

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



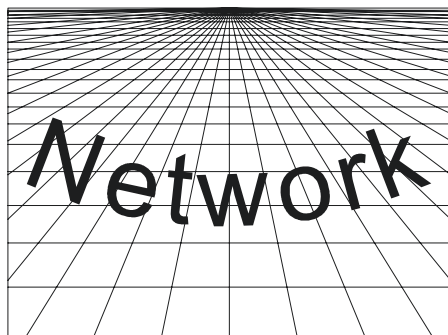
United Nations Economic Commission for Latin America and the Caribbean (ECLAC)

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Latin America and the Caribbean has seen an escalation of conflicts in recent years over the development and location of enterprises in the production sector, especially major mining companies whose activities affect both the lives of the population and the environment. These disputes are commonly highly polarized and feature little or no opportunities for dialogue, asymmetries of information, a lack of transparency, difficulties or failures in the handling of scientific evidence, vested interests and conflicting values and underlying ideologies, which make them difficult to address and often give rise to non-deliberative resolution mechanisms characterized by high transaction costs.



The use, management and protection of water resources are often at the heart of these conflicts, which are usually environmental or socio-environmental in nature, given the key role that water plays in the ecosystem and society. Their geographical scope also varies greatly, from local, regional and national-level disputes to international or transboundary conflicts in cases where water resources are shared by two or more States.

Conflicts over water almost always involve a social disagreement that takes on various dimensions. Such disagreements may be between users and non-users of the resource, but can also be inter-generational, -jurisdictional or -institutional in nature. Particular attention has been paid to conflicts involving claims by local communities or indigenous peoples to water for human consumption or to maintain subsistence economies or their traditional ways of life in

the face of large-scale modern economic projects supported or promoted by central governments, involving the extractive industries or the construction of dams for example. In this context, factors such as climate change only add to the complexity and severity of conflicts from an environmental and particularly social perspective since these groups are among society's poorest, with the least adaptive capacity and usually live on the most vulnerable areas, and are thus affected hardest by these factors. Water conflicts therefore constitute a problem that is simultaneously economic, social, political and environmental in nature and involves a conflict of interests and political power.

Many reasons have been put forward to explain the increase in the number and intensity of water conflicts in recent years. These commonly include rising exports of raw materials, the increasing trend towards urbanization—which leads to competition between urban and rural areas over water use—increased environmental awareness, the consolidation of democratic freedoms and even the proliferation of social networks.

ECLAC has long maintained that water management is tantamount to managing conflicts amongst people and between people and the environment (see Circular N° 4). A system of water and river basin management needs to be set up to detect, avoid and solve such conflicts. The underlying causes of many conflicts over water in the region are related to weaknesses or deficiencies in water governance systems. The root cause of most disputes is not in fact physical or real scarcity of water resources, but rather relative, artificial scarcity caused by a wide variety of factors including mismanagement, pollution, the monopolization of access, the transfer of negative externalities, threats to sustainability, limitation of future development opportunities, management shortcomings or insufficient regulation or investment in water-use infrastructure. Even when conflicts are caused by the scarcity of water itself, they cannot usually be classified as exclusively

water-based, since they generally take on political, social, environmental, cultural or economic dimensions, with all the complexity that the need to arbitrate between multiple interests seeking access to a scarce resource implies.

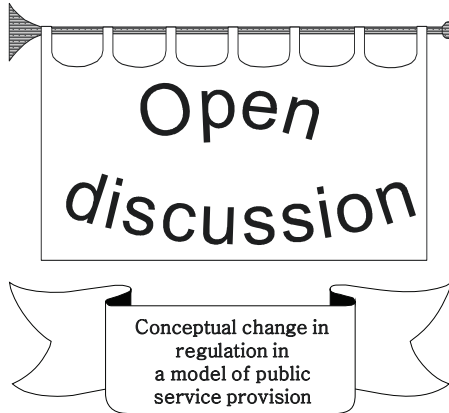
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The principal deficiencies of governance systems that can give rise to and aggravate conflicts include the problems associated with inadequate regulatory frameworks (which may be absent, outdated or unsuited to either the problems to be resolved or new challenges); a lack of institutional capacity to ensure their effectiveness (in cases where the enforcement authority has insufficient independence, resources, information, weak oversight and compliance powers, or has been captured by groups of interest); insufficiently comprehensive approaches (overlapping competencies, fragmented efforts, etc.); and the lack of confidence on the part of stakeholders in the ability of management

systems to protect their interests effectively. This is compounded by disputes over both the distribution and appropriation of rents (profits) and the (social and environmental) cost of projects, and their impact on local development opportunities and lifestyles. Lastly, the effects of climate change also exacerbate water-related conflicts, risks and uncertainties.

*Liber Martín and Juan Bautista Justo*



At the meeting of experts on tariff and regulatory policies in the framework of the Millennium Development Goals (MDG) and the human right to water and sanitation (see Circular N° 39), Daniel Greif, Chairman of the Regulator of Energy and Water Utilities (URSEA) of Uruguay, gave a presentation on “*Conceptual change in regulation in a model of public service provision*”.

From a conceptual standpoint, regulation aims to improve the efficiency and broaden the scope of public services by introducing competition and private-sector management and investment. However, in practice, the performance of the private sector failed to live up to initial expectations since its involvement became more of an end in itself than a means to improve the coverage and quality of services. Furthermore, the particular characteristics of the public services provided over networks call for the establishment of a dedicated regulatory framework and independent regulatory institutions.

The conceptual framework for institutions in the sector is based on forming a triangle whose three sides are made up of the public policies of the executive and legislative branch, the operation of utilities by public or private enterprises and regulation by specialized agencies. These three stakeholders work towards meeting the needs of users. In this context, regulation of public service provision also seeks to strike a balance between the institutional powers of each stakeholder, particularly in cases where a single State-owned enterprise has exclusive responsibility for provision. It is also important that the State play an active role in public policymaking, since if it fails to do so, other stakeholders such as utilities,

international organizations or users when they decide to leave the system will assume this function.

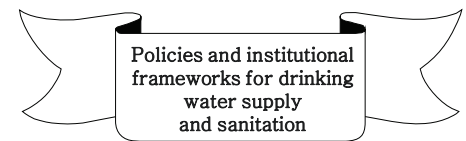
Under the model of public service provision a single institution carries out one or all activities internally. This model is often adopted either since the market is unwilling to get involved or because distrust of private companies means the population prefers a public provider which may be less efficient. It also involves direct control, unlike the private model which involves verifying compliance with results-based benchmarks. The major challenges facing the public model are linked to political interference and productive efficiency.

Regulation in Uruguay was developed in a two-stage process. In the first phase, between 1997 and 2005, a regulatory model designed to accompany privatization of service provision was developed. Then, between 2005 and 2012, there was a period of review and implementation of the regulatory model in which a more favourable view was taken to maintaining the presence of State-owned enterprises and the role of the State in active policymaking. The current challenges lie in adapting the regulatory model to a context in which State-owned enterprises, acting as monopoly providers, predominate, taking advantage of the separation of roles between sector stakeholders to promote transparency, safeguarding the rights of users and ensuring efficient service provision.

In this context, it is the responsibility of URSEA to set rules on quality and safety, monitor and oversee the regulated activities, provide the executive branch with technical advice and address complaints and grievances. It is commonly accepted that regulating operators in the public-sector service provision model requires conceptual changes in respect of the previous system, which involved oversight of private companies. This process of change must be guided by the following principles: *improving efficiency*, taking due account of the risks of corporatism and creating appropriate incentives for efficiency; *increasing transparency*, with an open information management system and the different possibilities of regulation; *providing coordination between institutions*, given the simultaneous existence of various different principles and objectives; and *applying incentives and sanctions*, carrying out results- or process-based monitoring of the quality of services and applying suitable rewards and sanctions (that should be more moral than economic in nature).

It must also be borne in mind that there are multiple objectives that differ over time, and the interests of various stakeholders must be given due consideration (within the same enterprise, the goals of politically allied

cadres of directors may contrast with those of career executives and, in turn, with those of subordinate staff).



The study “*Políticas e institucionalidad en materia de agua potable y saneamiento en América Latina y el Caribe*” (*Policies and institutional frameworks for drinking water supply and sanitation in Latin America and the Caribbean*) (LC/L.3822, May 2014) by Franz Rojas (see Circular N° 41) identifies, for each of the countries considered, good practices aimed at improving institutional frameworks, closing gaps in regulation and promoting alternative systems of investment and models of service provision to exploit economies of scale as well as public policies for water conservation and environmental protection. Here is a rundown of some of these practices.

### Argentina

The “*Argentina Trabaja*” (Argentina at Work) programme of social income through employment aims to implement a comprehensive local sanitation plan to improve neighbourhoods and living conditions consisting in a set of activities in various areas (health, education, infrastructure) designed to benefit the population from a social and health-related perspective. It works by training beneficiaries who join together to form cooperatives. The programme has a double positive impact since it both creates new jobs that encourage collective participation and improves community spaces, thus directly benefiting local residents. It operates in socially disadvantaged neighbourhoods, shanty towns and slums.

### Barbados

Residents are required to install rainwater collection tanks in newly built homes and commercial buildings. The reuse of treated wastewater is also encouraged.

### Bolivia

The purpose of the National Service for Sustainable Sanitation Services (SENASBA) is to contribute to strengthening service providers and ensuring their sustainability. Its tasks include furnishing technical assistance, implementing the community development strategy, institution-building, sharing positive experiences and carrying out sector-specific policies and strategies. It also provides operators with basic technical training via the *Escuela Plurinacional del Agua* (Plurinational Water School).

## Brazil

The Ministry of Cities was established to fill a long-standing need for a governing body at the federal level, and the National Department of Environmental Sanitation was created to coordinate and integrate sector-specific federal policies, with responsibility for formulating and implementing programmes and fostering dialogue with society and subnational governments. It has also stepped up its social involvement and oversight and created the National Cities Council.

## Chile

For more than two decades, tariff policies practised by urban service-providers have been based on the principle of self-financing, with all categories of users being charged the same tariffs. A system of State-funded demand-oriented subsidies for the most disadvantaged groups in society is also implemented to safeguard the income of service providers.

## Colombia

As part of its corporate social responsibility policy, the utility Empresa Pública de Medellín (EPM) promotes network connections for depressed peri-urban areas. These zones are often excluded from networks since they do not meet certain legal requirements for service provision. It is the local residents themselves, organized in local action groups, who carry out the necessary works to extend network coverage to their neighbourhoods. A similar programme is implemented at the nationwide level, which helps ensure effective access to services by subsidizing connections between homes in apartment blocks for low-income groups.

## Costa Rica

The Costa Rican Water Supply and Sanitation Institute (AyA) is responsible for implementing a programme to reduce non-revenue water. This entails substantial efforts to promote water conservation, efficient use and climate-change adaptation, rather than continuing to invest in developing new sources of water. Its targets include a substantial reduction in water losses, an increase in micro- and macro-metering across the board and the mapping of connections in several cities.

## Ecuador

The Rural and Small Towns Water Supply and Sanitation Project (PRAGUAS) included a financial incentive mechanism and capacity-building to facilitate decentralization and encourage the creation of municipal enterprises in rural communities and capitals of small municipalities.

## El Salvador

The Healthy Schools Network, made up of numerous ministries and other public bodies, was one example of operational coordination. Operational committees were also set up at the local level. Funding for the programme was incorporated into the budget of each agency, and it benefited from both the support of the private sector and the active participation of parents. This broad-based initiative involved different aspects of health: nutrition, fitness and school infrastructure, and entailed widening access to safe water and improving sanitation and education on health.

## Guatemala

The experience of setting up the Specific Water Cabinet (GEA) shows that coordinated progress in terms of drinking water and sanitation can be made when different institutions share common goals. GEA was headed by the Office of the Vice-President and included several high-ranking officials. Regular meetings were held which gave rise to the national water policy and its implementation strategy, which also served as a reference point for the national policy for the drinking water and sanitation sector, thus paving the way for a reform of the sector.



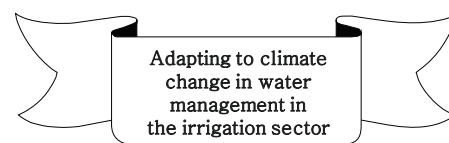
The study “*Estrategias de desarrollo bajo en carbono en megaciudades de América Latina*” (*Strategies for low-carbon development in megacities in Latin America*) (LC/W.568, December 2013) by Joseluis Samaniego and Ricardo Jordán (compilers) and María Teresa Ruiz-Tagle (editor) outlines specific economic, technological and regulatory measures concerning infrastructure to adapt to and mitigate the effects of climate change in Latin America’s largest cities. The sectors covered include drinking water supply and sanitation.

The characteristics of the sector mean that the issue of climate change must be addressed by managing both the demand and supply side. Demand-side management measures emphasize bringing consumption down to efficient levels while supply-side management focuses mainly on service providers achieving greater energy efficiency and controlling emissions from treatment plants.

A comprehensive understanding of the process of water service provision is required to set out a programme for mitigation of and efficient adaptation to climate change in the sector. The amount of energy consumed in all stages of the process needs to be quantified to

lay down a consumption baseline, a benchmark for the evaluation of the measures implemented. This would also enable the identification of the measures available to reduce energy consumption, for their subsequent prioritization. In this regard, abatement cost curves and technology road maps have proven to be extremely useful tools for service providers in identifying and prioritizing available courses of action to reduce emissions. These maps set out objectives and cross-reference them with the various technological solutions available for achieving them.

The study concludes by stating that, for more substantive results to be achieved, there must be a paradigm shift towards a comprehensive approach to water and wastes treatment in all sectors, as a flexible process of resource recovery that can address changing global challenges.



The Division of Natural Resources and Infrastructure of ECLAC collaborated with the University of Chile’s Department of Industrial Engineering, as part of the master’s degree programme in public administration and policy management, to supervise Christian Tapia’s case study “*Adaptación al cambio climático de la gestión hídrica para el sector riego en la tercera sección del río Maipo*” (*Climate change adaptation in irrigation sector water management in the third section of the Maipo River*).

Climate change, the study states, has an impact on the availability and utilization of water resources. Chile is vulnerable to these effects, a situation likely to have negative consequences for the production sector and the environment. Water management systems must adapt to new, uncertain and changing weather conditions. The study analyses the challenges of adaptation, taking irrigated agriculture in the third section of the Maipo River basin as a case study.

The Maipo River is the main water source for Chile’s Metropolitan region, and the large number of non-agricultural uses made of it sets it apart from other river basins in the country. This, together with the emergence of competition and conflicts between different uses and users, further complicates management of its water for irrigated agriculture. In the third section of the river, user organizations face problems such as deficiencies in legal aspects, low rates of internal participation, a lack of technical capacity, insufficient knowledge of the institutional environment, poor infrastructure and water pollution. Water rights in this



stretch of the river are dependent on return flows coming from the upper part of the basin; and these are expected to decrease in the future. This impending problem is not addressed in the existing legal framework, and there appears to be no clear way to achieve a solution, a situation compounded by a lack of State action in water resource planning.

The study reviews climate change adaptation measures aimed at strengthening user organizations; establishing training and awareness-raising tools for users and civil servants on the impacts of climate change; mainstreaming climate change adaptation into development instruments and targeting funding on these objectives; improving channels of meteorological information, advocating seasonal crop cultivation and State support programmes; improving surveillance, monitoring and conflict resolution systems, and tools to address extreme weather events such as droughts; formulating plans for better infrastructure and greater water security; improving mechanisms for the involvement of users in their organizations and in the State planning system; and laying down an institutional river basin framework conducive to coordination between institutions and sectors and water-resource planning.

The policy proposal set forth in the document attempts to improve mechanisms for the internal representation of user organizations with a view to establishing a legal and institutional framework that encourages greater participation of the holders of water rights. This would make internal agreements more representative and bring greater legitimacy to decision-making. The proposal's overarching principles are flexibility in rules and organizational autonomy, but it also stresses the essential role the State must play in planning.

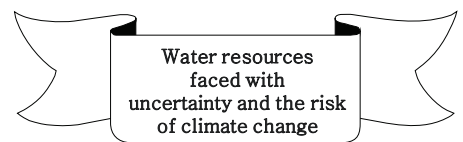
The full text of the study may be found at <http://tesis.uchile.cl> and <http://www.mgpp.cl>.



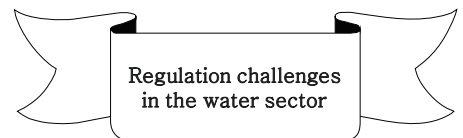
Authorities from several countries advanced towards creating a regional agenda leading to a compact on the governance of natural resources at the High-level Roundtable “Towards a Latin American and Caribbean

*Vision on Natural Resources Governance for Equality*”, held at ECLAC headquarters in Santiago, Chile, on 19 January 2015. In his presentation, Ricardo Sánchez, Officer-in-Charge of the Natural Resources and Infrastructure Division stated that improving natural resources governance in the region required building the agreements and political consensus necessary for progress in the following public policy areas:

- Creating a long-term State policy and strategy to ensure that the extractive industries contribute to development goals through productive diversification, structural change and social inclusion.
- Updating countries’ tax frameworks to achieve greater progressivity in the State’s share of income without discouraging investment in these sectors.
- Institutionalizing long-term mechanisms for the stabilization, saving and investment of income from the extractive industries.
- Building the capacity of public institutions to manage socio-environmental and labour conflicts associated with the development of extractive sectors.



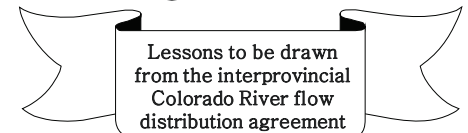
The main objective of the seminar on “*Water resources faced with uncertainty and the risk of climate change: tools for decision-makers in the public and private sectors*”, held at ECLAC headquarters in Santiago, Chile, on 29 and 30 October 2014, was to increase awareness, strengthen coordination and foster understanding among decision makers in the public and private sectors, as well as academia concerning the use of socio-economic risk management tools for climate change adaptation in the water resources sector. Participants in the seminar stressed that investment in infrastructure and public-private coordination were among the most important elements that countries in the region should consider when developing climate change adaptation plans. Investment was therefore the bridge between the short and medium term, and studies on the costs and effects of climate change could help officials to get an early start and adapt infrastructure projects for the coming decades.



The Natural Resources and Infrastructure Division cooperated with the Public Services Regulatory Authority of Costa Rica (ARESEP) in the framework of the *First*

*Latin American Congress on “Regulation Challenges in the Water Sector”* (San José, 29 September to 1 October 2014). The aim of the congress was to examine the latest developments in drinking water supply and sanitation services so as to gain an overview of the challenges facing stakeholders in the sector and promote regulatory policies and management techniques for the continuous improvement of services. The following conclusions were drawn on the main challenges to the development of the sector:

- A better balance needs to be struck in the provision of services, but without jeopardizing the progress achieved to date. A high level of quality and coverage has been reached in the supply of drinking water, but further improvement is required. Sewerage systems, however, leave much to be desired, and wastewater treatment is even worse. The gap in quality between services in cities and rural areas must also be closed.
- The most pressing challenge is to implement emergency action plans to eliminate water rationing in the driest seasons, address the network’s inability to meet the needs of certain population groups and respond effectively to the growing demand for new housing and productive projects.
- Action also needs to be taken to pre-empt medium and long-term situations that could be caused by a series of challenges, including reducing losses owing to leakage and failure to pay bills, maintaining and replacing much of the existing infrastructure and the need to further expand coverage, protecting sources so as to increase the quantity and quality of water, ensuring rational use and reducing wastage, adapting to the effects of climate change, meeting growing demand and addressing the reduction of water quality in some water systems.



We shall now present an article entitled “*Lessons to be drawn from the*

*interprovincial Colorado River flow distribution agreement*” by Javier Pascuchi, Water Basin Coordinator at the Office of the Under-Secretary for Water Resources of Argentina.

The Single Programme for Water Flow Distribution and Establishment of Irrigation Areas in the Colorado River Basin, agreed by the provinces of Buenos Aires, La Pampa, Mendoza, Neuquén and Río Negro in 1976 was a landmark event in integrated river basin management in Argentina. Now, nearly forty years after this agreement was signed, would appear an opportune moment to analyse the process leading up to it, since this case remains an example that has not been followed for any other river basin in the country.

The need for an agreement between the provinces arose not because of excessive demand for the resource—the river crossed sparsely populated areas—but because the government of the province of La Pampa decided to undertake major water resource exploitation projects in the hope of boosting the province’s economy and of reducing the concentration of its population in a handful of areas. This sparked a reaction from other provinces in the river basin, which, in the absence of any agreement, appeared to begin a race to undertake public works for the sole purpose of claiming water rights to the river.

This state of affairs was first addressed as a problem of “external relations” that could be resolved by negotiators from the provinces, with the help of experts. At the same time, however, a series of studies were carried out under the aegis of an inter-provincial technical committee which grappled with the issue for 20 years, proposing that it was a planning issue that should be addressed using systems engineering techniques. These techniques allowed to take into consideration both the many uncertainties surrounding the issue and the coexistence of various different objectives.

This meant that the large number of projects exploiting water resources undertaken by national and provincial agencies could be considered simultaneously. Thanks to the use of these techniques a satisfactory outcome could be reached. A retrospective analysis of this process reveals, however, that this success was due to the use not only of systems engineering but also of management tools that, although not explicitly heralded at the time, played a decisive role.

As subsequent experience in river basin management in Argentina shows that in the case of the Colorado River, the most difficult stage came before agreeing to the development of mathematical models to clearly display all possible configurations for water exploitation for various uses and

provide their cost-benefit analyses. The laboratory for water resources and hydrodynamics of the Massachusetts Institute of Technology (MIT) could be commissioned to develop these models because the basic principles of an inter-provincial agreement on the distribution of flows had already been agreed.

In management terminology, this “basis for an agreement” laid down a set of objectives shared by the five provinces on the use of the water of the river. The first step in managing complex problems should always be to attempt to reach an agreement on shared goals, because otherwise it is often very difficult to identify the path to take towards a solution acceptable to all parties.

The shared objectives in this case were the desire to make efficient use of resources, prioritize their use for human drinking water supply and irrigation and ensure that water exploitation contributed to territorial integration. The basis also included an agreement to carry out a comprehensive study and a commitment to respect its results.

The team at MIT worked intensively to gain a good understanding of what the provinces meant by territorial integration, and to translate the concept into measurable variables that could be incorporated into mathematical models. They concluded that this objective could be achieved in this case by developing irrigated agriculture in places that lacked any other natural resources with which to attract productive activities. The models were used to calculate the results of simulations based on historical records of river flow levels, and algorithms were employed to compare different configurations for water exploitation.

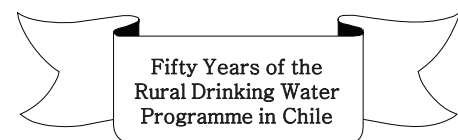
In this way, the agreement on overall goals allowed concrete proposals—on combinations of works and rules for their operation—to be made and the expected results of each proposal to be compared. The key element of this approach lay, however, less in its ability to compare alternatives than in the fact that it showed that most options brought far greater benefits for the provinces as a whole than could be expected from uncoordinated use of water from the river.

For many years the technical and political representatives of the provinces had concentrated on staking their claims to their rights and challenging any studies whose results did not appear favourable to the jurisdiction they represented. One consequence of this approach was that the basis for agreement between all provinces could only be reached once it had been decided to append a record of all disagreements concerning research findings or rights claims as an annex to the agreement.

Reading these grievances in isolation would lead one to believe that an agreement between provinces was unthinkable. But when work undertaken from shared goals showed that an integrated system of river basin management was beneficial for all parties, no complaints were raised on the basis of these disagreements (which in any case served the important purpose of showing that the representatives had not neglected the interests they represented).

From a management-based perspective, this is not surprising, since this approach specifically aims to limit technical discussions and debates on strategic matters to the consideration of concrete proposals. It thus avoids deliberations on many issues on which specialists from various fields and representatives from different jurisdictions are unlikely to agree. Management relies on verifying things in practice, and this enables the expected consequences of specific proposals to be discussed without straying into diagnostics or discussing causes or *a priori* rights when these proposals yield results that are satisfactory to all concerned. The overriding concept is that management focuses on generating solutions that are acceptable to all parties, in the knowledge that disputes, claims, complaints and rights cease to interest participants when a win-win situation can be reached that is preferable for all than a scenario in which only one party emerges as the winner of a dispute.

Endeavouring to explain why other river basins in Argentina have struggled to replicate this successful experience would doubtless give rise to as many different opinions as attempts. From a management perspective, however, this would be unnecessary. Replicating this experience would merely require the application of the basic management tools that were key to achieving this outcome: using of a systemic approach—thus avoiding the problems inherent in the partial approaches that are generally difficult to integrate—, identifying objectives shared by all parties, and working only on common ground so as to make proposals able to yield acceptable solutions.



The following is a contribution by Alberto Undurraga, Minister for Public Works of Chile, on progress in and achievements made by the *Rural Drinking Water Programme* (APR) over its 50-year lifespan.

Last year the Government of Chile launched the “Infrastructure, Development and Inclusion Agenda”. This initiative aims to secure the necessary investment for the

country to reach greater levels of development and territorial equity. Drinking water plays a crucial role in ensuring equity and quality of life. Since Chile is in the process of reforming its Water Code to accord priority to water for human consumption, the amount invested in the APR programme from the 2015 budget represents a considerable increase on previous years. This investment, up 35% on 2014, will fund 114 projects that will help more than 100,000 people who are without access to drinking water supply.

APR has played an invaluable role in improving the lives of families. We, as city-dwellers with easy access to water, find it difficult to imagine living in a home deprived of this resource and having either to go out in the rain to collect it from a river or a well with no guarantee of water quality or security.

That in a country with the level of income such as ours, there are still those without access to drinking water supply is undoubtedly a major ethical and political problem, and work is under way to overcome it and create an institutional framework for budgetary solutions. The basic content of an APR bill has already been agreed with the National Rural Drinking Water Federation (FENAPRU), which the Ministry of Public Works has promised to submit to parliament. The purpose of this draft law is to protect and strengthen APR systems and allow them to continue growing whilst ensuring that customers receive a good quality of service. In short, the aim is for all citizens to have drinking water, and the legal initiatives and budgets reflect this.

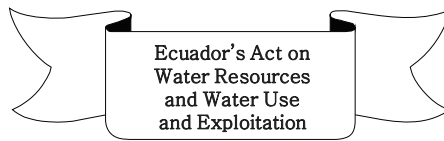
It should be remembered that Chileans are heirs to a long and rich history. In the early 1960s, however, only 6% of people in rural villages had access to drinking water. With a view to redressing this situation, in 1964 the Government adopted the Basic Rural Sanitation Plan. This was first funded jointly by the Chilean State and the Inter-American Development Bank (IDB), and later financed wholly from the public purse.

Various State agencies have been in charge of running the APR programme over the years. Since 2011 this responsibility has fallen to Rural Drinking Water Department of Waterworks Directorate of the Ministry of Public Works.

APR currently encompasses 1,666 systems (committees or cooperatives), 153 of which will celebrate their fiftieth year in 2015, and there is a long tradition of active participation from communities, since it is the beneficiaries themselves who operate, manage and maintain infrastructure once it has been built. The State has invested almost US\$ 1,350 billion in developing this infrastructure, of which 90% has been made since 1994.

Aside from the new institutional framework, other challenges include providing training on issues concerning the efficient management of systems, with a view to boosting competitiveness and improving the social and environmental conditions of the community. A further challenge is the incorporation of new technologies to provide solutions to the problems arising as a result of the prolonged water shortage.

Drinking water is a right. Ensuring effective enjoyment of it calls for investment and legal changes to institutionalize it.



One of the fundamental principles of Ecuador's *Act on Water Resources and Water Use and Exploitation* (see Circular N° 41) is that access to water is a human right.

The act enshrines the human right to water as the right of all persons to accessible, clean, safe, acceptable and affordable water for personal and domestic use in sufficient quantity and quality, and with adequate continuity and coverage of service. This right encompasses access to sanitation to ensure human dignity and health, prevent contamination and safeguard the quality of water reserves for human consumption.

Enjoyment of the human right to water must be sustainable, so that it may be exercised by future generations. The tasks of the Central Water Authority include identifying reserves of water of a quality fit for consumption by current and future generations and implementing policies ensuring compliance with the human right to water.

Individuals, communities, peoples, nations, groups and communes may petition the competent authorities to request compliance with and enforcement of the human right to water. These authorities should address these claims progressively and as a matter of priority. Authorities failing to ensure the exercise of this right shall be subject to the sanctions laid down in law.

The Central Water Authority shall establish, in accordance with national and international standards and guidelines, the necessary amount of water per person to meet basic needs and for domestic use. Access to this amount constitutes the core content of the human right to water. The necessary amount of raw water for processing for human consumption must be free of charge, in accordance with the human right to water. When consumption exceeds this minimum necessary amount, users shall be charged the

applicable rate. As for the necessary amount of treated water, users shall be charged a rate sufficient to ensure sustainability of service provision.

The human right to water also entails unconstrained access to and use of surface or groundwater for human consumption, provided that such waters are not diverted from their course, their quality is not compromised or their quantity significantly reduced and that the rights of third parties are not infringed, in accordance with the limits and parameters established by the National Environmental Authority and the Central Water Authority. The Central Water Authority shall keep a record of the use of groundwater for human consumption.

All forms of discrimination seeking to or having the effect of undermining or nullifying the equal enjoyment or exercise of the human right to water are prohibited. Policies and resource allocations concerning water and investment in the sector shall aim to ensure access to water for all members of the community under equal conditions. The State shall take whatever affirmative action measures it sees fit to promote effective equality in the exercise of the human right to water and to protect and give preferential attention to priority groups.

The gender dimension must be mainstreamed in all water-related policies to ensure that concrete measures are in place to address the specific needs of women in the exercise of the human right to water. Measures should also be taken with a view to achieving formal and substantive equality between women and men, particularly community-based activities concerning water management to ensure gender equality and empower women as agents of change.



Some websites worth visiting for information on water-related issues are listed below:

- ECLAC has published several new studies of the *socioeconomic impacts of climate change in Latin America and the Caribbean* (<http://www.cepal.org>). The issues covered include the feasibility and potential effects of a tax on greenhouse gases emissions, processes of adaptation and mitigation of climate change in the region, strategies to address climate change



and its explicit costs to public finances and the main sources of emissions.

- The **Latin American Association of Water and Sanitation Operators** (ALOAS) is a non-profit civil society association made up of drinking water and sanitation providers in Latin America, regardless of their legal form (<http://www.aloas.org>). Its primary objective is to promote and strengthen the institutional development of service providers in accordance with generally recognized principles on health, sanitation, human development, sustainability and environmental protection.
- In Paraguay, the **Inter-institutional Committee for the Coordination of the Drinking Water and Sanitation Sector** was established by Decree N° 874 of 10 December 2013. The committee's mission is to foster coordination between and joint action by public and private bodies and cooperation agencies operating in the drinking water supply and sanitation sector (<http://www.gacetaoficial.gov.py>).
- Some 40 million people in the region depend on small-scale, community-run systems for their drinking water and sanitation services. These bodies have come together to form the **Latin American Confederation of Community Organizations for Water and Sanitation Services** with a view to expanding their potential (<http://www.avina.net>).
- In Argentina, the **Federal Water Council** (COHIFE) was established following an agreement between the provinces and the central government on the need for, and desirability of, a federal body to express the views of the provinces, which have direct responsibility for water management (<http://www.cohife.org.ar>).
- **World Water Day** is held on 22 March each year as a means of focusing attention on the importance of water and advocating its sustainable use (see Circular N° 36). The theme for World Water Day in 2015 is "water and sustainable development" (<http://www.unwater.org>).
- The United Nations-Water Decade Programme on Advocacy and Communication (UNW-DPAC) has developed a **platform for best practices** in progress towards the target of the MDGs on drinking water and sanitation (<http://www.unwaterbestpractices.org>).
- **WATERLAT-GOBACIT** is an inter- and cross-disciplinary network for teaching, research and practical action on policymaking on and management of water and water-based services. It has a strong presence in Latin America and the Caribbean, but is global in scope (<http://waterlat.org>).
- The **Boletín (In) Justicia Hídrica, conflictos y resistencias en América Latina** (*Water (In) Justice Bulletin, conflicts and resistance in Latin America*) aims to help advance the debate on the future prospects and the strategies of dominance and submission implemented by stakeholders involved in water management and socio-environmental conflicts in this area in Latin America (<http://justiciahidrica.org>). It also serves as means of disseminating community-based practices for the conservation, care and development of water resources.
- The **Alianza por el Agua** (*Alliance for Water*) has published a series of documents that collect and analyse experiences in community water management and outline future challenges and prospects for the sector in the countries of Central America (<http://alianzaporelagua.org>).
- **Ambiente & Agua** (AMBIAGUA) is a quarterly publication. Its aim is to disseminate original works that contribute to the advancement of the environmental sciences and water resources management (<http://www.ambi-agua.net>).
- In Colombia, the **framework for a regional market** (<http://www.cra.gov.co>) in drinking water supply and sanitation aims to ensure long-term sustainability and financial self-sufficiency of the market and take advantage of economies of scale (see Circular N° 37). This framework enables a provider to serve multiple municipalities within the same department or in neighbouring departments, thus improving the coverage, quality and continuity of services. The Barranquilla Water Supply, Sewerage and Sanitation Company is the first service provider in the country to adopt this model.
- Peru's **National Water Authority** (ANA) is the governing body with technical and regulatory responsibility over the National Water Resources Management System (<http://www.ana.gob.pe>). Its legal form is a specialized agency reporting to the Ministry of Agriculture.
- Edition N° 4 of the magazine **Agua y Territorio** (*Water and Territory*) is devoted to large-scale water projects and relations between social and ecological stakeholders (<http://revistaselectronicas.ujaen.es>).
- The **Central American Indigenous and Peasant Coordination Body for Communal Agroforestry** works to promote processes for access to, and use and responsible management of natural resources with a view to promoting social and productive development in a manner respectful of the dynamics of the cultures of indigenous peoples and local communities in Central America (<http://www.acicafoc.org>). One of the areas of its work is rainwater collection.
- The website of **Fundación Aqueae** provides a range of interesting studies, such as "*Determinación de posibles impactos en la gestión de los abastecimientos humanos de agua situados en la Zona Metropolitana de Chile, provocados por fenómenos asociados a cambio climático*" (*Determining potential impacts of phenomena associated with climate change on the management of drinking water supplies in the Metropolitan region of Chile*), "*La eficiencia en los sistemas de distribución: revisión sobre la gestión del agua no registrada*" (*The Efficiency of Distribution Systems: a Review of the Management of Unaccounted-for Water*) and "*La reducción del consumo de agua en España: causas y tendencias*" (*Reducing Water Consumption in Spain: Causes and Trends*) (<http://www.fundacionaqueae.org>).
- **EcoAdapt** (<http://ecoadapt.eu>) is an action-research initiative working to influence water management processes that contribute to local development and reduce the vulnerability of human populations to climate change through capacity-building, knowledge sharing, conflict prevention and mitigation, and promoting joint work with key local and national stakeholders.
- The magazine **Redagrícola** is published at <http://www.redagricola.com>. One of the key issues it addresses is water use in irrigated agriculture.
- The **National Tariff System** (SNT) of Mexico's National Water Commission (CONAGUA) has maintained a database of rates for drinking water supply, sewerage and sanitation services in the country's major cities since 2006. It currently has data from more than 100 cities and provides information on tariff structures and levels that enable historical comparisons by city and classifications of users and type of service, among other things (<http://www.conagua.gob.mx>).
- **UN-Water** is the United Nations inter-agency coordination mechanism for all freshwater and sanitation related matters (see Circular N° 30). Its website has been redesigned (<http://www.unwater.org>).
- The European Environment Agency (EEA) has published a report entitled "**Assessment of Cost Recovery through Water Pricing**", which finds that, while implementation of cost recovery in water

systems across Europe vary, when applied, this approach is highly effective in managing residential water demand (<http://www.eea.europa.eu>).

- The United Nations Food and Agriculture Organization (FAO)-Water publications "*Crop yield response to water*" and "*Coping with water scarcity*" are now available as an interactive e-books (<http://www.fao.org>).
- Information on the activities of the *Caribbean Regional Fund for Wastewater Management* is available at <http://www.gefcrow.org>. Recent studies have shown that untreated sewage is one of the major threats to public health and the region's rich biodiversity and is the result of rapidly expanding urban populations, poorly planned development, and inadequate or poorly designed and malfunctioning sewage treatment facilities.
- Water has been identified by the United Nations Statistics Division (UNSD) as a priority area for implementation of the System of Environmental-Economic Accounting (SEEA). *SEEA-Water*, a SEEA "sub-system", provides compilers and analysts with agreed concepts, definitions, classifications, tables, and accounts for water and water-related emission accounts (<http://unstats.un.org>).
- The United Nations Economic Commission for Europe (ECE) has published the "*Guide to Implementing the Water Convention*". This Guide aims to strengthen the understanding of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes among governments, international partners, non-governmental organizations, academia and other stakeholders. The Guide constitutes a commentary to the Convention's

provisions, providing explanations of the legal, procedural, administrative, technical and practical aspects of the Convention's requirements for appropriate implementation (<http://www.unece.org>).

## Publications



Recent publications of the Natural Resources and Infrastructure Division on water resources management and provision of drinking water supply and sanitation services:

- "*Eficiencia energética y regulación económica en los servicios de agua potable y alcantarillado*" (*Energy Efficiency and Economic Regulation in Drinking Water and Sewerage Services*) (*Natural Resources and Infrastructure Series N° 170, LC/L.3949, January 2015*) by Gustavo Ferro and Emilio Lentini (available in Spanish only). This document analyses energy consumption in the water supply and sewerage sector and proposes regulatory policies with a view to improving the energy efficiency of service providers in the sector in Latin America and the Caribbean. Its target readership is sectoral regulatory agencies and all other stakeholders in the public and private sector. Its principal objective is to improve understanding of the issue of energy efficiency in the drinking water and sewerage sector, which encompasses the abstraction, treatment and distribution of water, as well as the collection, disposal and treatment of wastewater and sewage sludge, together with aspects related to the end use of water. A secondary aim is to propose courses of regulatory action to

improve energy efficiency which comply with standards of economic rationality. The issue of energy efficiency in the drinking water and sewerage sector is addressed from both the supply-side (concerning service providers' production and costs) and demand-side perspective (water uses and consumer responses to incentives of relative prices and income, as well as moral and behavioural aspects). Regulators need to collect and use indicators for purposes of comparative benchmarking. On the basis of indicators used by international and regional organizations, associations of service providers and regulators, and several national initiatives both in the region and elsewhere, a proposed set of indicators was developed that sector regulators in Latin America and the Caribbean could use to characterize problems prior to conducting energy audits of processes, subprocesses and equipment. Lastly, a programme of work is outlined for regulators in the countries of the region wishing to make changes in the interests of greater energy efficiency in drinking water and sewerage service provision. The programme comprises eight components (diagnosis, energy audits of equipment, loss control, information and education, encouraging the spread of metering, rewards for savings and penalties for excessive consumption, standards for appliances and mandatory labelling) of varying degrees of difficulty, cost, relative speed of implementation and expected impact.

The publications of the Natural Resources and Infrastructure Division are available as:  
(i) *electronic files* (PDF) which can be downloaded from <http://www.cepal.org> or requested from [caridad.canales@cepal.org](mailto:caridad.canales@cepal.org); and  
(ii) *printed (hard) copies* which should be requested from the Publications and Web Services Division (by e-mail to [publications@cepal.org](mailto:publications@cepal.org), post to Casilla 179-D, Santiago, Chile or by fax to (56-2) 2 210-20-69).

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