

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



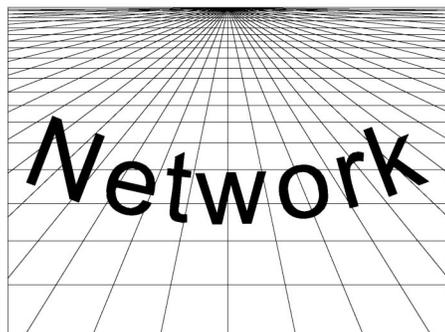
United Nations Economic Commission for Latin America and the Caribbean (ECLAC)

N° 35

January 2012

CIRCULAR N° 35

With the effects of climate change, water related risks and uncertainties will be exacerbated. In some areas, there may be excess water compared to availability in the past. In others, the opposite may be true, producing acute shortages and droughts. Increases in the spatial and temporal variability of rainfall and changes in run-off patterns can be expected. In this context, a review of some of the fundamental elements of water institutions is called for, in order to identify possible alternatives for adapting to a change in circumstances. Some of the elements worth studying in greater detail include:



- Improving information on water availability (quantity, quality and opportunity), its uses and users, and the expected impacts of climate change both on the water cycle as well as on water use and users.
- Improving information, and its public availability, regarding the impacts of the general economic system (taxes, subsidies, charges, etc.) on the different uses and users, as well as its effects on efficiency, sustainability and equity. The reason for this is that at some point a modification in the conditions of the economic context may have to be considered in order to respond to the new reality imposed by climate change.
- Defining clear channels for taking this information into account in water management decision-making processes. For example, it may be worthwhile to reconsider the manner in which long-term water availability should be evaluated for the purpose of water resources planning.
- Given that the water availability of the future will not be the same as that of the past, the criteria for designing and operating water infrastructure intended to last for several decades will need to be revised. Studies are required on the sensitivity of water systems to possible future variations in climatic conditions.
- Establishing clear criteria to determine the scope of water rights (and wastewater discharge permits) during shortages and improving possibilities for imposing conditionalities, favouring environmental sustainability and resiliency objectives.
- More precise definition of preferences and priorities in water allocation, especially during shortages.
- Improving the identification of consumptive uses.
- Achieving better integration between the management of surface and groundwater, between water allocation and pollution control, between managing water demand and supply, and between the management of water resources, land, and related ecosystems.
- Improving disaster prevention and response systems given the effects of increased variability (floods, droughts, etc.), emphasizing risk management.
- Planning the gradual, step-by-step implementation of adaptation measures, clearly establishing their trigger thresholds, as well as the related faculties of public authorities and the rights of private parties. Determine whether those measures will constitute a public emergency, and if so, to what extent and under what conditions.
- Creating, preferably at the river basin level, forums of water users, public authorities and other relevant stakeholders for consultation and coordination and possible decision-making, keeping in mind that a lack of consensus should not lead to inaction.
- Facilitating water reallocation mechanisms within and among user sectors, with effective controls and compensation for externalities.

CONTENTS

- **Editorial remarks:** water institutions and climate change adaptation.
- **Open discussion:**
 - Drinking water and sanitation services: lessons from relevant experience.
 - Relevant experiences in institutional frameworks and contracts.
 - The infrastructure gap in Latin America and the Caribbean.
- **Meetings:**
 - “Water in the Green Economy in Practice: Towards Rio +20” International Conference.
 - Specific Water Cabinet of the Presidency of the Republic of Guatemala.
 - International Investment Protection Treaties and Regulation of Public Services.
 - Harmony between bilateral investment treaties and the human right to water.
- **News of the Network:**
 - Internalizing the benefits of the environmental service provided by water in water tariffs.
- **Internet and WWW News.**
- **Recent ECLAC publications** on water resources management and use.

formalizing a water resources management system capable of addressing current and future challenges, and giving it authority, capacities and resources commensurate with its responsibility.

Andrei Jouravlev and Miguel Solanes



In the previous issue, the study entitled "*Servicios de agua potable y saneamiento: lecciones de experiencias relevantes*" by Emilio Lentini was first introduced (see "*Publications*"). Last time the discussion was centred on the external factors determining the performance of the drinking water supply and sanitation sector, in other words, successful or failed outcomes. In this issue we will look at the internal factors.

Institutional organization

Over the past three decades, the countries of the region have attempted different strategies to overcome failings in the provision of drinking water supply and sanitation services. Consensus has been reached regarding the need for reforms of the institutional structure, which must be based on a clear separation of the following functions:

- the formulation of sector policies, at the ministry level or its equivalent;
- regulation, oversight and control assigned to specialized agencies for which it is imperative to guarantee professional and financial capacity, independence and stability; and
- provision and management of services performed in accordance with technical criteria, avoiding their politicization.

Industrial structure

The existence of economies of scope and scale, and the need to reduce transaction costs, make it necessary for decisions related to the sector's industrial organization to take into account these conditions in order to avoid affecting efficiency through excessive decentralization, as well as to preclude other negative effects, such as the complexity of regulating and controlling an excessive number of providers and a reduction in the

possibilities for cross subsidization between wealthy and poor areas.

Property structure

The property structure of the provider, or the degree of participation of the private sector, does not, on its own, guarantee that successful results will be achieved. In the experience of the countries of the region, performance improvements brought about by private participation depended mainly on:

- stable public policies for the sector, prioritized by the Government, with broad political and social consensus;
- an effective financing structure, especially in the long term;
- independent, highly qualified institutions;
- sound regulatory practices;
- efficient tariff structures and a subsidy mechanism for low income groups;
- competitive bidding processes that are properly organized;
- institutional quality;
- a low level of corruption; and
- fundamentally, favourable macroeconomic conditions.

Additionally, a gradual sector reform process and respect for the institutional framework helped to shield against risk.

The excessive enthusiasm for private participation that characterized the first half of the 1990s has given way to a more realistic view on the part of both Governments and investors. Therefore, one can expect that the private participation processes seen from now on will be based on more detailed and specialized studies, on regulatory and institutional frameworks that are adapted to local conditions.

Regulatory frameworks

The importance of the public interests involved, especially the impact on the socially vulnerable population, along with the need to mobilize significant economic resources in order to correct deficits and the obligation to use those resources efficiently, make it essential to adopt regulatory frameworks that:

- anticipate sector issues and conflicts in a technical and specialized manner;
- contain sufficient incentives and signals for regulating and guiding the conduct of intervening parties; and
- are sufficiently sound from a legal standpoint.

Regional experience has shown that there are advantages to adopting a regulatory framework on the basis of higher level laws or regulations and, in the case of private sector participation, to define this framework and organizing regulatory, control and oversight

agencies prior to the privatization process itself. The experience of Chile in the region is an example of a country that has followed these guidelines.

Tariff policies

As a result of financing problems experienced by the sector in most Latin American countries, gradually and increasingly there is more attention being given to tariff policies. The earlier practice of basing sector development almost exclusively on financing through public funding separate from service provision has been abandoned. The current focus is based on a belief in the importance of the tariff levels for the rational use of resources and self financing, which are essential requirements if service provision is to be efficient and sustainable. This does not mean that tariff revenue should be the only way to finance service delivery, but rather a means of achieving an appropriate balance between tariff resources and public sector funds, and that the latter should be allocated to investments and subsidies that maximize the social profitability of public spending.

Policies for low income groups

Latin America is the region with the worst income distribution in the world, and of greatest concern is the fact that in recent years it has not shown signs of positive change. If satisfactory results can hope to be achieved, the sector policy must contain mechanisms for specific, effective subsidies to address this issue. This requirement is even more pressing if tariff adjustments are planned in order to approach self financing levels, and, additionally, access to services needs to be expanded since in both situations there is a conflict with the low ability to pay of major groups of the population. Here, once again, the Chilean experience is worth noting because a subsidy system has been in place since 1990 to help pay drinking water and sanitation bills of the low income population. It is a direct subsidy, financed with national budget resources, and it is granted in a targeted manner through a formal survey, the bases and guidelines of which are established by the national government.

Financing policies

One of the main characteristics of the drinking water supply and sanitation industry is that it is very capital intensive. This feature of the sector's assets, along with the size of investments required in most of the region's countries, show the importance of having an adequate long term financing structure in place that will make the sector strategy sustainable.

In this sense, the experience of Chile and of some companies in Brazil has lessons to

offer in terms of using the capital market to secure long term, low cost financing. The experience of services in Argentina, on the other hand, shows that certain excessive external borrowing practices are best avoided because they carry high risks, especially in very volatile economies with recurring crises and macroeconomic instability.

Contractual arrangements and guarantees

One aspect that is extremely important to keep in mind when designing legal frameworks is to avoid granting excessive guarantees in order to attract the participation of private companies. These guarantees, which do not appear as direct expenditures at the time they are taken, can generate significant contingent liabilities farther down the road. Unlike other countries in the region, especially Argentina, the privatization process in Chile did not include deliberate measures on the part of the State to reduce the exchange rate risk for foreign investors, and yet the lack of exchange guarantees did not hinder the incorporation of foreign capital and the development of the sector.

International investment protection treaties

In some cases, for example in Argentina, the economic crisis, which was accompanied by a devaluation and financial collapse, aggravated regulatory conflicts and led to contract renegotiations, which, because they were not settled amicably, ended up as demands in international arbitral tribunals. This experience illustrates the importance of structuring the legal framework to include avenues for local conflict resolution, thus avoiding the need for international arbitration. Furthermore, regulation is better governed by a general legal framework, as opposed to specific contracts, since this provides greater protection to the authority awarding the contract in the case of disputes arising as a result of possible modifications or events affecting the contract's environment.

Moreover, the reversion to State ownership of public utility companies, which has occurred in several countries of the region following the failure of the privatization process of the 1990s, demands that the applicable approaches and instruments be improved in order to effectively regulate and control the publicly-owned service providers of this new era. This topic is addressed in greater detail in the study entitled "*Fomento de la eficiencia en prestadores sanitarios estatales: la nueva empresa estatal abierta*" (Promoting efficiency in State-owned water utilities: the new open State-owned enterprise) (Project Document Series, LC/W.381, February 2011) by Juan Pablo Bohoslavsky (see Circular N° 34).



Relevant experiences in institutional frameworks and contracts

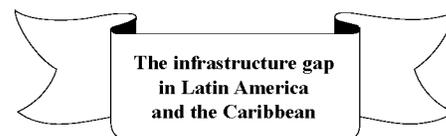
The following are the conclusions from the study "*Experiencias relevantes de marcos institucionales y contratos en agua potable y alcantarillado*" (Relevant experiences in institutional frameworks and contracts relating to drinking water and sewerage) (Project Document Series, LC/W.341, August 2010) by Jean-François Vergès (see Circular N° 33), which was prepared as part of the cooperation with the Superintendency of Residential Public Services (SSPD) of Colombia.

The experience of various countries of Western Europe and Latin America shows that there have been—and continue to be—different forms of institutional organization in the drinking water and sanitation sector. Essentially, these diverse arrangements and differences are connected to the administrative-territorial level of the public authorities responsible for services, the legal status of the providers, and the type of contract (or license) governing the interactions between both parties. In this context, based on this study, the following conclusions can be reached:

- ***It is not possible to identify a one-size-fits-all solution.*** Even though each country can learn from the experiences and models of other countries, it is not possible to recommend a single model of institutionality that can be transplanted in every country. Nevertheless, there are certain shared elements commonly found in public policy, structure, regulation and contractual practices, which can be adopted by all countries and adapted in accordance with national, regional and local idiosyncrasies. One clear example is benchmarking, which, in one form or another, is being adopted by all the countries studied. Another element linked to success in developing sustainable institutionality is that the provision of services should follow the logic of how the river basin is shaped, which should take precedence over the country's political divisions, facilitating regionalization, taking advantage of economies of scale and grouping together less attractive municipalities in order to transform them into an interesting investment opportunity for specialized operators that will benefit both parties.
- ***The public-private dichotomy as it relates to operators is often irrelevant.*** One constant throughout the institutional analysis of the study is the eagerness of some to contrast public operations with private service provision. However, in

most cases, this dichotomy is not the major issue. On the contrary, it is much more important to clarify who the responsible political-administrative agencies are and how they are related to the operators.

- ***Contracts do not eliminate the need for regulating the operator.*** Contracts with operators (both public and private) do not obviate the need for economic regulation of those contracts and, therefore do not prevent efficient performance from being demanded of the contractor by stimulating competition and comparing performance through benchmarking. This simulated competition must be based on information systems that are fed by thorough, standardized regulatory accounting. However, reconciling a dynamic regulatory system with static contractual clauses is particularly challenging. Likewise, contracts should be entered into on the basis of delivery goals, as opposed to works, in order to guarantee that service standards are met, although it is advisable to have an indicative investment plan for the first five years, which should be revised every five years, along with including specific accounting rules and a record of works received upon commencement of the contract and those that are built during its execution, in order to reduce conflicts at the time service provision is handed over and to reduce the likelihood of accounting practices that harm consumers or any of the contracting parties.
- ***Growing environmental costs.*** As the experience of developed countries has shown, it is necessary to add to the growing cost of investing in drinking water and sewerage systems, the cost that environmental protection needs impose on this sector. The growing costs that the sector is subjected to in Western Europe are related to concern with reducing the sector's impact on the environment. However, threats to the environment are not limited to drinking water and sewerage services, but are also increasingly related to industry and agricultural activities.

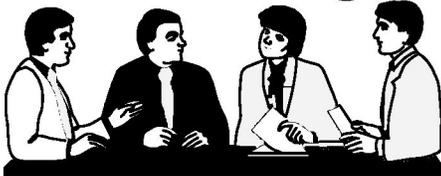


The infrastructure gap in Latin America and the Caribbean

The economic infrastructure constitutes a tool that can have a major impact on reducing poverty and achieving sustained economic development. In Latin America and the Caribbean, recent years have seen a reduction in investments aimed at those goals, which has led to a widening of the gap between infrastructure requirements and the effective supply of infrastructure. A recent publication put out by our division, entitled "*La brecha de infraestructura en América Latina y el*

Caribe” (*The infrastructure gap in Latin American and the Caribbean*) by Daniel Perrotti and Ricardo Sánchez (see “*Publications*”), had the objective of measuring this gap in the sectors of electrical power, drinking water and sanitation, surface transportation and telecommunications. The findings showed that it would be necessary to invest some 5.2% of the regional gross domestic product (GDP) annually in order to respond to the needs that will arise in the region between 2006 and 2020, whereas if the goal is to achieve the per capita infrastructure levels of a group of Southeast Asian countries, the annual investment required for the same period of time would rise to 7.9% of GDP. Keeping in mind that investment in infrastructure observed during the most recent period for which figures are available (2007-2008) was only 2% of GDP, the work still to be done takes on more significance. Nonetheless, the level of response to these requirements will be a key factor in determining the extent to which the region gains insertion in the world economy in the twenty-first century and in determining the quality of life of its inhabitants.

Meetings



Water in the Green Economy in Practice: Towards Rio +20

The Natural Resources and Infrastructure Division collaborated in organizing the *International Conference “Water in the Green Economy in Practice: Towards Rio +20”* coordinating the regional session on Latin America and the Caribbean. This event took place in Zaragoza, Spain, 3-5 October 2011, and the regional session brought together experts from Barbados, Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Mexico, Nicaragua and Peru, among others.

The objective of the conference was to position the water agenda as a key element for advancing towards a green economy. The format was focused on discussing practical implementation experiences and concrete proposals both in the region as well as the rest of the world. The cases presented showed how appropriate investments and financing models for providing drinking water and sanitation services and for managing water resources can contribute to reducing poverty and fostering development. The conference also highlighted the importance of institutional strengthening,

political commitment, the development of technical capacity and long-term vision to address the sector’s challenges.

The results of the event will be compiled in a best practices guide and will contribute to the preparation process for the United Nations Conference on Sustainable Development which will take place in Brazil in June 2012 (Rio +20). Some of the recommendations that came out of the discussions held during the event were:

- Water is the engine for the green economy; it is important to ensure that they stay connected.
- Water technology and innovation must be focal points of development.
- Economic instruments are a key aspect of the green economy platform.
- Constantly increasing efficiency must become a basic premise that accompanies the green economy.
- Political commitment and enabling policies that allow for managing and implementing change are fundamental.

In this issue of the Circular we present a brief synopsis of the case of the *Specific Water Cabinet (GEA) of the Presidency of the Republic of Guatemala*, a mechanism for defining, coordinating and monitoring public policy as it relates to water, outlining its strategy, programmes, activities and budget, presented by Elisa Colom in the regional session on Latin America and the Caribbean.

For further information on the conference, see: <http://www.un.org/waterforlifedecade>.

Specific Water Cabinet of the Presidency of the Republic of Guatemala

In response to the need for coordinating the management and governance of water with national development, the Government of Guatemala created the Specific Water Cabinet (GEA) as the coordinating agency for policy, planning and budget. The most significant changes resulting from implementation of GEA are:

- Making the process of defining and monitoring public policy related to the management and governance of water one of the priorities of national public policy.
- Establishing a coordinating agency at the highest political level.
- Linking the national water policy to, particularly, social policies and rural development, environmental and climate change policies.
- Setting common goals, objectives, and strategic lines of action for all governmental agencies, thus establishing a point of reference for local institutional.

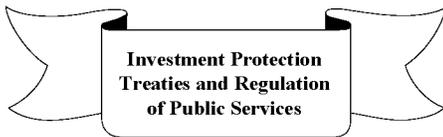
- Contributing to improve institutional performance at the ministerial level, adding value to actions taken as a means of achieving both sector goals as well as objectives of a national nature.

Institutionally, GEA’s coordinating work has allowed for separating the management and governance of water from the management and preservation of the environment; has identified the relationships of interference and interdependencies between water and ecosystems; and has highlighted the need for administering the environmental goods and services provided by water in a specific and specialized manner, distinguishing them from those provided by forests and biodiversity. It has also clearly demonstrated that the leadership role of the Ministry of the Environment and Natural Resources (MARN) of protecting, improving and recovering water resources must be strengthened, precisely so that it can perform the role of directing, regulating and supervising as regards quality, quantity and conduct; and, at the same time, it must set itself apart from activities corresponding to other governing bodies, such as measuring the resource and administering use rights, and those activities where joint, horizontal action is indispensable, such as risk management.

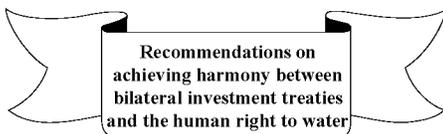
GEA’s greatest institutional challenge has been to generate favourable conditions to create incentives for and implement a national strategic water management process that promotes the use of water resources to further national development goals and objectives. With the establishment of the National Water Policy (2011), common objectives, principles, directions and strategic lines have been defined, such that sector actions and budgets at the national level are in line with both sector and thematic goals and objectives as well as national and public interest ones, and municipal governments and the system of development councils have a national point of reference. In terms of water governance, GEA has helped to bring about a transition from public sectoral management void of any inter agency planning or coordination to coordinated management, establishing policy, planning and budget tools based on a common policy and strategy; progress was made in defining a Multiyear Sectoral Plan for the Environmental and Water; and, where risk management is concerned, the focus has shifted from responding to emergencies caused by natural events to addressing the causes of water-related risks.

Since its creation, GEA has managed to establish the National Water Policy and its respective strategy; participate in constructing and applying the Multiyear Sectoral Plan for the Environmental and Water, as well as elaborating and applying the Plan for Recovery and Reconstruction with

Transformation. It has also brought about institutional changes in the Ministry of Public Health and Social Welfare (MSPAS), in terms of leadership in drinking water and sanitation public services, and regarding the definition and implementation of a policy for transboundary waters. An institutional mechanism for coordinating water policies at the highest level, like GEA, could be used as a model in cases where countries are lacking solid institutional structures or national water policies that guarantee the fulfilment of public interest objectives.



At the “International Investment Protection Treaties and Regulation of Public Services” Workshop (Buenos Aires, Argentina, 19 November 2010) (see Circular N° 33), Pablo Bohoslavsky and Juan Justo shared *recommendations on achieving harmony between bilateral investment treaties (BITs) and the human right to water*, which we present below.



Human rights treaties, such as the American Convention on Human Rights (ACHR), Pact of San José, are a manifestation of the decision of signatory States to abide by a legal structure that—through objective obligations and collective guarantees—will allow them to cooperatively achieve a common purpose, which, seemingly, they have not been able to achieve on their own: that those who are subjected to its authority can effectively exercise the rights therein enshrined. The challenge of this arrangement is to make it effective, avoiding mere rhetoric, and therefore this convention-based legal structure establishes a series of minimum obligations demanding strict compliance, taking precedence over other commitments, whether domestic or international. At the same time, the features inherent to the obligations specifically enshrined in the conventions—particularly their horizontal operational capability—serve—by virtue of the protective duty they engender—as the basis for and limit to the regulatory authority that could impact the rights of investors.

It is in this context that countries have committed themselves to—among other things—organizing their governmental structure in such a way as to obtain minimum levels of enjoyment of the right to water on the part of the population, gradually achieving full enjoyment. The basic means of achieving this end is simply to adopt public policies

(legislative, administrative or judicial) designed to reasonably and concretely accomplish this tutelary goal.

As a result of this cooperative premise and its ramifications, the members of human rights systems are unable to justify a violation—by commission or by omission—of their duties by claiming compliance with another international commitment, in the same way that they cannot invoke their domestic laws. Case law precedents in human rights tribunals clearly establish that each member is responsible in this sphere above and beyond any other parallel commitment they may have assumed, and consequently they may not invoke the Convention of the International Centre for Settlement of Investment Disputes (ICSID) or a BIT for noncompliance with conventions. The only option is to denounce them, provided that such an option is specifically included in the convention itself and in such case in relation to future claims.

This implies that all stakeholders in the system—both domestic and supranational—must ensure that the practices involving members—whatever their origin or form may be—comply with the directives of the pacts, and from that perspective it is advisable to uphold the central role of national authorities. The heart of the convention beating in the finality of certain government regulations shows, naturally, the support of a system without loopholes: when we find ourselves facing the reasonable and proportionate fulfilment of a tutelary duty, challenging such regulations also implies evading the system for safeguarding basic rights.

This line of reasoning was recently confirmed in the report by the Special Representative of the Secretary General of the United Nations on the issue of human rights and transnational corporations and other enterprises, John Ruggie, entitled Guiding Principles on Business and Human Rights: Implementing the “Protect, Respect and Remedy” Framework of the United Nations. In these recommendations it is worth noting that the terms stipulated in BITs can limit the capacity of States to fully enforce new human rights laws, or else expose them to the risk of binding international arbitration. For this reason, it is proposed that States must ensure that they retain the authority to enforce rules and regulations in order to protect human rights in the context of such treaties, while still offering the necessary protection to investors.

From this perspective, the encumbrance caused by an award in terms of convention rights can be direct or derived. The former case occurs when the award ignores a fundamental right or invalidates a measure to fulfil the duty of protection attributable to the pact. The encumbrance is derived when

ignoring the convention component of the State measure in question imposes a cost that is prohibitive for the State, which in turn prevents it from organizing the State apparatus as required by ACHR. This latter case occurs in those scenarios where prioritizing the basic rights of the population over those of the foreign investor—with the economic cost of the award that would entail—would simply be too costly an option.

When a dispute is resolved between the State and an investor that involves a right protected in the convention system, the arbitrators must explain the interaction between the two international systems in question without leaving either one out of the analysis (investors are not immune to the law of human rights pacts). The basic pattern for reasonably managing this interaction consists of finding readings of the BIT that are compatible with the human rights directives and vice versa. There is a need for harmonization in order to avoid the fragmentation of an international law order aspiring to legality, and, consequently, to coherency. No BIT is expressly waived from the application of human rights conventions.

Given the possibility of this harmonization, efforts must be directed at elevating the role of State authorities in the BIT framework. They play a crucial role as necessary agents in making human rights pacts effective, and, in that sense, the incorporation of two rules in the dynamics of BIT functioning is proposed:

- that arbitrators have the obligation to evaluate the regulatory measure from the perspective of the duty of protection enshrined in human rights pacts, not allowing the award to jeopardize their effectiveness; and
- the power of the State to ensure that awards respect the convention and to refrain from complying with them in the event of a negative outcome.

The redistribution of power entailed by such proposals in the context of BITs is palpable and must therefore be the subject of broad, pluralistic debate. In this spirit, keeping in mind the controversy surrounding the topic and its profound implications for all the countries who ratified ACHR, it would be interesting to explore the possibility of requesting—through parties entitled to bring an action—an advisory opinion of the Inter-American Court of Human Rights (IACHR) designed to clarify the rules applicable to the interaction of international systems governing human rights and investments. Just to give an example, this request could include the following questions: Can fulfilling the duty to protect a human right generate international liability for the State? In which cases? What would the scope of the damages awarded be? Would ACHR allow execution of an award

opposing it from an investment arbitration ruling? If so, which body is authorized to verify the particulars?

In any case, just as the High Commissioner for Human Rights has suggested, it is advisable for States to specifically include in negotiations, and later in the BITs and investment agreements, points related to human rights such that the arbitrators consider, to the broadest extent possible, the social and legal context applicable to the case.

For further information on this topic, we recommend the study “*Protección del derecho humano al agua y arbitrajes de inversión*” (*Protection of the human right to water and investment arbitration*) (*Project Document Series*, LC/W.375, January 2011) by Juan Pablo Bohoslavsky and Juan Bautista Justo (see Circular N° 34).



Internalizing the benefits
of the environmental
service provided by
water in water tariffs

The citizens of Heredia have envisaged the economic value of the catchment of high quality water, an environmental service generated by the management and conservation of the upper watershed of the rivers Segundo, Ciruelas and Tibas, as a component to be integrated into the municipal tariff system. This pioneering initiative in Costa Rica was motivated by concern on the part of the local public utility company, Heredia Public Service Company (ESPH).

adequate forest coverage in strategic infiltration and recharge areas. Funds collected this way are used to pay monetary compensation to protected areas and private landowners in exchange for conserving and restoring the forest in strategic areas of the watershed supplying drinking water.

An additional amount of 12 colones (0.025 dollars) per cubic meter is charged within the current tariff structure, and the participating owners of forested lands receive some 120 dollars per hectare per year from the ESPH for protecting the water catchment area. This amount represents the opportunity cost of using the land in the upper watershed to generate the environmental service of catchment, obtained by considering the income flow for traditional land uses, as well as the value that local residents place on this environmental service.

To date, the protection of approximately 1,190 hectares of natural forest and reforestation projects are being financed on private and State-owned property within the area of interest with the support of major industrial consumers of water. The financial contribution on the part of end users to compensate those who assume the cost of protecting the upper watershed is motivated by the principle of social equity and the need for correcting environmentally perverse distortions that lead to an inefficient use of the resource.

This experience offers a pragmatic example of the possibility and feasibility of paying for environmental services and internalizing the environmental benefits associated with water for human consumption in tropical developing countries.

Luis Gámez

Additional information can be requested from the following addresses:

E-mail: gamezch@racsa.co.cr
luisgamez@esph-sa.com
WWW: https://www.esph-sa.com

sanitation sector in Colombia) of the Commission for Regulating Drinking Water and Basic Sanitation (CRA) of Colombia aims to unify current sets of regulations for the residential public services of water, sewerage and solid waste collection and facilitate the search for references in the jurisprudence (<http://www.cra.gov.co>).

- The mission of the *Instituto para la Conservación de los Ecosistemas Acuáticos* (*Institute for the Conservation of Aquatic Ecosystems*) (ICEA) of Bolivia is to contribute to the management, treatment and preservation of aquatic ecosystems and wetlands, emphasizing protected areas and sites listed in accordance with the Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar), proposing alternatives in light of climate change (<http://www.iceabolivia.org>).
- In Chile, the main objective of the initiative “*Agua y Medio Ambiente*” (*Water and the Environment*) is to contribute to the multisectoral dialogue in order to generate a comprehensive vision on the topic of water and its environmental aspects (availability of water, water quality, information for decision-making, the human right to water, water efficiency, climate change vulnerability, water in an urban context, river basin management) (<http://www.aguaymedioambiente.cl>).
- The programme “*Gestión hídrica de la provincia de Petorca*” (*Water management in Petorca Province*) is run by the Department of Agricultural Sciences of the Pontifical Catholic University of Valparaíso, Chile (<http://www.ghpp.cl>). The general objective is to improve the province’s water management by building technical, legal and organizational capacity in water users, testing new alternative crops requiring less water, and making water information more available to users.

预览已结束，完整报告链接和二维码如下：

https://www.yunbaogao.cn/report/index/report?reportId=5_1338

