

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



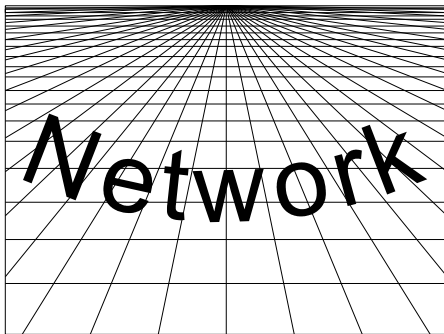
United Nations Economic Commission for Latin America and the Caribbean (ECLAC)

N° 50

July 2019

CIRCULAR N° 50

In recent decades, the development of Latin America and the Caribbean has primarily been characterized by supplying natural resources to the world, through exports of largely unprocessed commodities, with the resulting income managed predominantly to finance short-term expenditure. In view of these challenges, ECLAC has identified the conditions required to close economic, social, environmental and territorial gaps through a progressive structural change based on an environmental big push.



Coordinated refocusing of policies, investments, regulations and tax systems will drive an environmental big push. This big push will, in turn, align the paths of the numerous different stakeholders, sectors and investments, and will enable innovations, coordination and synergies involving supplies, skills, equipment, services, distribution, networks, demand and patterns. Structured interventions of multiple actors and coordinated public policies will therefore be needed to bring about an environmental big push, and, at the same time, guarantee economic growth, less social inequality, adoption of technological innovations, generation of employment, mitigation of emissions and sustainable use and preservation of natural resources.

Economically, an environmental big push depends on a coordinated package of investments and public policies. Therefore, in the context of the 2030 Agenda for Sustainable Development, we must ask ourselves whether and how the drinking water supply and sanitation sector can contribute to

the environmental big push. We believe that achievement of the Sustainable Development Goals (SDGs), and particularly SDG 6 “Ensure availability and sustainable management of water and sanitation for all”, has enormous potential to contribute to this environmental big push. But why?

Achieving SDG 6 would entail a number of advances, including universalizing the drinking water supply and sanitation services; closing social gaps in access to such services; ensuring affordable tariffs and adequate service quality (uninterrupted supply, safe drinking water); halving the percentage of wastewater currently discharged into water bodies without proper treatment; improving management and disposal of sewage sludge; minimizing emissions of chemicals into the environment, including greenhouse gases; moving forward the safe reuse of wastewater and waste recycling; increasing water-use efficiency, reducing water losses and minimizing the water footprint of services; ensuring the sustainability of water extractions; and lastly, protecting and restoring water catchment basins for domestic supply. Therefore, achievement of SDG 6 will contribute to an environmental big push for equality and sustainability in socioeconomic development in terms of:

- **Social equity:** These public policies have a direct impact on reductions in poverty and extreme poverty. Access to services frees up family funds which —previously used to obtain drinking water by other means, usually at a higher cost and of lower quality— can then be used for other activities. In addition, since this policy reduces time spent —mainly by women and children— carrying water, it will ensure more availability of time for paid work, studies or recreation. This change will lead to an overall increase in quality of life, greater gender equity and less social conflict.
- **Economic development:** people’s improved health has an impact through increased availability for work, in turn influencing productivity levels. Likewise, a

policy that boosts wastewater treatment also increases the sanitary security of water for irrigating crops and reduces water pollution, promoting access to external markets, expansion of internal markets and more competitive agricultural and fishery products, which will be eligible for more and better environmental and sanitary certifications. In terms of tourism, the availability of good drinking water and sanitation services ensures a destination

CONTENTS

- **Editorial remarks.**
- **Open discussion:**
 - Public policy guidelines: better management of the water, energy and food nexus.
 - Mexico’s national energy efficiency monitoring report.
 - Environmental sustainability of agrifood exports.
 - Estimated impact of climate change on the Caribbean’s main crops.
- **News of the Network:**
 - The 2018-30 National Irrigation Plan, Argentina.
 - Investment of funds from the Environmental Wastewater Charge in Costa Rica.
 - The Water Law of Santa Fe Province, Argentina.
 - Tenth National Meeting of the Water Resources Forum in Ecuador.
 - Uruguay’s National Water Plan.
- **Internet and WWW News.**
- **Recent ECLAC publications** on water resources management and drinking water supply and sanitation services.

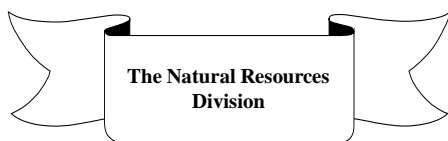
from a health standpoint and increases its attractiveness in comparison to others. Providing sewerage services, including wastewater treatment, improves the scenic quality of natural landscapes and increases their attractiveness. Lastly, having good drinking water supply and sanitation services reduces companies’ installation and operating costs. This, together with less social conflict, also drives economic development.

- **Environmental sustainability:** Although there has been an increase in recent years, urban wastewater treatment levels remain low in the vast majority of countries in the

region. As a result, many water bodies are highly polluted, especially close to large cities. Groundwater quality has also deteriorated as a result of inadequate wastewater management, leaks from sewage networks, destruction of recharge areas, urban sprawl, and overexploitation of aquifers. Expansion of wastewater treatment is crucial to overcoming the region's most pressing environmental problems. In addition, rationalization of water consumption and control of water losses can contribute to better management of the competition for use of this resource, especially in river basins where different uses compete, in a context of increasing scarcity and climate change.

- **Countercyclical policies:** Experience shows that, in times of crisis, public investment is often targeted for adjustment, with budget cuts taking precedence, in order to defer investments in public service sectors and reduce maintenance costs of existing infrastructure. These policies have disastrous consequences in the medium and long term, both in terms of economic efficiency and social equity. An important lesson of recent decades is the value of countercyclical macroeconomic policies. Faced with a need to spend and transfer more money in periods of recession, such public policies serve to ensure that credit standing and savings are accumulated in expansive phases of the cycle, so that the capital may be drawn on during crises. In addition, during this period, it is important to control the temptation to spend extraordinary and sporadic revenues as if they were ongoing and steady.

The challenge of an environmental big push in the drinking water supply and sanitation sector in Latin America and the Caribbean requires: structuring of public policies, institutional incentives and financing mechanisms to universalize such services, combined with a determined advance towards SDG 6 as a crucial long-term priority in government agendas.



In order to boost synergies and coordination in the ECLAC programme of work, the Natural Resources and Infrastructure Division (formerly the Natural Resources and Energy Division), which had published this Circular since July 1994, was restructured on 1 January 2019. As part of this reform, the Infrastructure Services Unit was moved to the Division of International Trade and Integration. In addition, the Agricultural Development Unit of the Division of Production, Productivity and Management

was transferred to the Natural Resources Division. Lastly, due to these changes, the name of the Natural Resources and Infrastructure Division was changed to **Natural Resources Division** (NRD). The Division now includes the Non-Renewable Resources Unit, the Water and Energy Unit, and the Agriculture and Biodiversity Unit.



One of the contributions made by the study “*Lineamientos de políticas públicas: Un mejor manejo de las interrelaciones del Nexo entre el agua, la energía y la alimentación*” (*Public policy guidelines: Better management of interrelations of the water, energy and food nexus*) by Antonio Embid and Liber Martín (see Circular No. 49) is the formulation of a phase-based action plan containing a series of recommendations for the countries of Latin America and the Caribbean to move towards better management of nexus interrelations and to thus achieve the objectives of water, food and energy security.

To date, the water, energy and food nexus has been the subject of limited consideration in the countries of Latin America and the Caribbean. The design of public policies on natural resources and infrastructure remains fragmented by sectors, as a result of both the novelty of the nexus approaches and the lack of appropriate regulatory and organizational frameworks. The latter negative factor frequently prevents planning and execution of public policies that reflect coordinated aggregation of sector policies and actions on water, energy and food and their environmental foundation.

It is essential that public policies are shaped to achieve a combined vision of actions that have so far been separate, given the challenges of achieving water, food and energy security within demanding time frames, and in view of expected increases in demands for water, energy and food by 2030. This relatively close year is highly symbolic since it is also the limit for fulfilment of the SDGs, some of which (2, 6 and 7) are closely related to the components of the nexus.

In territorial terms, these public policies related to the nexus will predominantly be

formulated at the national level. The public body responsible for devising and implementing these policies will be the State, with appropriate participation by other public entities —above all in federal-style States—, and also by citizens and the private sector. This starting point is irrefutable under the region's current conditions, although this should not be interpreted as a rejection of the role that the international or local territorial spheres can play in certain actions. In particular, certain international organizations play a crucial role in better protecting the human rights (water, food and energy) that are recognized in certain constitutions and national legislation. Similarly, the nexus is “naturally” incorporated into certain international treaties relating to binational hydropower infrastructure (such as Itaipú and Yacretá). For this reason, the challenges of the nexus could be reflected in new international treaties for the use of specific binational or plurinational energy infrastructure or in hypothetical amendments of current treaties, with a similar aim.

Even from this national level, the formulation of national policies based on the nexus may entail difficulties in federal States, where competences may be fragmented not only horizontally, but also vertically. This may mean that federal States may have the capacity to formulate policies for the three components of the nexus —also raising the need for non-fragmented global policies— notwithstanding the coordination that must be exercised at the national and local levels. Likewise, there is a special aptitude for developing nexus policies in river basins (through river basin organizations where they exist) and local entities (especially municipalities), given that urban areas account for a remarkable, growing proportion of the population in the region.

It would be impossible to consider a valid public policy programme (plan of action) for all the countries of Latin America and the Caribbean if such a plan were intended to be exhaustive in terms of instruments and deadlines for objectives and were designed to be applied identically in all cases. However, it is possible to identify a number of basic elements that could, with carefully selected objectives and time frames, form a widely shared starting point and could lead the different countries to formulate policies that enable better management of the interrelations in the nexus between water, energy and food.

This action plan comprises different stages, in this case not merely to establish time frames and a strict chronology of suggested actions, but rather to order measures from the most pressing to what could be considered to be the outcomes of nexus-based public policies, achieved in the final stages of the plan. This is suited to specific overlapping of

actions from different stages, adapted to the particular circumstances of each country. Actions that are considered to belong to a second or third stage could even be judged to be essential (for example, approval of a water law for countries that do not yet have one), with the capacity to form a basis for the rest of the actions. Dogmatism in such matters is the enemy of efficiency. Therefore, this plan's approach is based on flexibility, adaptability and gradualness.

Next, we will describe the first of these stages, relating to knowledge of context. We will continue with the remaining stages in Circular No. 51: improvement of knowledge, regulatory framework and administrative organization; and implementation and enhancement of planning, implementation and development of economic incentives, river basin organizations and investments focused on nexus policies.

Formulation of public policies must begin with a thorough knowledge of the existing situation that is to be transformed through new policies. Acquisition of such knowledge entails appraising the alignment of the known situation with the general objectives that must be pursued to achieve water, energy and food security, given the expected large volume of future consumption (or demand).

An understanding of the situation and the issues related to the nexus—in other words, as precise a description as possible of any priority interconnections in each country—will guide the policies that must be adopted to bring about change. For Latin America and the Caribbean as a whole, these interconnections were analysed in the study “*El Nexo entre el agua, la energía y la alimentación en América Latina y el Caribe: planificación, marco normativo e identificación de interconexiones prioritarias*” (*The water, energy and food nexus in Latin America and the Caribbean: planning, regulatory framework and identification of priority interconnections*) by Antonio Embid and Liber Martín (see Circular No. 47) and applied to a specific river basin in the study “*El Nexo entre el agua, la energía y la alimentación en Costa Rica: el caso de la cuenca alta del río Reventazón*” (*The water, energy and food nexus in Costa Rica: the case of the upper Reventazón river basin*) by Maureen Ballesteros and Tania López (see Circular No. 49).

In some cases, the volume and quality of information available will enable a fairly accurate understanding of the situation, through simple systematization, cross-checking and ordering, carried out with the critical interconnections in mind. In other cases, the priority will be to improve this knowledge, since otherwise it will be impossible to study interconnections and the

formulation of public policies. To make this possible, the following would be required:

- Verification of the information on energy production held by the different public bodies responsible for each sector of economic activity (in particular, hydropower, but also regarding other forms of energy whose generation processes may require water, such as cooling of thermal or nuclear power plants, production of biofuels and geothermal energy). Information on agricultural production and the internal and external food trade must also be verified. In addition, governments must have access to up-to-date studies on water footprints, especially as regards agrifood production (of the different key crops) or biofuels (in terms of the nexus, it is necessary to differentiate between the two agricultural processes).
- Obtaining theoretical and real information on water availability, knowledge of the degree of exploitation or depletion of aquifers and of the quality of water, particularly groundwater. For irrigated agriculture (including for biofuels) this information is of particular interest, to relate this hypothetical level of exploitation and quality with public policies on energy and irrigation incentives (or energy incentives to extend the agricultural frontier). In this respect, it is essential to know average annual consumption in irrigated agriculture, crop types, the state of internal distribution infrastructure within agricultural areas (to measure losses during conveyance) and the level of self-organization of agricultural users into associations, boards, watercourse inspectorates, associations of canal users or the other various names that exist, and whether they are able to participate in the design or implementation of policies on water and agriculture.
- Systematization of the means of economic intervention available to the competent public bodies in the water, energy and food sectors. This includes knowledge of the different prevailing taxes or charges (such as water-use charges, wastewater payments or taxes on electricity generation), as well as subsidies or financial assistance for different sectors (particularly those which are applied for and granted periodically). In addition, there should be a catalogue of existing tax bodies and, above all, their management (effective enforcement) and collection capacities. In the case of assistance or subsidies, objectives, recipients, amounts and impact on production and resulting prices must also be described at the individual level.
- Assessment of the different existing infrastructure construction projects for

production or transport of water (reservoirs, canals), energy (power plants, transmission lines), or the transformation of rain-fed land into irrigated land, or modernization. Also, a description of the degree of progress or completion of projects (technical plans in preparation, completed or approved, with budget items allocated, in public tender, awarded after tender, underway, indicating the current stage, such as purchase or expropriation of land, or construction).

- Special studies of projects that relate to multipurpose reservoirs (stored water used for supplying drinking water to the population, energy production or irrigation), specifying volumes of water used for each purpose, and proposed (hypothetical) production capacity of the sectors targeted to receive the reservoir water. Consequently, the capacity to generate income and exports, and to create jobs from planned uses (for example, tourism), should also be studied.
- In the different phases of transformation of agricultural lands from rain-fed to irrigated, or modernization of irrigated land, plans should also be produced specifying size, costs and beneficiaries' participation in the financing of actions.

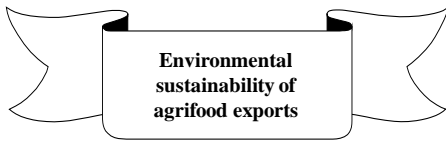


The *Informe Nacional de Monitoreo de la Eficiencia Energética de México* (*National Energy Efficiency Monitoring Report for Mexico*) was prepared as part of the activities carried out by Mexico's National Commission for the Efficient Use of Energy (CONUEE) within the framework of the Energy Efficiency Indicators Database (BIEE) programme, coordinated by ECLAC with the collaboration of the German Agency for International Cooperation (GIZ) and the technical support of the French Environment & Energy Management Agency (ADEME).

The report presents a number of indicators that reflect the evolution of energy efficiency in Mexico, analysing national trends in energy consumption and in energy efficiency measures for the energy, industrial, transport, commercial-services, residential and agricultural sectors, as well as the water and energy nexus. The indicators proposed by the BIEE program are a useful tool for monitoring programmes and analysing energy efficiency policies.

At the suggestion of ECLAC subregional headquarters in Mexico, CONUEE accepted the challenge of including in its national report a chapter on the water and energy

nexus and its corresponding indicators, with support and information from the National Water Commission (CONAGUA), Petróleos Mexicanos (PEMEX) and the Federal Electricity Commission (CFE). The chapter includes three sections that expound on the following themes: policies and programmes that link water management and energy management, energy for water management (hydrological characteristics, uses of water in Mexico and indicators for different states) and water for energy production (electricity generation and oil production). This report is an important point of reference, in addition to SDGs 6 and 7 of the 2030 Agenda for Sustainable Development, to start working on all the linkages in the nexus.



The ECLAC Division of International Trade and Integration has published the study “*Sostenibilidad ambiental en las exportaciones agroalimentarias: un panorama de América Latina*” (*Environmental sustainability of agrifood exports: a panorama of Latin America*) by Ximena Olmos. This publication reviews the main instruments used in international food trade as indicators, or support, for environmental sustainability practices. Some of these tools are cross-cutting (such as carbon and water footprints), while others are specific to agricultural, livestock and fishery products. In each case, the level of participation of the region is also included, or relevant aspects to take into account, considering the main products exported by Latin America and the Caribbean.

In 2014, the ISO 14046 standard was published, addressing the water footprint and offering a methodology for life cycle assessment of the potential impact of products, services or organizations on water. In 2016, a group of experts from 13 Latin American countries prepared a guide that considers the situation in the region. The guide identifies the major challenges relating to water footprint quantification and verification efforts in Latin America, which focus on the following key themes:

- Availability of representative data for Latin American countries, which are required to generate water footprint inventories.
- Adaptation of impact assessment methods so that they incorporate assumptions and environmental mechanisms that are more representative of the countries of the region.
- Access to databases and programmes to reduce costs.
- Increased demand for ISO verification.
- The technical capacities of companies, consultants and verifiers for this analysis.

In Latin America, use of the water footprint is relatively recent. Studies can be found from 2011 onwards that include the food situation in much of their research. For example, water footprints have been calculated for Argentine soybeans, milk, peanuts and wine grapes; Bolivian carbonated beverages; Brazilian soybeans, milk, rice, cattle and sugar cane; Peruvian bananas; Ecuadorian bananas, cocoa, maize and potatoes; and Mexican wheat, maize and beer.

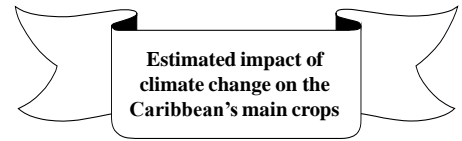
In the region, it is estimated that the agricultural products that consume the most rainwater (green water footprint) are soybeans and maize. The largest consumers of groundwater and surface water (blue water footprint) are rice and sugar cane. Of the crops in the region, maize pollutes the largest proportion of water (grey water footprint).

The international market accounts for 22% of the agricultural sector’s total water footprint. Just over three quarters of the region’s virtual water is exported in the production of five products: soybeans (36%), coffee (14%), cotton (10%), livestock products (10%) and cane sugar (8%). The main destinations for exported virtual water are the European Union (36%), the United States (22%) and China (8%). Most of the water footprints associated with these products were green footprints.

The study concludes that, in recent years, food exporters in the region have moved rapidly from mere safety requirements to environmental sustainability requirements. This has entailed incorporating other factors, such as climate change, into their business strategies, as well as instruments for calculating the impact of their production processes on an increasingly broad range of environmental categories.

The environmental sustainability of food production and export encompasses issues as broad and diverse as carbon footprints, water footprints, soil conservation, biodiversity, and even the loss of foodstuffs. Emphasis and instruments change according to the specific characteristics of each product and the changes in consumption patterns.

One key stimulus for introducing these instruments and standards is the demands of international consumers. The geographical fragmentation of production and the concentration of food trade in transnational companies also fosters incorporation of standards that enable the quality and sustainability of the entire production chain to be demonstrated. Since the countries of the region are at the beginning of global food value chains they are subject to a wide variety of requirements, because a significant part of the environmental impact is generated in the extractive stage.



The Climate Change Unit of the ECLAC Sustainable Development and Human Settlements Division has published the study “*Estimación del impacto del cambio climático sobre los principales cultivos de 14 países del Caribe*” (*Estimated impact of climate change on the key crops of 14 Caribbean countries*) by Alejandro López-Feldman, Juan Manuel Torres and George Kerrigan Richard. The objective of this paper is to contribute to analysis of the potential impact of climate change on agriculture in the Caribbean. The key results of this study show that climate change —specifically changes in temperature and precipitation— can have a significant impact on agricultural production in the countries of the Caribbean region.

At the regional level, looking ahead to 2050, the aggregate expected impact of climate change for all crops is a 7% drop in average production compared to the 1961–2014 period. However, changes in temperature and rainfall patterns will affect different crops in different ways. Therefore, by 2050, production from fruit trees is expected to have decreased by 24%, while oilseed production may rise by 15%.

At the regional level, the most affected country would be Dominica. Based on the climate projections used, the island could experience substantial losses in production of vegetables (81%), roots and tubers (51%), legumes (42%) and fruit (37%). However, more moderate climate scenarios could entail smaller declines in crop output.

The impact of climate change on agriculture could be even greater if the potential effects of extreme weather events are included. Overall, extreme events and disasters in the Caribbean are expected to increase in frequency and intensity over the coming years and significantly affect the agricultural sector.

Such events have significant side-effects on economies, social well-being and the environment, considering the importance of agricultural activities in the Caribbean in terms of their contribution to rural income, gross domestic products (GDP), employment, poverty trends and food security. The Caribbean shows clear asymmetry with respect to climate change: the region’s contribution to greenhouse gas emissions is unquestionably marginal, but it is also particularly vulnerable. In this regard, it is important to promote an agenda of adaptation to and mitigation of this cross-cutting change, which involves the agricultural sector and also

forms part of development and disaster risk management plans.

Caribbean countries (such as Grenada, Guyana, Jamaica and Trinidad and Tobago) are therefore implementing national climate change policies and action plans within the framework of development strategies. At the regional level, great progress is being made in climate-compatible development planning and in the formulation of the 2014–2024 Caribbean Strategy for Integrated Disaster Management, which recognizes the links between disaster management, sustainable development and adaptation to climate change in the agricultural sector.

Decision-makers in the agricultural sector need climate change impact assessments to formulate policies, define investment priorities and estimate comparative advantages for food production. In this respect, the results of this research offer an initial overview. More accurate studies will require platforms and models that are not yet available for all Caribbean countries due to limited economic, climatic and crop data. This is why there must be investment in generation and systematization of information, in scientific analysis and in communication of findings.



The 2018–2030 National Irrigation Plan in Argentina

In May 2018, the Argentine Ministry of Agroindustry launched the **2018–2030 National Irrigation Plan**, by means of Resolution No. 108/2018. The Plan was created under the auspices of the Office of the Under-Secretary of Agriculture of the Secretariat of Agriculture, Livestock and Fisheries. The Plan is intended to form the basis for development of different programmes and projects to address diverse aspects of irrigated agriculture and promote fully sustainable development of such agriculture throughout the country.

In Argentina it is estimated that there is an irrigated area of approximately 2 million hectares, with 1.4 million requiring irrigation for the entire cycle and 600 thousand where supplementary irrigation is used. The surface area under supplementary irrigation has

grown, mainly in the last 10 years, with a boom in grain crops and significant private investment, using groundwater.

Nonetheless, existing major irrigation systems are still considered inefficient in terms of conveyance and distribution losses, with consequences that sometimes make drainage difficult, and even cause waterlogging and salinization of soil, particularly in arid or semiarid regions, jeopardizing the economic sustainability of the systems. The inefficiency of irrigation systems is mainly due to the poor state of infrastructure within farms and low technology use in irrigation. Efficient use of water, both on-farm and off-farm, is considered essential to increasing production and improving the competitiveness of producers in different areas of the country, which can in turn increase the sustainability of production systems. Sufficient surface water and groundwater is considered to be available, and enough potential in terms of land, for significant expansion of the agricultural frontier through irrigation. Thus, the irrigation area in the country can and must be doubled to 6 million hectares by 2030, accompanied by more efficient use of water for irrigation.

To achieve these objectives, the National Plan includes the following components: institutional strengthening, communication, research, public works, financing, legislation (harmonization and convergence of the legal framework on ownership and use of water), environment (designing climate change adaptation strategies for integrated, sustainable management of water resources used in irrigation), and technical training and education of public and private agents.

Investment of funds from the Environmental Wastewater Charge in Costa Rica

Directive No. 02-2018-MINAE of the Minister of the Environment and Energy (MINAE) of Costa Rica, published on 6 June 2018, stipulates that **revenues from the Environmental Wastewater Charge** (see Circular No. 20) shall be invested as follows:

- 15% shall be used to finance cleaner production projects that enable more efficient use of water resources and a reduction in pollutant discharges. These funds shall be invested in voluntary cleaner production agreements, technical assistance, the development of cleaner production manuals and research to reduce pollutant discharges.
- 10% shall be used to finance the cost of managing the Environmental Wastewater Charge. This amount will be invested by the MINAE Water Directorate in tasks related to management of this charge.

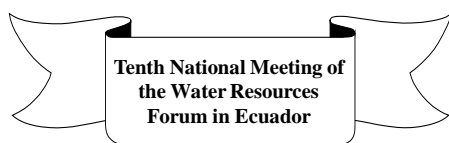
- 10% shall be used to finance compliance with requirements for monitoring of sources of emissions, including identification of effluent-generating sources, sampling of discharges, laboratory analysis, technical studies of water quality in water bodies, and other aspects related to the measurement, estimation and control of discharges.
- 5% shall be used to finance environmental education activities focused on saving water and preventing water pollution; good practices for water use and management that improve water quality; and appropriate forms of water treatment and disposal of treated wastewater, prevention of pollution of water bodies and water resources in general, aimed at the general public and other water users.
- 60% shall be used to support financing for investments in sewerage systems and domestic wastewater treatment projects. This amount shall be transferred by MINAE to the providers of public drinking water supply and sanitation services to undertake the projects selected through public tenders.

The Water Law of Santa Fe Province, Argentina

Law No. 13740, the “**Water Law**” of the province of Santa Fe, Argentina, regulates integrated water resources management to promote the different sustainable uses of water for the benefit of present and future generations. The Law thus guarantees the fundamental human right of access to safe water and emphasizes that integrated water resources management entails land-use planning. The provincial water policy is built around the following lines of action:

- Protecting water as a social, environmental and landscape good for present and future generations.
- Preserving the quality and quantity of this good, applying the principles of prevention and foresight.
- Ensuring equitable access to water to meet human and social needs by improving quality of life, prioritizing regions where this resource is scarce.
- Conserving and protecting hydrological cycles, natural water reserves, environmental uses and ecological flows.
- Undertaking actions to increase resilience to the risk of natural disasters such as erosion, droughts and floods, through structural actions and non-structural measures, preserving the integrity of people and their property.
- Protecting all aspects of health that are related to water.
- Preserving water resources and protecting them from attack by pollutants.

- Implementing structural actions and non-structural measures related to water resources, to favour productive activities.
- Implementing water resources management that is appropriate to the naturally established patterns of each region, respecting watersheds and river basins.
- Evaluating water resources based on ongoing recording of hydrological variables.
- Regulating productive uses of water resources.
- Undertaking participative management, guaranteeing the right to public information and to citizen participation in regulatory decisions regarding general matters or management; in particular, taking into account that women play a fundamental role in water supply, management and protection.
- Achieving active participation in national organizations related to water resources management.
- Coordinating and integrating water policy into the province's sector-specific public policies. In particular, it should be coordinated with environmental, food, land-use, urban planning, road and risk management policies.
- Preparing and continuously updating an inventory of available and potential water resources. In addition, a Water Information System will be organized, including data storage, processing and consultation. To this end, there will be coordination and collaboration with the bodies of administrative districts and municipalities, and with national, international and private entities that are involved in or responsible for the matter.
- Promoting human resources training.
- Promoting water education and culture.
- Disseminating knowledge concerning water resources.



In the city of Quito, Ecuador, on 5 and 6 July 2018, the *Tenth National Meeting of the Water Resources Forum* was held, with more than one thousand delegates from organizations and institutions in the public sector and from civil society and academia, committed to integrated and sustainable water resources management. The debates focused on the following topics:

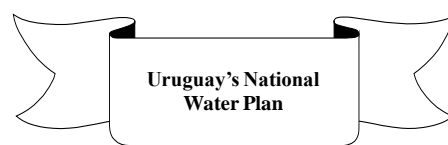
- Water for all.
- Making the community-based system a reality and making public-community partnerships effective.
- Attending to community water and sanitation systems.
- Developing irrigation for food sovereignty and the fight against poverty.

- Achieving a democratic, efficient and transformative institutional framework.
- Establishing norms that guarantee the human right to water, the rights of nature and food sovereignty.
- Caring for ecosystems for the present and future.
- Avoiding natural resource extractivism and large dams.

At the Tenth National Meeting, the “Agenda for Water” Agreement was signed by the representatives of the Water Secretariat (SENAGUA), of the Water Resources Forum and of social entities, research institutions, universities and non-governmental organizations (NGOs). The Agenda contains commitments in the following areas: water and mining, water and sanitation, water protection areas, the community-based water system, the water fund, the regulatory framework, water grabbing and democratization, and irrigation and drainage.

For example, as regards water and mining, the commitments are as follows:

- To analyse water use and exploitation permits related to mining. In addition, to analyse certificates of non-interference with water resources so that compliance with constitutional and legal provisions and suitability can both be determined during the issuance process, and if inconsistencies are found, to take the corrective measures provided for in the Organic Law on Water Resources, Uses and Exploitation (see Circular No. 42).
- To promote a process of participatory monitoring of water quality in mining activities in which communities, organizations of peoples and nationalities, academia and decentralized autonomous governments are all central actors.
- To develop, in a participative way, the tools for water resource management in mining: a manual of procedures for the different stages of mining, requirements, procedures and obligations.
- To request that the competent authorities take appropriate measures regarding mining concessions that do not have prior approval from SENAGUA as a prerequisite to begin operating in any of the stages of mining.



The government of Uruguay approved its *National Water Plan* in a decree on 31 July 2017. The Plan is a technical-political instrument for water planning and management, considering the different uses of the resource. This is an initial water management plan, guiding actions through to

2030, as established by the National Water Policy Law of 2009 (Law No. 18610) (see Circular No. 32).

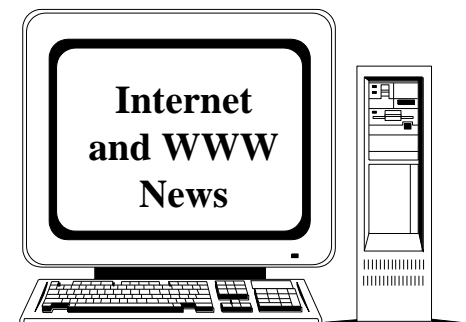
The Plan has objectives that reflect its aspirations:

- **Water for human use:** To guarantee that inhabitants can exercise their fundamental human rights of access to safe water and sanitation. The first priority for water use is supplying drinking water to towns and providing drinking water and sanitation services. This should be done by putting social motivations before economic ones.
- **Water for sustainable development:** To have water in sufficient quantity and quality for the country's social and economic development and, also, for the conservation of biodiversity and for the functioning of ecosystems through integrated and participatory management.
- **Water and its associated risks:** To prevent, mitigate and adapt to the effects of extreme events and climate change, with a focus on risk management.

The plan is based on a status report that includes analysis of the main factors related to water knowledge and management in Uruguay, with projections of future scenarios regarding demand for different uses, hydroclimatic variability and the environment. It uses analysis of the current situation and projections to identify crucial issues and is directed by strategic guidelines that guide actions and pervade the objectives set for the Plan:

- Integrated and sustainable management.
- Participation of civil society users.
- Incorporation of the concept of risk into planning and management.
- Research, innovation and capacity building.
- Environmental education.

The lines of action are structured into programmes and projects with short-, medium- and long-term goals. The planning cycle concludes with monitoring and evaluation of the actions implemented, resulting in revisions, updates, rescheduling and new projects.



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

- The presentations from the *32nd Annual Convention and Expo of the National Association of Water and Sanitation Companies of Mexico* (ANEAS) (29 October to 1 November 2018, Mazatlán) (see Circular No. 27) are available at <http://www.convencionaneas.com>.
- Spain's *Research Institute of Water and Environmental Engineering* (IIAMA) promotes scientific and technical research and fosters specialised teaching and technical advice in all water-related matters (<https://www.iiama.upv.es>).
- The main objective of Ecuador's *Water Regulation and Control Agency* (ARCA) (see Circular No. 41) is to regulate and control comprehensive and integrated water resources management. In addition, the Agency reviews the quantity and quality of water at sources and in recharge areas. ARCA also evaluates the quality of public services and all uses and exploitations related to the water sector (<http://www.regulacionagua.gob.ec>).
- The Pan American Health Organization (PAHO)/World Health Organization (WHO), jointly with health authorities of countries of the Americas, have released *Health Situation in The Americas: Core Indicators 2018*, which includes data on the 82 core indicators grouped into the following categories: demographic-socioeconomic, health status, risk factors, service coverage, and health systems. It also presents information on 22 SDGs indicators (<https://www.paho.org>).
- The objectives of Colombia's *Autonomous Regional Corporation for the Magdalena River* (CORMAGDALENA) include restoring navigation and port activity, adapting and conserving land, generating and distributing electricity, and making sustainable use of the environment and other renewable natural resources and preserving them (<http://www.cormagdalena.gov.co>).
- The *Nicaraguan Institute of Territorial Studies* (INETER) is the entity responsible for meteorological, geological, cartographic and hydrological research and for physical resource assessment in Nicaragua (<https://www.ineter.gob.ni>).
- The *Spanish Water Supply and Sanitation Association* (AEAS) is a professional association for the promotion and development of the scientific, technical, administrative and legal aspects of urban drinking water supply and sanitation services (<http://www.aeas.es>).
- The *Agua de Honduras* platform is an innovative initiative that provides information on water resources. It combines scientific methods with public information on climate, hydrometry, hydrographic boundaries, soils, vegetation, water demand and digital technology to facilitate decision-making on water management in micro-basins, sub-basins and basins (<https://aguadehonduras.gob.hn>).
- *HydroLink* is the main magazine of the International Association for Hydro-Environment Engineering and Research (IAHR) community and supplies the latest news on hydro-environment engineering and research (<https://iahr.org>).
- The purpose of the *Environmental Fund of El Salvador* (FONAES) is to gather and manage financial resources for plans, programmes, projects and other activities to reverse environmental degradation and reduce climate change vulnerability (<http://fonaes.gob.sv>).
- The *National Environmental Information System* (SINIA) is the Chilean public sector's main gateway for environmental information and is also a tool for disseminating environmental information, thus safeguarding the right of access. The information in this system also supports decision-making on environmental issues at the national and regional levels (<http://sinia.mma.gob.cl>).
- The Inter-American Development Bank (IDB) published the study, "*Impuestos a los servicios públicos domiciliarios: un análisis descriptivo de las tasas sobre los servicios de agua y electricidad*" (*Taxes on domestic public services: a descriptive analysis of charges for water and electricity services*) by Cinthya Pastor, Tomás Serebrisky and Ancor Suárez-Alemán, which offers descriptive analysis of the taxes, levies, rates and charges on the provision of domestic public electricity and water services (<https://www.iadb.org>). The study covers experiences from the region (Argentina, Chile, Ecuador, Peru and Uruguay) and also from some developed countries (Belgium, France and Spain).
- The *Mexico City Water System* (SACMEX) was created in 2003 by merging the General Directorate of Water Constructions and Operations (DGCOH) with the Water Commission of the Federal District (CADF). SACMEX's objective is to provide the inhabitants of Mexico City with drinking water, drainage, sewerage, wastewater treatment and reuse services (<https://www.sacmex.cdmx.gob.mx>).
- *Waterpreneurs* is a global "for-impact" organization, supporting the scaling-up of impact investments financing the growth of drinking water supply and sanitation enterprises operating in developing countries (<https://www.waterpreneurs.net>). It works on dialogue and provides multi-stakeholder solutions (private, public, civil society, etc.) around issues of human rights, security and peace in the world, through the development of entrepreneurs who provide basic services to the most vulnerable populations, in particular through access to drinking water.
- The *Provincial Water Institute of La Rioja* (IPALAR) manages the water sector in the province of La Rioja, Argentina, developing, unifying and executing plans, programmes and projects for the conservation, adaptation and sustainable use of water resources, as well as the development of irrigation and basic sanitation with an integrated approach, preserving the environment and ensuring the priority of use of water for life (<http://www.ipalar.com.ar>).
- Panama's *National Water Council* (CONAGUA), created by Cabinet Resolution No. 114 of 23 August 2016 to replace the High-Level Water Security Commission, is responsible for promoting, guiding, coordinating and ensuring development and implementation of the 2015–2050 "Water for All" National Water Security Plan (<http://www.conagua.gob.pa>).
- The Food and Agriculture Organization of the United Nations (FAO) has launched the discussion paper "*Nature-Based Solutions for agricultural water management and food security*", in which 21 case studies of water management processes are analysed to ascertain the extent to which they meet the requirements of nature-based solutions (<http://www.fao.org>).
- The purpose of the *Water Knowledge Centre* (CENCA) is to facilitate access to and dissemination of information, and to collaborate in knowledge creation processes, in order to contribute to the mission of the Mexican Institute of Water Technology (IMTA) (<http://cenca.imta.mx>).
- The *Yaque del Norte Water Fund* (FAYN) in the Dominican Republic is a public-private platform designed to channel financing for preservation of water supply ecosystem services in the Yaque del Norte River basin, to contribute to the water security of the city of Santiago de los Caballeros (<http://fondoaguayaque.org>).
- The Organization for Economic Cooperation and Development (OECD) has published a paper on *exploring means to facilitate policy changes on water in agriculture* (<https://www.oecd-ilibrary.org>). This report offers a guide to potential reform pathways towards sustainable agricultural water use, based on a thorough

review of selected past water and agriculture reforms and extensive consultation with policy experts. The theory of change developed emphasizes the importance of flexibility in the timing and design of reform processes to achieve practical and effective policy changes.

- In November 2000, a group of researchers from Argentina and Uruguay established the **Argentine-Uruguayan Association for the Green Economy** (ASAUEE) (<http://asauee.org>), with the aim of expanding the regional knowledge base and research on the green economy.
- Through the **Joint Monitoring Programme on Water Supply and Sanitation** (JMP), WHO and the United Nations Children's Fund (UNICEF) have published reports on such services in schools and health-care facilities (<https://washdata.org>).
- The **International Society for Ecological Economics** (ISEE) is an organization devoted to advancing understanding of the relationships among ecological, social, and economic systems for the mutual well-being of nature and people (<http://www.isecoeco.org>).
- A new LinkedIn group "**Blue-Green Infrastructure**" promotes the sharing of knowledge and expertise on the use of nature-based solutions for managing water, wastewater, and stormwater sustainably to reduce environmental degradation and enhance resilience to climate change (<https://www.linkedin.com/groups/10412555>).
- The International Institute for Sustainable Development (IISD) has published a scoping study which provides an overview and assessment of the **costs and benefits of**

investment treaties from the perspective of developing countries (<https://www.iisd.org>).

- A recent issue of the journal **Water Alternatives** (see Circular No. 27) includes a series of articles on remunicipalization of water services and the socio-political complexity of Peru's water crisis (<http://www.water-alternatives.org>).
- The **Guidance Document to Economic Valuation** is aimed at Global Environment Facility (GEF) International Waters project managers, economic experts and other stakeholders involved in GEF International Waters projects and more generally those interested in including the economic valuation of ecosystem services into Transboundary Diagnostic Analyses (TDA) and Strategic Action Programmes (SAP) and linked processes, such as policy and decision makers and environmental and development planners (<https://iwlearn.net>).

between water, energy and food production, which are considered three key resources for sustainable development at the global and national levels. This study analyses the case of the nexus in Chile, covering the appearance of the issue of electricity in the public agenda, the evolution of public policies and legal-institutional frameworks related to water management and the development of irrigation and electricity. It also presents the most significant outcomes in each period and their relationship with social, economic and political changes in the country. The analysis distinguishes between four periods: the initial stage; the second period, in which the State was the driver of development; the third in which the market played a predominant role and there was limited regulation; and, finally, a new stage of equilibrium between public interest and market incentives. This historical and institutional approach aims to show how the relations expressed within the nexus reflect specific contexts determined by the level of development of the country at given points in time, which may be useful in terms of contrasting this case with other countries' experiences and taking advantage of lessons learned. The report highlights the importance of the nexus for compliance with the SDGs and for the country's progress in this area.

Publications



Recent publications of the Natural Resources Division on issues related to water resources:

- "**Agua, producción de alimentos y energía: la experiencia del Nexo en Chile**" (*Water, food production and energy: the nexus experience in Chile*) (Project Document Series, LC/TS.2018/102, 2018) by Humberto Peña (available only as an electronic document). There has long been emphasis on the particular importance of interactions

The publications of the Natural Resources Division are available in two formats: (i) electronic files (PDF) which can be downloaded from <http://www.cepal.org/drni> or requested by email from marina.gil@cepal.org; and (ii) printed (hard) copies which should be requested from the Publications and Web Services Division (either by email to publications@cepal.org or by mail to ECLAC Publications, Casilla 179-D, Santiago, Chile).

UNITED NATIONS

NACIONES UNIDAS



NATIONS UNIES

Economic Commission for Latin America and the Caribbean (ECLAC)

Natural Resources Division

Casilla 179-D

Santiago

Chile

PRINTED MATTER
AIR MAIL