches, 1998).

In federal countries the practice has been to declare certain water uses to be under national jurisdiction, such as international and inter-provincial navigation, certain economic activities, such as hydroelectricity generation, and certain public interests, such as pollution control and some ecological concerns. Interjurisdictional agreements (as in Argentina) and river basin organizations have also been tried (Pochat, 2005; Dourojeanni, Jouravlev and Chávez, 2002). In this context Brazil has stressed the importance of the River Basin Committees and the Water Agencies, as appropriate management institutions. Curiously, river basin organizations have also been employed in unitary countries for ensuring better local participation.[26] This proves that appropriate institutional arrangements are a function of the nature of the resource more than of the political or organizational philosophy of a particular country.

It is noteworthy that Chile, probably the most successful country in the region in terms of efficiency and coverage of drinking water supply and sanitation services, adopted a model based on regional companies covering a significant area in order to achieve economies of scale and take advantage of the benefits of decentralization. Meanwhile, countries that have adopted models on a fragmented political base at the municipal level show serious difficulties, unable to capitalize on economies of scale and with rich and poor municipalities and non-functional subsidy schemes (see Box 15). On the other hand, the presence of larger units prevents excessive operational fragmentation that would make regulation activities inefficient.

F. Public participation

An important characteristic of some arid and semi-arid areas is the participation of users, either in field activities or in the integration and consultation with administrative and political institutions. Well-known examples in South America include Chile, and the provinces of Mendoza and San Juan in Argentina. Participation produces a sense of community between the administration and the users, lowers central administration costs, and ensures that the interests of users are taken into consideration.

[26] In many countries, there is a trend towards attempting to establish governance capacities over naturally defined areas such as river basins and aquifers, which do not correspond to traditional forms of government over political administrative entities such as states, regions, provinces and municipalities (Dourojeanni, Jouravlev and Chávez, 2002). These bodies, which are usually mixed, collegiate and comprised of representatives of various levels of government, users and other relevant actors, are normally responsible for coordination and collaboration at the river basin level. The experience of Peru indicates that, without a good national water administration, it is difficult to establish sustainable bodies at the river basin level (Ballestero and others, 2005). In general, river basin bodies should not be created before or instead of sound water authorities at the national level.

Box 15

PROBLEMS CAUSED BY THE DECENTRALIZATION OF DRINKING WATER SUPPLY AND SANITATION SERVICES TO THE MUNICIPAL LEVEL

The assumption that drinking water supply and sanitation services are better and more efficiently managed when decentralized to the lowest possible appropriate level or to the municipal level has had an enormous impact on the sectoral reforms undertaken in the past two decades by the countries of the region. The main arguments for this type of reform were based on the need to bring local problem solving closer to grass roots level, with a view to taking advantage of local initiatives and proximity to users. While the centralizing tendency of the 1960s and 1970s may have gone beyond what was economically justifiable, decentralization to the municipal level, apart from isolated cases, has not led to a more efficient provision of services than in the past, and has in fact very often given rise to serious problems, including the following:

- **Loss of economies of scale**. It is generally recognized that drinking water supply and sanitation services are characterized by significant economies of scale. Experiences outside the region indicate that economies of scale can be achieved with at least 500,000 customers and possibly 1,000,000. Within the region, there is concrete proof that drinking water supply and sanitation services for communities of up to 150,000 or 200,000 inhabitants could be provided more efficiently and at a lower cost if supplied by regional companies. The vast majority of municipalities in the countries of the region have populations considerably smaller than would be needed to achieve such economies, and only much less than 1% approach that level.
- **Mismatch between the horizontal structure of the sector and the jurisdictional level responsible for regulation**. It is clear that excessive operational fragmentation hampers regulatory and control activities. It is not feasible to assume that hundreds of providers can be effectively regulated or controlled by a single agency.
- **Reduced potential for cross subsidies**. By reducing the size of service areas and, possibly, by making them more homogeneous, the decentralization process tends to limit the potential for cross subsidies and facilitates cream skimming that leaves low-income segments of the population without access to services.
- **Management and regulation of services based on political rather than technical criteria**. Decentralizing service provision to the municipal level subjects it to a relationship with local governments which has quite often resulted in decisions on essentially technical issues being taken from a political standpoint, in addition to misuse of government resources and funds. Moreover, many municipalities lack the resources necessary to deal efficiently with the complexity of the processes inherent in the provision of drinking water supply and sanitation services.
- **Lack of attention to rural areas**. In view of political dynamics at the local level, municipal governments tend to assign higher priority to the needs of the urban population to the detriment of rural communities.
- **Lack of incentives to protect watersheds and control water pollution**. The fact that the political and administrative boundaries of local governments typically overlap and do not coincide with the geographical contours of river basins tends to hinder rather than favour the internalization of externalities linked to watershed protection and water pollution control.

On the other hand, it is also important to point out that, with the exception of smaller countries, centralized national companies are not necessarily the most efficient solution. Experiences from the 1960s and 1970s indicate that centralized structures were enormously useful in developing and implementing projects to extend coverage. However, excessive centralization overburdened management capacity to such an extent that serious inefficiencies in service provision became widespread. This approach has therefore been abandoned in many countries including Argentina, Colombia, Mexico, Peru and Venezuela.

Source: Jouravlev (2004).

However, there is still a long way to go in ensuring the access of users and the public to the water decision-making process. In most countries, public participation is restricted by two principal factors: (i) the lack of real and obligatory rules for assessing the economic efficiency of public investment; and, in consequence; and (ii) the existence of rigid regulations that only give active and substantial legitimacy to acting in defence of traditional individual economic interests.

There are also numerous deficiencies in participation: (i) limiting social conditions; (ii) limited definition of the areas in which the public and users can participate; (iii) provision of deficient and inopportune information to the public; (iv) lack of identification of alternative mechanisms and decision-making capacity when participation does not reach convenient decisions, both in substance and in timing; (v) capture of user organizations by special interest groups or sectors for their own private benefit; (vi) deficient State control; (vii) a lack of awareness on the part of those who would delegate all water management responsibilities to these entities of the fact that these institutions reflect only the interests of active members; and (viii) failure to realize that it is not just water rights holders and water users who have a legitimate interest in the resource (for example, the role of water as part of the environment). Other common problems include indifference towards the interests and concerns of the local population as well as towards traditional rights. Concern has also been expressed at the disregard of social values and interests linked to water (Barraqué, 1993).

Users and other parties interested in the resource may participate in public hearings or consultations aimed at analyzing policies, programmes, projects, or legislation. Although the mechanism is mostly aimed at opening up space for participation, its mere creation does not mean that all interested parties will participate, neither that it will guarantee a balance of interests and more rational decision-making (Barraqué, 1993). This was confirmed by a South African experience: in a public consultation on new water legislation, industry submitted comprehensive responses, while a number of organizations and individuals also answered in a positive manner (South Africa, 1997). However, no observations were forthcoming from community organizations, rural communities and village water committees. Nongovernmental organizations made very few comments.

Because of this, meaningful stakeholder participation requires, at the least, a certain degree of government overseeing, and, occasionally, support. Governments should stimulate and facilitate the participation of interested parties, providing access to information, authority to act in meetings, and, in general, provide the possibility of expressing opinions and formulating positions (Haddad, 1996). A good example of creating participation opportunities is afforded by the United States environmental jurisprudence, where the area where citizens can legally appeal decisions has been broadened, giving greater flexibility for initiating group or individual action, on the basis of interests that are different from traditional personal economic interests.

Otherwise there is an ever present risk of participation becoming captured by well-informed, intent-specific, special interest groups (Solanes and Gonzalez-Villarreal, 1999). For example, in certain areas privileged user groups have a dominant position, have a higher educational level, are better organized and are more powerful in collective negotiations aimed at, for example, keeping water rates low. These have more influence than poorer peasants. In contrast, the poorer users have to follow the rules of political clientelism (Kemper, 1996).

Participation is affected when there are no legal frameworks allowing for public action. The existence of these frameworks is, in turn, affected by the different possibilities of access to those who make political decisions, and by the lobbying capacity of pressure groups with different special interests. Although some countries have established norms and mechanisms for public participation with respect to environmental impact assessment, the regulations covering economic evaluation of projects are such that recourse by the public is scarce or non-existent. The result is

that the public cannot question even the most deficient projects on economic grounds. This underlines the need to streamline the requirements for effective accreditation of competency to sue on the part of nongovernmental organizations and the public.

There have been cases in the region, where public opinion has manifested itself in favour of projects with negative rates of return. However, the opinion surveys failed to mention these negative returns and the questions put forward were vague about sources of financing, rates of return, and as to who would benefit. So, the legislation should make it mandatory to carry out ecological, economic and social evaluations of water projects and programmes. Mechanisms should also be established for interested and affected parties to participate in such evaluations in a timely and meaningful way. Finally, the legislation should define the threshold above or below which projects will not be approved, and establish mechanisms for administrative and judicial remedies that enable parties to take action where they feel the legal requirements of the system have not been complied with.

In addition, to be effective, a system of participatory planning and management of water resources must be able to provide timely information on where and what kind and quality of water is available, and on who is using the water and for what purposes. Therefore, effective water management systems require adequate official surveys, inventories and cadastres of water sources and water supplies, as well as up-to-date registers and records of water uses and wastewater discharges, water rights, and beneficiaries of such rights, with their respective water allocations. The objective of information is to allow appropriate decisions by policy-makers, administrators, managers, users and the public.

As for water user organization, although in principle these entities can be organized under private or public law, most countries rely on public law organizations (Solanes, 1993). The intrinsic requirements of water management (decisions binding on minorities, compulsory spreading of costs and assessment of dues and fees, rule making authority, condemnation powers, etc.) call for some sort of public law vehicle. Water user organizations have traditionally been subject to government controls. The most common controls are issuance and conditioning of water rights, imposition of minimum legal requirements, monitoring of elections, approval of work plans, approval of budgets, control of expenses, removal of authorities in case of misconduct, review of decisions, either through administrative or judicial appeals, compulsory formation, etc.[27]

Finally, it is important to note that consumer interests are not well represented in the public utility regulatory processes in Latin America and the Caribbean. 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 (ECLAC, 2000). This is due to institutional barriers as well as to the lack of information and technical know-how among consumer organizations. Consumers should have a formal participation in the regulatory process. Their participation should be supported by requirements for public disclosure of relevant information. Consumer organizations should also have adequate

[27] In Chile, the 2005 reform of the Water Code seeks to strengthen the role of users by increasing the involvement of user organizations in public decisions (Peña, 2005). One example is users' participation in identifying water use rights for which licence fees should be charged (see page 30) and in creating a database of existing rights. The new legislation also broadens the scope of activity of private individuals by authorizing the creation of groundwater user organizations and granting legal personality to the country's many water communities. On the other hand, the reform also provided an opportunity to review whether the provisions of the 1981 Code governing the steps private individuals could theoretically take to protect their interests were realistic, given that experience showed they were unable to implement such measures due to limited access to information and little opportunity to study the complex issues involved. The reform remedies this and establishes various new obligations for the administration in terms of representing the common interest.

resources to do their jobs properly, including the ability to conduct research into consumers' needs, concerns and problems (McKechnie, 1998).[28]

G. The environmental dilemma

The environmental dimension of water is rapidly becoming a major component of water legislation (Solanes and Gonzalez-Villarreal, 1999). As water becomes scarcer relative to demand, as externalities increase and as knowledge improves, the need to control the deterioration of water quality is translated into more detailed and demanding legislation. These considerations help explain why environmental issues have acquired growing significance in the region in the last few years and they frequently give rise to highly controversial situations reflecting the lack of social consensus.

1. Protection of environmental uses

The safeguarding of environmental uses when facing excessive exploitation of water resources for other ends causes conflicts in arid and semi arid areas, as the matter attains important economic significance. This becomes even more serious when dealing with situations which have been consolidated over a long-term period of use, especially when the technical difficulties and the uncertainty associated with defining levels of ecosystem protection are added.

2. Water pollution control

The region has a major deficit in water pollution control and overcoming it implies the need to implement effective institutional arrangements for the mobilization of significant financial resources, which may have alternative social or productive destinations.[29] Although there is a growing awareness of the need to correct the existing situation, it is difficult to identify an appropriate and publicly acceptable funding mechanism. This is very evident in the case of pollution from urban wastewater discharges, when the difficulties of financing drinking water supply and sanitation systems are considered. A similar situation exists in the case of industrial pollution, especially by small or medium-sized industries with low levels of technological development. Other concerns reflecting the difficulties in building effective governance on this matter refer to administrative limitations for dealing with matters such as control and supervision of clandestine dumps, especially into aquifers, and in controlling diffuse contamination.

3. Building of major hydroelectric works

Environmental impact assessment systems for new projects have been implemented in the last few years in the region, under varying modalities. Major hydroelectric projects often prove to be highly conflictive and generate public interest beyond national boundaries. Also, the systems

[28] In some developed countries, governments or utilities finance consumer participation in the regulatory process, for example, by paying for experts to help consumer organizations investigate utility accounts and present informed opinions. To help consumer organizations raise their own funds, it has proved useful to allow consumers to insert into utility bills an invitation to join an independent organization to represent their interests, as is done in some states in the United States (Palast, 1996).

[29] In 1962, it was estimated that in the countries most advanced in this area, only 10% of sewerage systems had wastewater treatment facilities (PAHO, 1990). Since then, except for a few isolated cases, the situation has in general not changed significantly in regional terms. This is mainly due to the high costs of wastewater treatment facilities and the chronic lack of financing in the sector. It is estimated that at present only 13.7% of wastewaters from the 241 million inhabitants whose homes are connected to sewerage networks, receive some degree of treatment (PAHO, 2001). The situation becomes even more worrying in view of the fact that a large number of treatment plants have been abandoned or function precariously. As a result of this, many bodies of water close to urban areas are little more than open sewers and watercourses crossing large cities are frequently anaerobic owing to the heavy load of sewage. An important exception is Chile, where wastewater treatment coverage increased from 8% in 1989 to 72% in 2004, and it is expected to exceed 98% in 2010 (SISS, 2003 and 2006).

established do not always have a high enough level of credibility in public opinion, nor are the true interests of the community always adequately represented, and opposition to the project can easily turn into long-term legal battles with unpredictable results. In some countries this situation has become a disincentive to private investment in such projects. From the perspective of the development of natural resources, this situation is not irrelevant (see Box 16 and Box 17), when it is kept in mind that only a fraction of regional water resources are currently developed, particularly for hydroelectricity generation (for example, only about 15% of the estimated economically exploitable hydroelectric potential is currently used in the region (OLADE, 2004).

H. Protection of the interests of ethnic groups and customary users

In a number of areas in the region, serious conflicts occur between indigenous and traditional users and economic activities, such as mining and irrigation. There are also cases where the extraction of groundwater for supplying cities affects traditional uses and ecosystems. Some countries, to a lesser or greater extent, have created systems for protecting indigenous rights. For example, in Brazil, the Constitution of 1988 and Law N° 6001 of 1973 contain norms for this purpose. In Chile, Law N° 19253 of 1993 protects the customary rights of northern ethnic groups. In Colombia, the Constitution and Law N° 21 of 1991 recognizes rights over traditionally occupied land and resources.

However, not all countries in the region have elaborated careful and clear definitions of the rights and obligations of interested parties and the government, nor do they have contingency plans for the defence of ethnic and customary users. The results are poorly defined and ambiguous situations creating legal uncertainty and insecurity, which do not translate into an effective respect for protected rights. The problem is aggravated by the incapacity or unwillingness or lack of means of many groups to appeal to ordinary legislation in order to protect or consolidate their rights. There are significant differences in the manner in which rights of the native population are regulated in the region and in the United States. In the latter country judicial decisions (see Box 18) have established a very high priority to native Indian rights that the law respects and enforces.

The weaknesses in the system for the protection of indigenous and traditional uses affect both extractive and *in-situ* uses related to the natural water regime. The most frequent situation is the destruction of traditional habitats for the sake of assigning rights for mining, water supply to cities and hydroenergy generation. The customary uses destroyed are not considered in project evaluations, let alone compensated. Part of the problem is that legislation generally does not recognize non-extractive customary uses, such as fishing activities in lakes. There are examples in the region where irrigation developments, with the award of formal titles to the water, have led to the destruction of customary fisheries with negative effects on the subsistence and the economy of significant population groups.

There is also a need to define an operational strategy for the recognition of indigenous and customary rights (see Box 19). Customary rights and the recognition of customary rights and practices are not one and the same. It is not enough to simply recognize a structure of customary rights. The specific rights that emanate from the structure must also be recognized, or compensated, and this requires surveying and registering activities by the State. The problem arising from an imprecise definition of protected rights is aggravated when foreign investment protection agreements are signed, where customary uses have not been recognized under any specific legislation nor protected by being recognized or registered in ordinary legislation. In these cases, an investor may well argue that it is unreasonable to consider the existence of these uses and rights, given that they have no legally recognized expression.

Box 16

RENEWABILITY AND SUSTAINABILITY OF HYDROENERGY: THE NEED FOR AN ENVIRONMENTAL AND SOCIAL REASSESSMENT

From the perspective of national policy-makers, electrical companies and project developers, hydroelectric projects are the ones that could make the most substantial contribution to the region's electric power supply. Therefore, the initiative for water, forestry and the community is being proposed on the following principles:

- **Hydroelectric projects have a clear and beneficial environmental synergy with forestry**. One of the most important lessons for hydropower plant developers and operators, particularly reservoir plants, is that forestry is indispensable for the existence of this kind of plant. Accordingly, any modern development of hydroelectric plants is already associated with forest management, which may represent a source of environmental synergy that facilitates efforts to reduce greenhouse gas emissions while capturing the carbon associated with these emissions.
- **Hydroelectric projects bolster electrical systems and offer clear operational synergy with wind power projects**. Because of the ease and rapidity with which their capacities can be changed, hydroelectric plants have a key role to play as voltage regulators and thus in ensuring the quality of electrical energy supplied by the underlying grid system. Moreover, the value of the energy produced by wind-power projects increases when they operate in conjunction with hydroelectric projects, given that this approach can convert these facilities into projects with firm capacity and boost their profitability, with the result that fewer government subsidies are required. At least in Central America, where the wind is stronger when it does not rain and vice versa, the market value of a hydroelectric-wind combination is greater than the value of the sum of the two projects in isolation.
- **Marginal increases in the capacity of existing dams are a very economical way of reducing greenhouse gas emissions**. Building hydropower plants with small dams can mean reduced local environmental impacts, but also limits the profitability of the projects and at the same time limits the scope for reducing greenhouse gas emissions. Additionally, without increasing installed generating capacity, it is possible to achieve a greater production by building or expanding dams.
- **The electricity that comes from hydroelectric plants has low unit costs**. Although they are more expensive per unit of installed capacity, the unit cost of the energy produced by hydroelectric plants is low, due to the long service life of the projects.
- **The hydroelectric potential is well evaluated and many of the possible projects have already been identified and specified**. For many years, hydroelectric plants were the alternative preferred by national electrical companies and development banks as a way to boost electric power supply. For this reason, hydroelectric resources have been carefully considered and many potentially useful sites (at least those of a medium or large size) have been thoroughly evaluated and have even undergone preliminary specification for construction purposes.
- **Projects have to be developed hand in hand with the communities, not against them**. Some of the many benefits of hydroelectric projects should undoubtedly be bestowed upon the communities in question and compensate them for the negative effects which such activities unavoidably produce. The assessment of these costs and benefits needs to be viewed as the centrepiece of efforts to implement these projects and not as an afterthought.
- **There is technical capacity in the region to execute them**. Precisely because of the importance associated with hydroelectric projects in the region, there is a plentiful supply of the expertise and technical capacity required to design and build them, and this represents an opportunity for business development in the region.

Source: ECLAC/GTZ (2004).

Box 17

RENEWABILITY AND SUSTAINABILITY OF HYDROENERGY: ELEMENTS OF THE PROPOSAL

- **Comprehensive environmental assessment of hydroelectric projects**. Above and beyond their potential impact in terms of reducing greenhouse gas emissions, hydroelectric projects have to be evaluated also in terms of their indirect contribution to forest management, not only on account of how they are developed, but also through the manner in which they help to provide a firm anchor for the neighbouring communities.
- **Establish a code of conduct in relation with communities**. It is both urgent and necessary to spell out a number of rules that are accepted universally and supervised both nationally and internationally so as to commit the project developers to adopting a fresh approach to those communities affected by hydroelectric developments.
- **Establish payments for environmental services**. One way of supporting the communities, as has happened in Costa Rica, is to establish payments to be made by project developers for forest-related environmental services so that they can be channelled as incentives to those who live in those areas.
- **Modify the terms and conditions set forth in energy purchasing contracts**. One way of recognizing the value of hydroelectric projects is to modify the regulatory frameworks so as to lengthen the permitted terms of the hydroelectricity purchase and sale contracts in such a way as to obtain better financing terms.
- **Establish mechanisms that highlight the synergy between wind power and hydroelectric projects**. At present, the rules prescribed for electricity markets are established for individual plants and not for comprehensive capacity supply packages. Given the synergy between wind and hydroelectric projects, it would be advisable to revise these rules and if necessary to modify them so as to recognize this synergy and thereby enhance the profitability, with more competitive costs, of these projects.
- **Integrated river basin management policy**. The multiple uses and effects of water are typically internalized within the river basins in which water is captured and from which it flows out to sea. Accordingly, the hydraulic systems should analyzed in the context of river basins in which it is essential to optimize benefits and minimize the negative effects of temporary and spatial shifts in water flows. This calls for establishing a system for measurement, monitoring and decision-making and requires concerted efforts to achieve interinstitutional coordination between central governmental agencies and regional governments.
- **Meet social obligations and resolve existing conflicts**. It is necessary, on the one hand, to finish fulfilling the obligations to the communities resulting from dam construction and, on the other hand, to disentangle major conflicts related to the construction of hydroelectric plants, at least those that have met acceptable criteria according to this new policy.
- **Public outreach and transparency of information**. To bring about a societal reappraisal of these kinds of projects, it is necessary for the initiative to undertake an intensive public relations effort in order to give hydroelectric projects the credit that they truly deserve at the present time.

Source: ECLAC/GTZ (2004).

I. Conflict resolution

Given physical and economic characteristics of water (see page 27), its potential for generating conflicts is unlimited: “Water management … is the management of conflicts between users competing for the same resource, many of which do not have any idea of how their interaction has mutual prejudicial or beneficial effects” (ECLAC, 1994b). Prolonged conflicts delay and discourage investments and harm conservation. As conflicts can involve anyone from

private individuals and companies to municipalities, provinces, institutions, sectors and nations, the problem is extremely significant. In such a situation, the lack of an efficient and opportune conflict-solving mechanism becomes critical for water governance.

Therefore, a poor administrative capacity for conflict resolution is a serious practical limitation. Without a third party arbitrator, the parties in a conflict that benefit from the *status quo* have no incentive for reaching a negotiated solution, benefiting as they do from a situation another objects to. This situation, clearly seen in Chilean legislation, contrasts notably with water administration powers in other countries, such as in the United States or in the province of Mendoza, Argentina, where the administration has a decision-making capacity. This authority has not been arbitrary, because of the quality of the administration and because of the existence of appropriate constitutional and procedural guarantees.

Box 18

THE WINTERS (RESERVED RIGHTS) DOCTRINE IN THE UNITED STATES

The reserved rights doctrine is rooted in the Supreme Court decision in Winters v. United States (1908). The case grew out of a conflict between Indians of the Fort Belknap Reservation in Montana and nearby non-Indian settlers over waters of the Milk River. In 1888 the Indian tribes agreed to cede a large area of land to the United States that was part of the lands reserved by them in an earlier treaty and agreed to remain on a relatively small reservation. The federal government induced settlers to take up homesteads on the ceded lands. The homesteaders began using water from the Milk River for irrigation, perfecting their water rights under Montana law. A short time later the Indians began diverting large quantities of water for irrigation. The settlers diverted water upstream from the Indians, preventing them from getting sufficient water. The United States then brought suit against the settlers on behalf of the tribes.

The Supreme Court held that although the settlers had established rights under state law and had begun using water before the Indians, the Indians held a prior water right. The right was based on an implication drawn from the circumstances. Because it was government policy to make the Indians “pastoral and civilized people,” and because the reserved lands were arid, the Court found it inconceivable that either the Indians or the government would agree to the vast land cession unless enough water were reserved to make the remaining lands useful. Although the agreement was silent on the subject, water rights were found to exist by “necessary implication.” Further, the Court had to reconcile the conflicting inference that the government had intended settlers to cultivate the ceded lands, which purpose would be defeated by denying the settlers' water rights. The Court resolved the conflict by applying the established rule of construction that ambiguities in an Indian agreement or treaty should be resolved in the Indians' favour to compensate for the typically unequal bargaining positions of the Indians and the United States.

Source: Getches (1990).

The conclusion is that water legislation should enable interested parties to settle disputes by agreement, or by appeal to arbitration, adjudication by communities or user associations, or other friendly means. It is in the public interest to have guaranteed and effective user representation, especially of the weaker and minority sectors in any society. Also important is the right to defence and an appeal system, and access to avenues that ensure that no one is left undefended and that legal action does not become eternal.

When the parties are unable to reach agreement, the legislation should permit the water authority to make a ruling in the first instance, except where the dispute relates to certain essentially legal matters, on which there is direct recourse to the judicial system. It is important at all levels to have applicable conflict resolution criteria and authorities responsible for their enforcement. The decisions of the water authorities and those of the arbitration process should both have recourse to justice.

Box 19

CONDITIONS FOR RECOGNIZING INDIGENOUS WATER RIGHTS

In social terms, water in the Andes region is community property, and communities have established rights and obligations for its use. Water management at the community level also creates cohesion, while individualist privatization of water rights limits community influence on its members and may contribute to social breakdown and fragmentation.

Given that governments have not always formally recognized indigenous rights (communal or otherwise), such rights risk being eliminated if water rights are formally allocated to individuals or corporations. This risk is particularly high if the rights are allocated to corporations covered by foreign investment protection treaties. These treaties are at the top of the legal ladder and investors responsible for *de facto* infringements on customary use would have the advantage in arguing that indigenous people have no such rights and that, in any event, the absence of legal provisions or administrative documents recognizing or certifying such rights means that they, the corporations, could not have known of their existence beforehand.

It is therefore essential to implement a strategy for obtaining recognition for indigenous water rights and management within national legislation and to design and simplify the procedures for establishing and registering those rights on the ground. This should be done in clear unambiguous terms to avoid ignorance that could lead to hesitation and uncertainty that could lead to vague and encroachable boundaries. The following are the minimum requirements in terms of legislation:

- Water laws must recognize customary water uses, including water as part of a stable living environment and an environmental service. This obviously includes uses that require diversions, use of flows and the wider role of water as part of a stable and sustainable habitat.
- In terms of management, this strategy is closely linked to integrated watershed management and the regulatory instruments needed to prevent destruction of water sources and production due to mismanagement of land and forests.
- If national projects are going to affect indigenous customary rights, these should be promptly and appropriately compensated in a way that takes into account the loss of an asset, effects on way of life and cancellation of environmental services.
- Indigenous communities and individuals should be able to request registration and recognition of indigenous rights at any time. Paper rights that affect indigenous water use must be annulled. If the contested rights are not annulled, indigenous users should receive compensation. Compensating for the indigenous uses affected should be the responsibility of the new right holders, the government and the water authority administration. The right to request registration of indigenous uses should not be subject to expiry or forfeiture of the right.
- Any member of a community, or its head, on behalf of the community should be able to exercise the right to request registration and recognition of indigenous uses. Individual claims can only be made by the beneficiary of a claim, or the head of his/her community, on her/his behalf and benefit.
- At indigenous community locations, water authorities must examine, recognize and register diversions, uses of flows and water rights *ex officio*. Should the water authority neglect to do so, this shall constitute failure by the head of the water agency to carry out his/her public duties, thereby making him/her liable for criminal charges and civil liability.
- Procedures for implementing indigenous water policies and examining and registering water rights and uses should ensure that the opinions of the communities and individuals involved are heard and that they are given the opportunity to participate in a timely way. They should also be able to submit evidence to support their claims, uses and rights. In case of doubt, decisions should favour the indigenous party (*in dubio pro indigena*).

Source: Solanes (2002b).

There is a tendency to replace the obligatory jurisdiction of the State with that of international arbitration tribunals (Box 20). There are, however, certain doubts regarding the performance of these tribunals when dealing with matters of public interest.[30] Further problems arise in economies in crisis, as petitions are made to these tribunals which in general are an attempt by foreign-owned public utilities to avoid the effects of the crisis. Two types of economic players are thus created: those having all manner of guarantees, whatever the fluctuations in the economy, and those, usually ordinary citizens, who do not have any (Solanes, 2004). This may have negative effects, as maintaining a constant return in economies in recession increases the relative share of some sectors at the expense of others. This has not been the case in all countries, however. For example, in the United States in the depression of 1929, the courts acknowledged the decline in interest rates and in company profits throughout the country, and were inclined to accept lower returns in public utility services. A twofold effort is required: on the one hand, to adjust the procedures to the nature of the problems, and on the other hand, to adjust the solutions to experience with similar cases.

J. Public policy decision making

There are many public policy decisions associated with water resources which can enhance or limit their contribution to national socioeconomic development (Solanes, 2005a). One type of decisions which has a significant potential for distorting water use, and in some cases can even compromise the stability of public finances, is the indiscriminate granting of public subsidies to promote water use without evaluating its impact on the economy or the sustainability of the resource.

A typical case is agricultural subsidies applied to water used for irrigation. One example of misuse of this type of subsidies was the irrigation subsidies in Argentina. In this case, the subsidies, on the one hand, affected the sustainability of aquifers in places such as the province of Mendoza, and on the other hand, helped to generate a level of agricultural production that exceeded the actual demand for irrigation products, thus resulting in subsidized products, which finally led, in association with other factors, to a serious crisis in public finances and to mass failures in the wine production sector.

Decisions that affect the productive integration of water resources also include those concerning public water-related projects, usually for irrigation, the benefits of which, due to evaluation problems, in many cases, have turned out to be less than the costs, resulting in net losses for the national economies (Solanes, 2005a). This problem is more serious when projects are financed in hard currency, while the returns are generated in local currency. The net result is impoverishment.

In response to these problems, some countries, such as Chile, have implemented rules on the viability of projects that are publicly financed, so that financing is not allowed below a certain cost-benefit threshold. As for subsidies for private investment in irrigation and drainage works, again in Chile, they are assigned through public competitions and on the basis of objective criteria, in order

[30] According to DePalma (2001), these tribunals have led to national laws being revoked, justice systems questioned and environmental regulations challenged. Within the context of the NAFTA, some argue that their worst fears about anonymous government have become reality. Joan Claybrook, president of Public Citizen, says “What we’re talking about here is secret government”. According to Andreas Lowenfeld, an international trade expert at the New York University School of Law: “There is no doubt that these measures represent an expansion of the rights of private enterprises vis-à-vis government … The question is: Is that a good thing?” According to Martin Wagner, director of international programmes for the Earthjustice Legal Defense Fund: “The fact that the drafters of NAFTA chose this secretive process … is further evidence that they weren’t foreseeing matters of broad social concern coming before these panels”. Critics of the system say that each appeal to these bodies is undermining public policy. The lack of a traditional appeal process, transparency and legally binding precedent have made many people cautious and circumspect about this method of resolving disputes.

Box 20

INTERNATIONAL INVESTMENT PROTECTION AGREEMENTS AND NATIONAL GOVERNANCE

Countries in the Americas have signed many trade- and investment-protection agreements. The way these agreements are applied is radically different from the application of agreements concluded in other parts of the world, such as the European Union. The main difference is that the European Union agreements are implemented within a system that takes into account, and attempts to strike a balance between, various perspectives including economic growth, environmental stability and social equity, while similar agreements in the Americas are focused on the sole objective of protecting foreign investment and international trade.

Compared with agreements concluded by the European Union, those signed by countries in the Americas are not fully-fledged governance instruments, as their aims and beneficiaries are determined on a much narrower basis than the broad principles of structural governance. This means that issues that could alter social balance and equity are considered outside the framework and guarantees of public and constitutional law.

There is no way of knowing what repercussions the trade- and investment-protection agreements signed by the region's countries will eventually have on the ecological sustainability of water as a resource and its associated services, and related social issues. Yet concerns have already been expressed about the use of such agreements to solve disputes. For instance, a considerable number of experts are seriously worried about the way in which international arbitration systems set up under the North American Free-Trade Agreement (NAFTA) and other trade- and investment-protection agreements affect countries' capacity to regulate public services and manage their natural resources. The reasons for this concern include the secret nature of procedures, the lack of obligatory precedent, the absence of principles of public interest, and the fact that the tribunals are *ad hoc* bodies comprised of members paid by the parties involved. Under constitutional common law (in countries such as the United States and the United Kingdom), there is a centuries-old precedent discrediting courts in which judges are paid on the basis of particular cases and their results.

In terms of concrete experiences, the decisions of international arbitration tribunals tend to restrict the power of governments to act in the public interest and in that of local communities. This is clearly relevant for water-related environmental matters, informal local customary interests and public services issues. Some agreements include stabilization clauses that affect the State's ability to adopt and improve regulations once the treaty has been signed. The combined effect of stabilization and most-favoured nation clauses can seriously erode public policy and hamper the protection of the public interest.

Serious questions are being raised about the functioning of international arbitration tribunals. However, it is unrealistic to expect international investment- and trade-protection treaties or arbitration mechanisms to be abolished, as they form an important part of the world economy. It is therefore necessary to think of ways to ensure that their principles and procedures are adjusted to their impact on countries' governance and on national environmental, social and economic sustainability.

In the drafting of international trade- and investment-protection agreements and contracts governing activities that can affect or be affected by environmental, social or economic public interest, it is therefore vital to establish the appropriate checks and balances. These include applying the general principles of law accepted by civilized nations or the principles of domestic law applied by the companies' countries of origin. Contracts could also specify the law to be applied or exceptions to agreements.

These agreements could also serve as an important invitation for States and companies to think responsibly by concluding contracts that can be reasonably adhered to. Another option is to introduce appropriate national legislation before agreements are signed. Other possibilities include insisting that certain issues or situations be examined by tribunals with specific specializations (in areas such as administrative law or macroeconomics), or certain qualifications, such as judges of high courts of countries renowned for their legal systems and use of precedents.

Source: Solanes (2005b).

to promote competition between applicants (see Box 21). Lastly, with regard to water as an agricultural input, its integration in the productive economy, in the case of Chile, has been strengthened by public policies that have considered not only the water use issues, but also the improvement of the quality of products, their timely presentation on external markets and the design of marketing systems appropriate for those purposes.

The conclusion is that the productive and sustainable integration of water into national socioeconomic development requires adequate evaluation of the incentives and subsidies to the private sector, realistic assessments of public projects and due consideration of the national macroeconomic situation, and the integration of the water component in public services and in value-added chains (Solanes, 2005a).

In this respect, it is important to note that, although all countries have laws and institutional frameworks, almost none has made an assessment of the role of water in the national economy (Solanes and Getches, 1998). Any attempt to draw up water legislation in line with national policies should be more firmly grounded in the general and subsectoral economics of the resource.[31]

Finally, recent experiences in many countries clearly point to the need to promote water resources planning (Ballestero and others, 2005). This is linked in part to the Plan of Implementation for the World Summit on Sustainable Development, which calls for the development of "integrated water resources management and water efficiency plans". This planning should be understood as a participatory exercise and indicative in nature, aimed at identifying main problems (gaps between water supply and various user demands, and institutional and governance shortcomings); coordinating the State's management and promotion activities and the private sector; and providing clear signals to water users with a view to maximizing the economic, social and environmental benefits of water resources in the long term. This implies, among others, the need for economic, social and environmental criteria and procedures for assessing public decisions relating to water resources, such as the granting of subsidies and guarantees or project financing. These procedures should be objective, compulsory and applied across the board.

[31] Studies to determine "who gets what from water?" and "who pays for what in water resources?", apart from answering these questions, would be positive in a variety of ways: they would develop an analytical methodology with which the elements of a systemic analysis could begin to be put together, aimed at achieving long-term equilibria and generating statements or suggestions on macro factors; they would make it possible to move beyond superficial examinations and statements and on to more substantive evaluations; they would also enable factors to be identified that cause inertia or deterioration in water resources management and use, and make it possible to coordinate management strategies; finally, such studies would allow an objective assessment to be made of the quality and extent of real effective public participation, and of the information on which this is based, with the possibility of suggesting policies for improvement.

Box 21

PROMOTION OF PRIVATE INVESTMENT IN MINOR IRRIGATION WORKS IN CHILE

The objective of Law N° 18.450, of 30 October 1985, on the promotion of private investment in irrigation and drainage works, is to increase the surface area under irrigation, improve the supply of water to areas where irrigation is insufficient, improve the efficiency of the application of irrigation water and bring new areas into agricultural use, either by remedying poor drainage or facilitating irrigation development. The State, through this Law, manages a programme of minor irrigation and drainage works which operates as a system of public competitions through which farmers can apply for a state subsidy.

Construction of the works is financed from private and state contributions. The State contribution is assigned through a competitive mechanism and project selection takes place through the allocation of points in accordance with the following factors: the financial contribution offered by the applicant, the surface area to benefit from the work to be carried out and the cost of the work. The projects are selected in order of priority according to the points obtained and the requests for fiscal support are covered by the resources available for the specific competition. Projects may be awarded a subsidy of up to 75% of the cost of the work. The maximum cost for a project for submission to the competition is about US$ 415,000 in the case of projects that benefit just one farm holding, and US$ 830,000 for collective projects and water users' organizations. A number of competitions are announced each year for specific irrigation and drainage purposes.

The operating procedure for implementing the Law includes the following principal characteristics: (i) farmers apply at the regional level; (ii) project selection is based on the three factors referred to above, on which basis they are assigned a particular number of points; (iii) construction of the works may begin prior to the announcement of the competition, before the completion of the competition or after award of the subsidy, but if the works begin prior to completion of the competition, the responsibility for financing is exclusively that of the user; (iv) the maximum period for construction is one year, which may be extended for a similar period if there is appropriate justification; and (v) the subsidy is paid when the work is approved by the National Irrigation Commission (CNR).

In 1990, the Council of Ministers found that, although there had been compliance with the general direction of the Law, the system had not facilitated mass participation from the group of small farmers. In fact, as the State makes the payment of the subsidy once the work has been carried out, the irrigator must pre-finance the construction from his/her own resources or apply to the financial system. As small farmers do not have access to adequate financing, in practice they are unable to apply for the subsidy. This observation led to a significant change of policy with the creation of a Subprogramme for Irrigation for Small Farmers, which now complements Law N° 18.450 by pre-financing the construction of the works and subsidizing the cost of producing the project studies.

In 1994, the changes of policy were approved by Parliament, giving rise to a modification of Law N° 18.450, which has provided for competitions to be held separately for entrepreneurs and small farmers and other types of producers, by area, by type of works, etc. In general, these changes have made it possible to focus the subsidies in accordance with the different socioeconomic situations that exist in the country's agricultural sector.

Experience indicates that the implementation of Law N° 18.450 has given a boost to Chilean agriculture. It has received broad acceptance and is made use of by farmers with properties of different sizes. The success of this legal initiative is due to the application of a policy that is different to the policies traditionally followed in the countries of the region, where the State takes on the major role in the planning and implementation of irrigation and drainage programmes. In this case, the initiative for implementing small irrigation and drainage works is left in the hands of private farmers and the State takes on the role of encouraging such investment. Other characteristics of this development programme include the following: (i) the subsidies are focused on economically and socially viable projects, so that the private party must contribute part of the total cost of the project and fully finance implementation of the project before receiving the subsidy; and (ii) the system is transparent, as the subsidies are allocated through public competitions that are duly publicized.

Source: Pereira and Gross (2004).

Conclusions

A. The lack of universal and simple answers

As water is so closely linked to society, economy and the environment, there are no simple or easy answers that guarantee governance. The only possible suggestion is that although governance may be expressed in different organizational systems and its formal content arranged differently (such as laws and institutional arrangements), every society has natural conditions, power groups, power structures, and requirements that must be considered specifically in the process of designing the system. Otherwise, there is a risk of ignoring factors necessary to ensure viability. The following considerations merit particular mention:

- **The prevalent ethnic and cultural characteristics**, as deeply rooted views of the world may prove decisive in applying certain management systems. In Chile, for example, the principle of individual allocation of water rights has been waived for Aymará and Atacameña communities.
- **The institutional history of the sector**, considering that this history has generated practices used for generations in many communities and these frequently comprise an extremely valuable social capital for effective water governance.
- **The economic framework, social and economic ideas and practices prevalent in the society, the capacities of the different players involved and their socioeconomic conditions**. For example, the creation of market incentives in

the water sector cannot be the result of applying public policies divorced from the general development trend of the society.

- **The management capacity of the State**, as this may restrict the practical possibilities for efficient implementation of certain institutional arrangements.
- **Geographical characteristics**, for example, the manner in which water is perceived is very different where it is a scarce resource compared to areas where it is in abundance. This kind of difference may require that even within a single country, different regions require different regimes.
- **The characteristics of different water sectors and their associated public services** may be different even within one country. For example, while governance of water as a resource has experienced significant progress recently in Brazil, it has become clear that the governance of drinking water supply and sanitation services has been limited by the lack of an adequate management framework, ideological differences and other factors.

It is also important to remember that globalization affects governance in many ways. External agents and factors influence internal processes, more so now than ever before. The most important consideration is to be aware of the phenomenon and to identify those external factors or conditions that may most seriously affect governance.

B. Lessons and general consensus

Despite the comments above, one must be aware, when the management of a resource or its associated public services consistently shows certain characteristics, that this is not due to a lack of innovative capacity of the sector, but probably due to the nature of the resource or services involved. This is clear from the typical characteristics of the legislation governing water and its associated public services. In this respect, some considerations are tentatively presented that, in the light of practical experiences, may be considered to be generally valid.

In **water legislation**:

- Water laws must clearly state that water belongs to the public domain of the State.
- Water laws must determine specifically that water use rights, when granted under conditions of, or which aim at, effective and beneficial use and that do not cause environmental damage, are protected by private property clauses in the constitution. This is a basic legal element present in the systems that have successfully promoted private investment in the development and conservation of water resources.
- However, and provided there is no functional curtailment of the economic value of water rights, the laws may allow for the exercise of these rights to be generally regulated as needed for ecological and social sustainability, and in the public interest.
- Systems of water rights and the regulations guiding their allocation should be uniform without exception and have the highest legal status, to prevent manipulation by special interest groups.
- In this context, water rights are allocated when there is enough available water flow, when third party rights and ecological requirements are not affected, and when, in accordance with the opinion of water administration, the request is in the public interest regarding water use.

- The only functional priorities for the allocation of water rights when requested ought to be those for drinking water supply and sanitation purposes, subject to safeguards for ensuring that this does not prevent the generation of clear signals regarding the scarce nature of existing water supplies, and it does not lead to inefficient use arising from this privilege. Such considerations should not affect the preservation of minimum flows and levels for ecological reasons. In cases of concurrent uses for other purposes, water authorities must carefully assess their merits and, if the uses are equivalent, then they must be allocated on the basis of economic tender, order of application, or some other relevant criteria.
- Water laws should establish, as a condition for the acquisition and maintenance of water rights, that the holders of such rights have to pay the corresponding financial charges.
- Countries should allow the trading of water rights between or within user sectors, subject to adequate regulation in the light of social, economic, environmental and public interest considerations.
- In the case of water rights and uses that were in existence prior to the legislative change, including traditional and indigenous uses, they should be recognized in accordance with their effective and beneficial, historical and current use, without this affecting the possibility of imposing appropriate regulations.
- There is a need for integrated water planning to satisfy economic objectives, environmental requirements and social concerns, through the generation of a shared vision regarding the future evolution of water availability and use at the river basin level.
- It is important to develop a public information system covering all elements affecting resource management, giving transparency to the actions affecting water, which is part of the public domain.
- The procedures for implementing these important considerations must ensure their continued effectiveness.

There are some fundamental principles for the **regulation of drinking water supply and sanitation services**:

- Universal and non-discriminatory service.
- Adequate quantity and quality of service.
- Reasonable tariffs and profits. It is important to bear in mind that privatization does not miraculously make unprofitable operations profitable.
- A subsidy system that avoids as far as practicable cross-subsidies and that guarantees the low-income groups a basic minimum supply.
- Control of transfer prices, holdings and intra-holding transactions.
- The right to adequate and opportune information, both for the regulators and for customers.
- Obligatory uniform regulatory accounting.
- Use of essential facilities.
- Rights to opportune and adequate inspection and participation.
- Maximum use of economics of scale and scope.

Regarding **centralization and decentralization**:

- Depending on the activities involved, determine the appropriate level for decentralization or centralization, in accordance with technical considerations and economies of scale and scope.
- Separate the requirements of decentralized activities and their technical management from political influences, in order to ensure viability and effectiveness through the necessary legal, financial and control methods.
- Preserve a residual capacity at the central level, to promote or implement the necessary activities or measures in the event of decentralized bodies being negligent or unable to carry out their functions.
- Design systems in which administered parties and users have swift and expeditious access to justice.
- Clearly establish the legal obligations of the decentralized system and make its administration personally responsible for violations thereof.
- National legislation should recognize the two basic principles that govern disputes between decentralized authorities: (i) equity and reasonableness; and (ii) not causing significant harm.

Regarding **water management institutions**:

- The authority responsible for water allocation and management should be independent from sector influences, with authority and resources in line with its responsibility.
- Inserting water management within environmental agencies may result in minimizing its effect as a socioeconomic development factor.
- Therefore, it seems appropriate that the water resources have their own stable and independent institutions, even when these are closely linked to institutions responsible for the strategic vision of national development.
- In general, administrative bodies of a collegiate type have not given good results, for which reason policies ought to aim at creating non-collegiate entities, while enabling sectoral agencies or interests to be brought in for purposes of consultation or participation.
- Adequate administration presupposes precise definition of its functions, duties and faculties, and the rights of administered parties and the public in general, under supervision of the judicial system for legality and arbitrariness.
- Water-related decision-making has economic content, and special interest group pressures can promote or dissuade such decisions. Accordingly, water authorities should have independent budgets and chief executives appointed for fixed terms and protected from arbitrary removal.
- River basin level organizations are valid options for water management. Critical requirements for their creation include a precise definition of their specific exclusive functions focused on water resources, and adequate authority and funding.
- User organizations are useful management structures; however, they cannot replace the State, as they have inherent limitations and must be subject to appropriate government controls. They should normally be organized under public law.

- A conflict resolution system should exist which provides an appropriate balance between the water administration, the user organizations, and the courts, and defines the limits of their authority.
- There are decisions related with water and its associated public services that are directly linked to governance, because of the impact that they have on economic and social stability. These considerations should be appropriately dealt with in trade and investment protection treaties.

Regarding **regulatory agencies for drinking water supply and sanitation services**:

- Clear institutional separation between the functions of sector policy formulation, regulation and provision of services.
- The system to be regulated should be manageable. It is not realistic to assume that, for example, hundreds of service providers can be effectively regulated or controlled. Consolidation is often necessary due to its advantages with respect to economies of scale and the requirements of control.
- The regulator must have independence and stability, and be subject to rules of good conduct and ethics.
- The regulator must have the necessary powers and resources.
- The regulator must have appropriate legal capacities.

One limitation that administrative systems seem to share at every level is a notorious lack of operational capacity, due to various factors, including limited financial, human and legal resources and, at times, the lack of importance given to the role of regulation and management. This is the consequence of a poor understanding of the fact that an administration's roles, adequately defined functions, scope, structure and controls are all vital for the management of a complex resource such as water. Indeed, an appropriate definition of the roles of the administration is vital for protecting sustainable management, the user community and the general public from monopolies and special interests, both in this particular context and more generally.

C. The process of building effective water governance

It is important to analyze the routes that may allow for progress in constructing the appropriate governance frameworks for the water sector. Latin American and Caribbean countries offer innumerable examples of frustrated reforms to the sector and of efforts which, once legally approved, have ended up dead letters, far removed from the purpose for which they had been adopted in the first place (for example, in Chile the control of industrial pollution was made law many decades before it could be made effective).

If the source of the reforms that have been attempted is analyzed, it can be seen that frequently changes in the water sector are merely a reflection of reforms initiated in other areas of the public administration, which in turn have answered to shifts in the ideological or economic paradigms of society. For example, in Chile, the social movements that gave rise to agrarian reform imposed a change in water legislation in 1969. Later the transformation of society with the adoption of a neoliberal perspective required once again a change in the water law, as exemplified in the legislation of 1981. In both cases, the reforms which can be considered to be consolidated and effectively incorporated into water management are those that, divorced from all ideology, have appropriately answered the nature of the problems posed by water resources management and have been in tune with conceptions and practices of the society (see Box 22) (Peña, 2004).

Box 22

THE PROCESS OF BUILDING EFFECTIVE WATER GOVERNANCE IN CHILE

Water resources policies are the result of a complex interplay of forces within society, and of all the forces involved, only a few belong to the water sector as such, while the main ones come from other dynamics in society, in particular the prevailing views in terms of ideology and national development strategy. The water institutions currently in place originated from societal forces and the challenges that arise alongside economic growth, and are not the result of an overall design and coherent structure thought out from the start. In other words, the institutions have been fine tuned and balanced until the gaps of the original blueprint were filled in. Moreover, it can be seen from the Chilean case that both the positive and negative impacts of policies may be very slow to appear and may vary significantly according to the geographical area of the country and the user sector analyzed.

The above would suggest that, under certain conditions, the appropriate strategy for the water sector might be a step-by-step approach to policy change. It would be governed by realistic and pragmatic criteria to address the most urgent and accessible tasks, rather than being a proposal of global reforms developed as a sort of "water fundamentalism", which aims to resolve all problems, including those that are not urgent or hypothetical situations that might arise in the very distant future, concerning which there is insufficient social awareness (despite the fact that they are obvious to the experts) or for which society does not yet have the resources to provide an effective solution.

It must be kept in mind that in order to implement policies, the funding issue must be resolved. In this regard, the Chilean case clearly shows a rigorous increase over time in the social goals of the water sector, although this is probably closely linked to overall political change in the country, rather than being the result of design. Nevertheless, the point is that investment in pollution control, for example, is being pursued in the country now that significant advances have been made with respect to other goals (such as drinking water supply and sewerage coverage) and now that the population has doubled its per capita income. Moreover, the increase in water tariffs, which surprisingly did not meet with any significant social reaction, coincided with a period of economic growth and strong gains in real wages. Undoubtedly, the same process would have had a different outcome in a recession. This analysis suggests that great care should be taken in the proposal of policies and social goals to maintain an appropriate balance between the actual possibilities of the country, a consideration that is also valid in relation to designing financing modalities.

Discipline in relation to public investment was another factor of considerable weight. This discipline emerged with the initial reforms and was later maintained by the high level of consensus and the need to maintain macroeconomic equilibria. In practice, this has meant that for both public works and subsidies for privately funded projects of public interest, emphasis has been placed on minimum returns and their contribution to national socioeconomic development, as criteria for approval. Moreover, there is a system that prioritizes investments according to economic and social assessments.

Despite various successful experiences, it is important to acknowledge the fact that there has been little success in the agricultural sector in recovering the costs incurred with large hydraulic works. However, given the fact that public investment activities must pass an economic profitability test from a social standpoint, progress is being made with respect to new modalities that will explicitly detail the resulting profitability of such investments. This is done using a system of tenders for the concession of construction, operation, maintenance and charging users in the case of large-scale irrigation projects.

Another notable feature of the evolution of development and public policy in Chile is the issue of the environment. Threats to the environment are certainly increasing as a result of greater demand for natural resources. However, investment in pollution control is also being substantially increased and there is greater concern in policy-making for controlling environmental impacts. The process of globalization itself plays a significant role in this response of water policy, in the sense that it allows the transfer of experiences and technology from more developed countries and encourages the establishment of international standards. As a result of the above, if the levels of water pollution seen in the 1980s are compared to current levels, the current situation is clearly more favourable.

Source: Peña, Luraschi and Valenzuela (2004).

Since the 1960s, Peru has made several attempts at reform of its legislation with, in some cases, the proposed legislation being based mainly on political, economic and financial considerations. These projects proposed the creation of non-regulated water markets, ignoring local conditions, traditional uses and the nature of the resource itself. These proposals were stopped because of criticisms made by national, regional and United States professional advisors. Bolivia has made numerous attempts at reform during the last twenty years, without there being a water law to date. This is due to the difficulties of trying to reconcile the legitimate grievances of traditional users with a model for water resources management more closely linked to the aims of economic development. The experience of many other countries of the region is also indicative of the difficulties of seeking broad social consensus on the reform of water legislation.

There are, as well, reforms of the water sector arising from internal processes independent of the various existing decision-making powers in society. This route is generally slow and difficult, as it means breaking the characteristic limitations of the water sector and the reductionism prevalent in many decision-making spheres, making it especially difficult to engage them on water-related issues. An interesting example of this is found in Brazil, where water resources specialists managed, after years of effort, to get their legal and organizational proposals accepted at the political level in such a way that they reflected the consensus reached by the water professionals. The importance of this case lies in the fact that it is the result of a discussion that was fundamentally national in nature and so has a solid basis for long-term consolidation.

Something similar could be said of the process that led to the current drinking water supply and sanitation regulation framework in Chile. Here too, the catalyst was the specifically national experience of the sector in regulation, and the transformation process generated strong involvement of the government, the congress and public opinion. Also worthy of note is the case of the 1992 national water law of Mexico, which was the response of the most prestigious Mexican water professionals to changes in the role assigned to the State and to the introduction of the use of economic incentives for improved management.

The information presented demonstrates that it is not necessary to wait for a general improvement in the governance situation of a country in order to foster initiatives in the water sector. Thus, the regional association and interaction of motivated and aware professional groups may prove decisive in improving sector governance problems and in giving technical viability to proposals for change. Also fundamental is the dissemination and opening up of the debate to the public, the various interested parties, and a wide range of decision-makers, so as to guide the search for effective solutions to existing problems. As long as a basic consensus is not reached at the various levels, and this consensus does not get through to the political world, there will be little hope for solid progress in the region.

In this respect, it is important to point out that, experience also shows that it is counterproductive to move forward with reform proposals without a prior process of coordination and construction of specific agreements on existing and concrete situations (Pochat, 2005). 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 legislation and organizational structures that were achieved elsewhere only after a significant effort of coordination.

It is not sufficient to have reform proposals that are drafted by experts: it is essential that such proposals are based on previous agreements as to what are the problems and how they should be tackled (Pochat, 2005). If such agreements do not exist and no true climate of confidence has been created, then any proposed reform, or even adopted legislation, 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.

This illustrates the scope of the efforts made at the international level for promoting integrated water resources management. In effect, as human society becomes ever more complex and the intensity of human impact on natural resources becomes more severe, the need to integrate the different elements of water management becomes imperative. In a simpler context, these elements are assumed by society in a fragmented manner without serious difficulty. A careful analysis of the contradictions arising from approaching water problems from the socioeconomic point of view (characterized by its fragmentation into multiple entities and ways of acting) and from the natural world (as seen by the intrinsic unity of hydraulic processes) shows definite inefficiencies, lost opportunities for better solutions and generalized conflicts in water management. In summary: loss of governance in the sector.

Water resources management often presents problems requiring a holistic approach. Among these the following are most significant: coordination of supply and demand policies, policies for the quality and quantity of water resources, the joint use of surface and groundwaters, the multiple use of resources, coordinated management of land use, vegetation cover and water, management of externalities, and environmental conservation policies. In accordance with the above, the GWP has defined integrated water resources management as a process promoting coordinated management and development of water, land and related resources, aiming to maximize the resultant social and economic welfare equably, yet without compromising the sustainability of vital ecosystems (GWP, 2000b). According to this concept, integrated management is not an end in itself. It is a means, or more precisely, a "process", a way of approaching dynamic water resources management, characterized by abandoning reductionism. Its urgency depends on concrete situations, being lesser in river basins having a low level of water resources exploitation and low levels of human impact, and in all cases it assumes progressive development ("a process").

Summing up, it implies a major cultural change, reflecting a progression away from the industrial society, which is characterized by specialization (reductionism), pyramidal structure (planning), and abundant resources, placing the emphasis on infrastructure, as is reflected to some extent in the Mar del Plata Declaration (United Nations Water Conference, Mar del Plata, 14-25 March 1977), and towards the post-industrial society (based on knowledge), characterized by integration (holistic), participation and negotiation, the awareness of limited resources, and placing the emphasis on management, as is reflected in the Dublin Declaration (International Conference on Water and Environment (Dublin, Ireland, 26-31 January 1992) (ECLAC, 1998). It is for these reasons that effective water governance will be more and more closely linked to integrated water resources management.

Bibliography

Alcázar, Lorena; Manuel Abdala and Mary Shirley (2000), *The Buenos Aires water concession*, Policy Research Working Paper N° 2311, World Bank, April, Washington, D.C. (http://econ.worldbank.org).

Ángel, Jorge Enrique (2003), "Calculo y fijación de tarifas de agua potable y alcantarillado sanitario en 4 países miembros de ADERASA", *Tercer Encuentro de la Asociación de Entes Reguladores de Agua Potable y Saneamiento de las Américas (23-25 de Septiembre de 2003, Santiago de Chile)* (http://www.siss.cl).

Arbor, Xavier and Salvador Giner (1996), *La gobernabilidad: ciudadanía y democracia en la encrucijada mundial*, Siglo Veintiuno de España Editores, Madrid, Spain.

Azpiazu, Daniel and Martín Schorr (2001), "Desnaturalización de la regulación pública y ganancias extraordinarias", *Revista realidad económica*, N° 184, 16 November-31 December, Buenos Aires.

Ballestero, Maureen; Ernesto Brown; Andrei Jouravlev; Ulrich Küffner and Eduardo Zegarra (2005), *Administración del agua en América Latina: situación actual y perspectivas*, Economic Commission for Latin America and the Caribbean (ECLAC), Recursos Naturales e Infraestructura series N° 90, LC/L.2299-P, March, Santiago, Chile (http://www.eclac.org).

Barraqué, Bernard (1993), "Water management in Europe: beyond the privatization debate", *Economia delle Fonti di Energia e dell'Ambiente*, N° 3, March.

Bauer, Carl Jonathan (1998), *Against the current: privatization, water markets, and the State in Chile*, Kluwer Academic Publishers, Massachusetts.

Bitrán, Eduardo and Pablo Serra (1998), *Regulation of privatized utilities: the Chilean experience*, Universidad de Chile, Santiago, Chile.

Booker, Alan (1999), "Former Ofwat boss attacks ''excess profits' in South", *Source Bulletin*, N° 7, October (http://www.wsscc.org).

Briscoe, John (1996), *Water resources management in Chile: lessons from a World Bank study tour*, World Bank, Washington, D.C.

Bustamante, Rocio (2002), *La guerra del agua o la resistencia contra el intento de privatización y tarifación del agua en Cochabamba, Bolivia*, South American Technical Advisory Committee (SAMTAC), Global Water Partnership (GWP).

Bustos, Álvaro and Alexander Galetovic (2002), "Regulación por empresa eficiente: ¿Quién es realmente usted?", *Estudios públicos*, N° 86, Autumn.

Cano, Guillermo and Joaquin Lopez (1976), *Las cuencas hídricas como unidades óptimas para la planificación y administración de los recursos hídricos: participación de los usuarios en tales actividades*, Zaragoza, Spain.

Chisari, Omar; Antonio Estache and Carlos Romero (1997), *Winners and losers from utility privatization in Argentina: lessons from a general equilibrium model*, Policy Research Working Paper Nº 1824, World Bank, September, Washington, D.C. (http://www-wds.worldbank.org).

Ciriacy-Wantrup, Siegfried (1951), "Dollars and sense in agriculture", *Circular*, Nº 402, California Agricultural Experiment Station (http://www.economics.nrcs.usda.gov).

Colby, Bonnie (1995), "Regulation, imperfect markets, and transaction costs: the elusive quest for efficiency in water allocation", in Daniel Bromley (Editor), *Handbook of environmental economics*, Basil Blackwell.

___ (1987), "Do water markets work? Market transfers and trade offs in the Southwestern states", *Water Resources Research*, Volume 23, July, Nº 7.

Colby, Bonnie and David Bush (1987), *Water markets in theory and practice: market transfers, water values, and public policy*, Westview Press, Boulder, Colorado.

Colby, Bonnie; David Bush, William Martin and Thomas Brown (1987), "Do water market prices appropriately measure water values?", *Natural Resources Journal*, Volume 27, Summer, Nº 3.

Corrales, María Elena (2003), *Gobernabilidad de los servicios de agua potable y saneamiento en América Latina*, South American Technical Advisory Committee (SAMTAC), Global Water Partnership (GWP).

___ (2002), "Diferentes niveles de equilibrio para garantizar la gobernabilidad", *Foro electrónico sobre la gobernabilidad efectiva del agua*, Global Water Partnership (GWP), 16 July (http://espanol.groups.yahoo.com/group/gobernabilidad-agua).

Crespo, Carlos (2000), *A propósito de la guerra del agua*, unpublished.

Delgado, José (1999), *Situación y perspectivas de la regulación de los servicios de utilidad pública en Colombia*, Cali.

Demsetz, Harold (1967), "Toward a theory of property rights", *The American Economic Review*, Number 2, May.

DePalma, Anthony (2001), "Obscure tribunals settle disputes, but go too far, critics say", *New York Times*, 11 March.

Diaz, Edgardo and Armando Bertranou (2003), *Investigación sistémica sobre regímenes de gestión del agua. El caso de Mendoza. Argentina*, South American Technical Advisory Committee (SAMTAC), Global Water Partnership (GWP).

Donoso, Guillermo (2003), *Mercados de agua: estudio de caso del Código de Aguas de Chile de 1981*, Pontificia Universidad Católica de Chile, July, Santiago, Chile.

Donoso, Guillermo and Oscar Melo (2004), *Water institutional reform: its relationship with the institutional and macroeconomic environment*, Pontificia Universidad Católica de Chile, May, Santiago, Chile.

Dourojeanni, Axel and Andrei Jouravlev (2001), *Crisis de gobernabilidad en la gestión del agua (Desafíos que enfrenta la implementación de las recomendaciones contenidas en el capítulo 18 del Programa 21)*, Economic Commission for Latin America and the Caribbean (ECLAC), Recursos Naturales e Infraestructura series Nº 35, LC/L.1660-P, December, Santiago, Chile (http://www.eclac.org).

___ (1999), *El Código de Aguas de Chile: entre la ideología y la realidad*, Economic Commission for Latin America and the Caribbean (ECLAC), Recursos Naturales e Infraestructura series Nº 3, LC/L.1263-P, October, Santiago, Chile (http://www.eclac.org).

Dourojeanni, Axel; Andrei Jouravlev and Guillermo Chávez (2002), *Gestión del agua a nivel de cuencas: teoría y práctica*, Economic Commission for Latin America and the Caribbean (ECLAC), Recursos Naturales e Infraestructura series Nº 47, LC/L.1777-P, August, Santiago, Chile (http://www.eclac.org).

DWR (Department of Water Resources) (1993), *Water transfers in California: translating concept into reality*, Sacramento, California (http://www.water.ca.gov).

ECLAC (Economic Commission for Latin America and the Caribbean) (2006), *Social panorama of Latin America 2005*, LC/G.2288-P, March, Santiago, Chile (http://www.eclac.org).

___ (2005a), *Recursos hídricos y agricultura en el Istmo Centroamericano*, ECLAC Subregional Headquarters in Mexico, LC/MEX/L.658, 22 April, Mexico, D.F. (http://www.eclac.org).

___ (2005b), *The Millennium Development Goals: a Latin American and Caribbean perspective*, LC/G.2331-P, March, Santiago, Chile (http://www.eclac.org).

___ (2005c), *Statistical yearbook for Latin America and the Caribbean, 2004*, LC/G.2264-P, April, Santiago, Chile (http://www.eclac.org).

___ (2004a), *Social panorama of Latin America 2004*, LC/G.2259-P, November, Santiago, Chile (http://www.eclac.org).

___ (2004b), *Productive development in open economies*, LC/G.2234(SES.30/3), 18 June, Santiago, Chile (http://www.eclac.org).

___ (2001a), "Editorial remarks", *Circular of the Network for Cooperation in Integrated Water Resource Management for Sustainable Development in Latin America and the Caribbean*, Nº 12, January, Santiago, Chile (http://www.eclac.org).

___ (2001b), *El espacio regional. Hacia la consolidación de los asentamientos humanos en América Latina y el Caribe*, LC/G.2116/Rev.1-P, May, Santiago, Chile (http://www.eclac.org).

___ (2000), *Equity, development and citizenship*, LC/G.2071(SES.28/3), 6 March, Santiago, Chile (http://www.eclac.org).

___ (1998), *Recomendaciones de las reuniones internacionales sobre el agua: de Mar del Plata a París*, LC/R.1865, 30 October, Santiago, Chile (http://www.eclac.org).
___ (1997), "Editorial remarks", *Circular of the Network for Cooperation in Integrated Water Resource Management for Sustainable Development in Latin America and the Caribbean*, N° 6, December, Santiago, Chile (http://www.eclac.org).
___ (1995), *Mercados de derechos de agua: entorno legal*, LC/R.1485, 9 January, Santiago, Chile (http://www.eclac.org).
___ (1994a), *Agenda 21 and integrated water resources management in Latin America and the Caribbean*, LC/G.1830, 12 April, Santiago, Chile.
___ (1994b), *Políticas públicas para el desarrollo sustentable: la gestión integrada de cuencas*, LC/R.1399, 21 June, Santiago, Chile (http://www.eclac.org).
___ (1990), *Latin America and the Caribbean: financing water-related investments in the eighties*, LC/R.904, 11 July, Santiago, Chile.
___ (1989), *La gestión de los recursos hídricos en América Latina y el Caribe*, LC/G.1523-P, April, Santiago, Chile.
___ (1985), *Los recursos hídricos de América Latina y el Caribe y su aprovechamiento. Informe sobre los avances logrados en la aplicación del Plan de Acción de Mar del Plata*, LC/G.1358, August, Santiago, Chile.
ECLAC (Economic Commission for Latin America and the Caribbean)/GTZ (German Agency for Technical Cooperation) (2004), *Renewable energy sources in Latin America and the Caribbean: situation and policy proposals*, LC/L.2132, 19 May, Santiago, Chile (http://www.eclac.org).
Estache, Antonio, José-Luis Guasch and Lourdes Trujillo (2003), *Price caps, efficiency payoffs and infrastructure contract renegotiation in Latin America*, Policy Research Working Paper N° 3129, World Bank, August, Washington, D.C. (http://www-wds.worldbank.org).
FAO (Food and Agriculture Organization of the United Nations) (2004), *The state of agricultural commodity markets 2004*, Rome, Italy (http://www.fao.org).
Gerchunoff, Pablo and Guillermo Cánovas (1993), *Las privatizaciones en la Argentina: impactos micro y macroeconómicas*, Buenos Aires, Instituto Torcuato Di Tella.
Getches, David (1990), *Water law in a nutshell*, West Publishing Company.
Gewen, Barry (2002), "Beware of false profits: an economist has high praise for both free markets and government regulations", *New York Times Book Review*, 16 June.
Gray, Philip and Timothy Irwin (2003), "Allocating exchange rate risk in private infrastructure projects", *Public Policy for the Private Sector*, Number 266, December, World Bank, Washington, D.C. (http://rru.worldbank.org).
GWP (Global Water Partnership) (2000a), *Towards water security: a framework for action*, Stockholm, Sweden (http://www.gwpforum.org).
___ (2000b), *Integrated water resources management*, Technical Advisory Committee (TAC), Stockholm, Sweden (http://www.gwpforum.org).
Haddad, Brent Michel, (1996), *Evaluating the market niche: why long term rural-to-urban interregional markets for water have not formed in California*, University of California, Berkeley.
Holtram, Gerald and John Kay (1994), "The assessment: institutions of policy", *Oxford Review of Economic Policy*, Volume 10, Number 3, Autumn.
IISD (International Institute for Sustainable Development) (2001), *Private rights, public problems. A guide to NAFTA's controversial chapter on investor rights*, Winnipeg, Manitoba, Canada (http://www.iisd.org).
INELA (Instituto de Economía, Legislación y Administración del Agua) (1976), *Administración hídrica en América Latina*, Instituto Nacional de Ciencia y Técnica Hídricas (INCYTH), Mendoza, Argentina.
Jones, Douglas (1992), "Discussion of: 'Regulatory reform for diversified public utilities: for better or for worse?' by Ronald Braeutigam", *Resources and Energy*, Volume 14, Number 1/2, April.
Jouravlev, Andrei (2004), *Drinking water supply and sanitation services on the threshold of the XXI century*, Economic Commission for Latin America and the Caribbean (ECLAC), Recursos Naturales e Infraestructura series N° 74, LC/L.2169-P, December, Santiago, Chile (http://www.eclac.org).
___ (2003), *Acceso a la información: una tarea pendiente para la regulación latinoamericana*, Economic Commission for Latin America and the Caribbean (ECLAC), Recursos Naturales e Infraestructura series N° 59, LC/L.1954-P, August, Santiago, Chile (http://www.eclac.org).
___ (2000), *Water utility regulation: issues and options for Latin America and the Caribbean*, Economic Commission for Latin America and the Caribbean (ECLAC), LC/R.2032, 11 October, Santiago, Chile (http://www.eclac.org).
Kemper, Karin (1996), "The cost of free water. Water resources allocation and use in the Curu Valley, Ceará, Northeast Brazil", *Linköping Studies in Arts and Science*, N° 137, Kanaltryckeriet i Motala AB, Motala.
Laffont, Jean Jacques and Jean Tirole (1993), *Theory of incentives in procurement and regulation*, Massachusetts Institute of Technology, The MIT Press.
___ (1991), "The politics of government decision making: a theory of regulatory capture", *The Quarterly Journal of Economics*, N° 427, November.
Lee, Terence (1990), *Water resources management in Latin America and the Caribbean*, Westview Press, Boulder, Colorado.

Lee, Terence and Andrei Jouravlev (1998), *Prices, property and markets in water allocation*, Economic Commission for Latin America and the Caribbean (ECLAC), Medio Ambiente y Desarrollo series N° 6, LC/L.1097, February, Santiago, Chile (http://www.eclac.org).

Lentini, Emilio (2004), "La participación privada en los servicios de agua y alcantarillado. La experiencia de la concesión de Buenos Aires", *IV Seminario Internacional CYTED-XVII "Un enfoque integrado para la gestión sustentable del agua. Experiencias en gestión y valoración del agua" (29-31 de marzo de 2004, San José, Costa Rica)*.

Livingston, Marie Leigh (1993), *Designing water institutions. Market failures and institutional response*, Policy Research Working Paper N° 1227, World Bank, December, Washington, D.C. (http://www-wds.worldbank.org).

Lloyd, John (1999), "The Russian devolution", *New York Times Magazine*, 15 August.

Matsukawa, Tomoko; Robert Sheppard and Joseph Wright (2003), "Foreign exchange risk mitigation for power and water projects in developing countries", *Energy and Mining Sector Board Discussion Paper*, N° 9, December, World Bank, Washington, D.C. (http://pppue.undp.org).

Mattos, Roger and Alberto Crespo (2000), *Informe nacional sobre la gestión del agua en Bolivia*, South American Technical Advisory Committee (SAMTAC), Global Water Partnership (GWP).

McKechnie, Sheila (1998), "Public services, public voices", *New Statesman*, 24 July.

McMillan, John (2002), as cited in Gewen (2002).

NWC (National Water Commission) (1972), *Water resources planning*, U.S. Department of Commerce, Springfield.

OLADE (Latin American Energy Organization) (2004), *Energy statistics*, Version N° 16, October, Quito, Ecuador (http://www.olade.org).

Olson, Mancur (1982), *Rise and decline of nations: economic growth, stagflation, and social rigidities*, New Haven, Yale University Press.

Orphanópoulos, Damaris (2003), "Conceptos de la legislación sanitaria chilena: tarifas eficientes y subsidios focalizados", *Precio del agua y participación pública-privada en el sector hidráulico*, Mexico City, Third World Centre for Water Management.

PAHO (Pan American Health Organization) (2001), *Regional report on the evaluation 2000 in the region of the Americas: water supply and sanitation, current status and prospects*, Washington, D.C.

___ (1990), *Situación del abastecimiento de agua potable y del saneamiento en la región de las Américas al finalizarse el decenio 1981-1990, y perspectivas para el futuro*, Washington, D.C.

Palast, Greg (1996), "Secrecy, democracy and regulation", *Consumer Policy Review*, July/August, Volume 6, Issue 4.

Peña, Humberto (2005), "Meaning and scope of Water Code reform in Chile", *Circular of the Network for Cooperation in Integrated Water Resource Management for Sustainable Development in Latin America and the Caribbean*, N° 22, August, Economic Commission for Latin America and the Caribbean (ECLAC), Santiago, Chile (http://www.eclac.org).

___ (2004), "Chile: 20 años del Código de Aguas", *Mercados (de derechos) de agua: experiencias y propuestas en América del Sur*, Guillermo Donoso, Andrei Jouravlev, Humberto Peña and Eduardo Zegarra, Economic Commission for Latin America and the Caribbean (ECLAC), Recursos Naturales e Infraestructura series N° 80, LC/L.2224-P, November, Santiago, Chile (http://www.eclac.org).

Peña, Humberto and Ernesto Brown (2004), *Investigación sistémica sobre regímenes de gestión del agua. El caso de Chile*, South American Technical Advisory Committee (SAMTAC), Global Water Partnership (GWP).

Peña, Humberto; Marco Luraschi and Soledad Valenzuela (2004), *Agua, desarrollo y políticas públicas. Estrategias para la inserción del agua en el desarrollo sostenible*, South American Technical Advisory Committee (SAMTAC), Global Water Partnership (GWP).

Pereira, Nelson and Marcelo Gross, *Fomento a la inversión privada en obras menores de riego y drenaje. El caso de Chile*, South American Technical Advisory Committee (SAMTAC), Global Water Partnership (GWP).

Phillips, Charles (1993), *The regulation of public utilities. Theory and practice*, Arlington, Virginia, Public Utilities Reports.

Pistonesi, Héctor (2005), "La construcción de mercados de competencia en los sistemas eléctricos de América Latina: presupuestos y realidades", *Seminario sobre Regulación de Servicios de Infraestructura: Agua y Electricidad*, 18 and 19 October 2005, Santiago, Chile.

Pochat, Víctor (2005), *Entidades de gestión del agua a nivel de cuencas: experiencia de Argentina*, Economic Commission for Latin America and the Caribbean (ECLAC), Recursos Naturales e Infraestructura series N° 96, LC/L.2375-P, October, Santiago, Chile (http://www.eclac.org).

Rodríguez, José (2002), *Contabilidad regulatoria. Aplicación en el sector sanitario chileno*, Superintendencia de Servicios Sanitarios (SISS), Santiago, Chile.

Rogers, Peter (2002), *Water governance in Latin America and the Caribbean*, Inter-American Development Bank (IDB), Washington, D.C. (http://www.iadb.org).

___ (1993), "The value of cooperation in resolving international river basin disputes", *Natural Resources Forum*, Volume 17, Number 2, May.

Rosenberg, Tina (2002), "The free-trade fix", *New York Times Magazine*, 18 August.

Rozo, Javier (2003), "Regulación en agua potable y saneamiento básico", *Conferencia "Regulación y Situación actual del Sector Agua Potable y Saneamiento Básico"*, Bogotá, Colombia, 23 May, Observatorio de Servicios Públicos Domiciliarios, Facultad de Economía, Universidad Externado de Colombia (http://www.uexternado.edu.co).

Sappington, David (1993), "Comment on 'Regulation, institutions, and commitment in telecommunications', by Levy and Spiller", *Proceedings of the World Bank Annual Conference on Development Economics. 1993*, Michael Bruno and Boris Pleskovic (Editors), World Bank, Washington, D.C.

SIGEN (Sindicatura General de la Nación) (2002), *Ente Tripartito de Obras y Servicios Sanitarios (ETOSS). Análisis de contratación de Aguas Argentinas*, Buenos Aires (http://www.sigen.gov.ar).

SISS (Superintendencia de Servicios Sanitarios) (2006), *Evolución histórica de la cobertura de tratamiento de aguas servidas nacional*, Santiago, Chile (http://www.siss.cl).

___ (2003), *Aguas claras*, Santiago, Chile (http://www.siss.cl).

___ (2002), *Corte de Apelaciones de Santiago rechazó recurso de ilegalidad interpuesto por Aguas Andinas en contra de la SISS*, Santiago, Chile (http://www.siss.cl).

Solanes, Miguel (2005a), "Editorial remarks", *Circular of the Network for Cooperation in Integrated Water Resource Management for Sustainable Development in Latin America and the Caribbean*, N° 21, February, Economic Commission for Latin America and the Caribbean (ECLAC), Santiago, Chile (http://www.eclac.org).

___ (2005b), "Editorial remarks", *Circular of the Network for Cooperation in Integrated Water Resource Management for Sustainable Development in Latin America and the Caribbean*, N° 22, August, Economic Commission for Latin America and the Caribbean (ECLAC), Santiago, Chile (http://www.eclac.org).

___ (2004), "Editorial remarks", *Circular of the Network for Cooperation in Integrated Water Resource Management for Sustainable Development in Latin America and the Caribbean*, N° 19, May, Economic Commission for Latin America and the Caribbean (ECLAC), Santiago, Chile (http://www.eclac.org).

___ (2003), "Groundwater: regulatory needs", *Circular of the Network for Cooperation in Integrated Water Resource Management for Sustainable Development in Latin America and the Caribbean*, N° 17, March, Economic Commission for Latin America and the Caribbean (ECLAC), Santiago, Chile (http://www.eclac.org).

___ (2002a), *América Latina: ¿sin regulación ni competencia? Impactos sobre gobernabilidad del agua y sus servicios*, Economic Commission for Latin America and the Caribbean (ECLAC), 30 July, Santiago, Chile.

___ (2002b), "Water policies and regulations: conditions to recognize indigenous water rights", *Towards recognition of indigenous water rights and management rules in national legislation. International WALIR Seminar (4-8 March 2002, Wageningen, The Netherlands)* (http://www.eclac.org).

___ (2002c), "Provision of profit oriented irrigation services: institutional issues", in Fernando Gonzalez and Salman Salman (Editors), *Institutional reform for irrigation and drainage. Proceedings of a World Bank Workshop*, World Bank, Washington, D.C. (http://www-wds.worldbank.org).

___ (1999), *Servicios públicos y regulación. Consecuencias legales de las fallas de mercado*, Economic Commission for Latin America and the Caribbean (ECLAC), Recursos Naturales e Infraestructura series N° 2, LC/L.1252-P, September, Santiago, Chile (http://www.eclac.org).

___ (1993), "Decentralization of water management: the case of water users' associations", *14th World Bank Agricultural Symposium "Agriculture in liberalizing economies: changing roles for governments"*, World Bank, Washington, D.C.

Solanes, Miguel and David Getches (1998), *Prácticas recomendables para la elaboración de leyes y regulaciones relacionadas con el recurso hídrico*, Inter-American Development Bank (IDB), Washington, D.C. (http://www.iadb.org).

Solanes, Miguel and Fernando Gonzalez-Villarreal (1999), *The Dublin principles for water as reflected in a comparative assessment of institutional and legal arrangements for integrated water resources management*, Global Water Partnership (GWP), Technical Advisory Committee (TAC), Stockholm, Sweden (http://www.gwpforum.org).

South Africa (1997), *White paper on water policy* (http://www.thewaterpage.com).

Stiglitz, Joseph (2002), *Globalization and its discontents*, W.W. Norton & Company, New York.

___ (1999), as cited in Lloyd (1999).

Thobani, Mateen (1999), "Private infrastructure, public risk", *Finance and Development*, Volume 36, Number 1, March (http://www.imf.org).

___ (1995), "Tradable property rights to water. How to improve water use and resolve water conflicts", *Public Policy for the Private Sector*, Number 34, February, World Bank, Washington, D.C. (http://rru.worldbank.org).

Transparency International (2005), *Corruption Perceptions Index 2005* (http://www.transparency.org).

Trelease, Frank (1974), *Water law, resource use and environmental protection*, West Publishing Corporation.

Troxel, Emery (1947), *Economics of public utilities*, Rinehart & Company, New York, as cited in Phillips (1993).

UNDP (United Nations Development Programme) (2005), *Human development report 2005*, New York (http://hdr.undp.org).

United Nations (2003), *World urbanization prospects: The 2003 revision*, ST/ESA/SER.A/237, New York (http://esa.un.org).

United States Supreme Court (1912), *Cedar Rapids Gas Light Co. v. City of Cedar Rapids*, 223 U.S. 655 (http://www.findlaw.com/casecode/supreme.html).

Vis-Dunbar, Damon and Luke Eric Peterson (2006), "Bolivian water dispute settled, Bechtel forgoes compensation", *Investment Treaty News*, 20 January, International Institute for Sustainable Development (http://www.iisd.org).

Wells, Louis (1999), "Private foreign investment in infrastructure: managing non-commercial risk", *Private Infrastructure for Development: Confronting Political and Regulatory Risks (8-10 September 1999, Rome)* (http://rru.worldbank.org).

WHO (World Health Organization)/ UNICEF (United Nations Children's Fund) (2006), *Joint Monitoring Programme (JMP) for Water Supply and Sanitation* (http://www.wssinfo.org).

World Bank (1993), *Water resources management*, Washington, D.C. (http://www-wds.worldbank.org).

Yepes, Guillermo (2003), *Los subsidios cruzados en los servicios de agua potable y saneamiento*, Inter-American Development Bank (IDB), Washington, D.C. (http://www.iadb.org).

Young, Robert (1986), "Why are there so few transactions among water users?", *American Journal of Agricultural Economics*, Volume 68, Number 5, December.

Young, Robert and Robert Haveman (1985), "Economics of water resources: a survey", in Allen Kneese and James Sweeney (Editors), *Handbook of natural resource and energy economics. Volume II*, Elsevier Science Publishers, Amsterdam.

Zearfoss, Nancy (1998), *The structure of state utility commissions and protection of the captive ratepayer: is there a connection?*, National Regulatory Research Institute (NRRI), June.

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