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Preface

Ensuring long-term water security is essential in the pathway towards climate change adaptation, inclusive growth and sustainable development in Argentina. In a country with such a large territorial and hydrological diversity, managing water risks and ensuring universal access to drinking water and sanitation, requires effective multi-level governance and planning. The macroeconomic context as well as key megatrends related to climate, demography and urbanisation pose serious challenges to current and future water availability and demand. But they also provide a unique opportunity to set the right incentives towards greater water use efficiency and to transition from crisis to risk management, in a shared responsibility across local, basin, state and national levels.

Over the past year, the national Secretary of Infrastructure and Water Policy of the Ministry of Interior, Public Works and Housing of Argentina and the OECD, in co-operation with the Inter-American Development Bank (IDB), have engaged a multi-stakeholder dialogue to assess the strengths and weaknesses of Argentina's water governance against the *OECD Principles on Water Governance*, and to enhance national and provincial capacity to deliver effective, efficient, and inclusive water policies. This policy dialogue involved over 200 representatives from public, private and non-profit sectors (Annex A). It was based on a robust data collection process and benefited from peer-reviewers from Australia, Brazil, the Netherlands, Spain and the United States. The report *Water Governance in Argentina* summarises the key findings and recommendations from this dialogue. It includes an evidence-based analysis of the multi-level governance, basin management and economic regulation of the sector. In addition, four case studies depict the distinctive challenges faced at basin, metropolitan and provincial scale to manage water resources (Mendoza and the Inter jurisdictional Authority of the Limay, Neuquen and Negro River Basin) and deliver water services (Metropolitan Area of Buenos Aires and Santa Fe) in Argentina.

Water policy has recently gained higher profile in Argentina's national agenda, especially after the launch of an ambitious National Water Plan in 2016 aiming for water resilience, climate change adaptation and universal access to water services, and the creation of a dedicated Secretary of Infrastructure and Water Policy. Moving forward, the report identifies three areas of action to make water policies fit for the future: i) a stronger multi-level governance system that reconciles national and provincial priorities; ii) a more functional approach aligning administrative and hydrological boundaries to manage water at the right scale; and iii) an effective regulatory framework to provide better quality water services. With such actions, Argentina will be equipped to design and implement better water policies for better lives.

Pablo J. Bereciartua
Secretary of Infrastructure and Water Policy, Argentina

Lamia Kamal-Chaoui
Director, OECD Centre for Entrepreneurship, SMEs, Regions and Cities

Foreword

Over the past decade, the OECD has accompanied several countries in their efforts to reform water policies as a means to achieve sustainable growth and development. The demand-driven national Water Policy Dialogues help governments at all levels set the water agenda and facilitate ambitious policy reform in a shared responsibility with stakeholders by:

- Assessing a country's performance in terms of designing and implementing water policies, and identifying key pressing and emerging challenges.
- Engaging in a constructive and collaborative dialogue with stakeholders to identify the key issues and build consensus on potential ways forward.
- Providing a clear menu of options for reform, building on international good practice and a robust analysis of the specific characteristics in the country.
- Establishing a realistic action plan, grounded in multi-stakeholder policy discussions, and laying down short, medium and long-term measures; and
- Initiating momentum for change that derives from political buy-in acquired in the data collection, analysis, and consultation phases.

The OECD carried out such national policy dialogues in countries such as Mexico, the Netherlands, Brazil, Korea, Jordan, Tunisia, and currently in Peru, focusing on various elements of water policy reform, including multi-level governance, regulation, financing and pricing, water allocation, basin management and private sector participation. In all these countries, the OECD independent and external view, as well as the high-level political leadership and commitment have provided impetus for change and improvement.

This national Policy Dialogue with Argentina is a valuable addition to this series. It assesses whether current water governance systems are functioning optimally in the country and provides policy advice to adjust them where needed. It also holds much potential for concrete follow-up and implementation thanks to the fruitful collaboration with the IDB throughout the process, which provides avenues for mainstreaming the report's recommendations in future technical assistance with Argentina.

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This report was prepared by the OECD Centre for Entrepreneurship, SMEs, Regions and Cities (CFE) led by Lamia Kamal-Chaoui, Director, as part of the Programme of Work and Budget of the Regional Development Policy Committee. It is the result of a one-year policy dialogue with 200+ stakeholders from public, private, non-profit sectors and representatives from across all levels of government in Argentina.

The report was co-ordinated by Antonio Canamas Catala, Policy Analyst, under the supervision of Aziza Akhmouch, Head of the Cities, Urban Policies and Sustainable Development Division in the CFE. The report was drafted by a core team of OECD policy analysts comprised of Elisa Elliott Alonso (Chapter 1), Antonio Canamas Catala (Chapters 2 and 3) and Maria Salvetti (Chapter 4). Special thanks are conveyed to Celine Kauffmann, Deputy-Head of Division in the OECD Public Governance Directorate and to Kathleen Dominique, Policy Analyst in the OECD Environment Directorate, for their participation in missions and comments provided on earlier drafts.

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Acronyms and abbreviations

AASA	Aguas Argentinas S.A.
ABSA	Aguas Bonaerenses S.A.
ACRES	Regulation for Special Restricted Crops Areas *Área de Cultivos Restringidos Especiales*
ACUMAR	Matanza Riachuelo Basin Authority *Autoridad de Cuenca Matanza Riachuelo*
ADERASA	Association of Water and Sanitation Regulators of the Americas *Asociación de Entes Reguladores de Agua Potable y Saneamiento de las Americas*
AFERAS	Association of Regulators of Water and Sanitation Services *Asociación Federal de Entes Reguladores de Agua y Saneamiento*
AIC	Interjurisdictional Authority of the Limay, Neuquén and Negro River Basins *Autoridad Interjurisdiccional de las Cuencas de los ríos Limay, Neuquén y Negro*
AMBA	Metropolitan Area of Buenos Aires *Área Metropolitana de Buenos Aires*
ANA	National Water Agency (Brazil)
APLA	Planning Agency *Agencia de Planificación*
APSF SA	Provincial Water Company of Santa Fe *Aguas Provinciales de Sante Fe S.A.*
ASSA	Santa Fe Water Company *Aguas Santafesinas S.A.*
AySA	*Agua y Saneamientos Argentinos S.A.*
BAPIN	Public Investment Project Bank *Banco de Proyectos de Inversión Pública*
CABA	Autonomous City of Buenos Aires *Ciudad Autónoma de Buenos Aires*
CFA	Federal Agricultural Council *Consejo Federal de Agricultura*

CFE	Federal Energy Council *Consejo Federal de Energía*
CILP	La Picasa Lagoon Basin Committee *Comisión Interjurisdiccional de la Laguna La Picasa*
COAG	Council of Australian Governments
COFEMA	Federal Council of the Environment *Consejo Federal de Medio Ambiente*
COFEMIN	Federal Mining Council *Consejo Federal de Minería*
COFES	Federal Council of Sanitation Services Entities *Consejo Federal de Entidades de Servicios Sanitarios*
COFESA	Federal Health Council *Consejo Federal de Salud*
COHIFE	Federal Water Resources Council *Consejo Hídrico Federal*
COIRCO	Interjurisdictional Committee of the Colorado River *Comité Interjurisdiccional del Río Colorado*
CONAL	National Food Commission *Comisión Nacional de Alimentación*
CONICET	National Council of Technology and Science *Consejo Nacional de Investigaciones Científicas y Técnicas*
COREBE	Regional Committee of the Bermejo River *Comisión Regional del Río Bermejo*
COFESA	Federal Health Council *Consejo Federal de Salud*
DGI	General Irrigation Department *Departamento General de Irrigación*
DNAPyS	National Directorate for Water Supply and Sanitation *Dirección Nacional de Agua Potable y Saneamiento*
DNIP	National Directorate for Public Investment *Dirección Nacional de Inversión Pública*
ENACOM	National Communications Agency *Ente Nacional de Comunicaciones*
ENARGAS	National Gas Regulator *Ente Nacional Regulador del Gas*
ENOHSA	National Entity for Sanitation Water Works

	Ente Nacional de Obras Hídricas de Saneamiento
ENRESS	Water and Sanitation Regulator of the province of Santa Fe
	Ente Regulador de Servicios Sanitarios
ERAS	Water and Sanitation Regulator
	Ente Regulador de Agua y Saneamiento
EU	European Union
GBA	Greater Buenos Aires
	Gran Buenos Aires
GDP	Gross domestic product
GEA	Water Cabinet
	Gabinete del Agua
GNI	Gross national income
ICT	Information and communication technology
IDB	Inter-American Development Bank
IMF	International Monetary Fund
INA	National Water Institute
	Instituto Nacional del Agua
INDEC	National Institute of Statistics and Censuses
	Instituto Nacional de Estadística y Censos
INTA	National Institute of Agriculture Technology
	Instituto Nacional de Tecnología Agropecuaria
IWA	International Water Association
JMP/WHO	Joint Monitoring Program/World Health Organization
MAM	Metropolitan Area of Mendoza
MMA	Metropolitan Water Board
	Metropolitana Mesa del Agua
NBI	Unsatisfied basic needs *Necesidades básicas insatisfechas*
NGO	Non-governmental organisation
NIP	National Irrigation Plan
NRW	Non-revenue water
NWI	National Water Initiative (Australia)
NWP	National Water Plan
NWSSP	National Water Supply and Sanitation Plan
ONS	Sanitary Works of the Nation
	Obras Sanitarias de La Nación

ORSEP	Dam Safety Regulator *Organismo Regulador de Seguridad de Presas*
PEP	Provincial Strategic Plan *Plan Estratégico Provincial de la provincia de Santa Fe*
PGR	Management and result-based plan *Planes de Gestión de Resultados*
PMOEM	Plan for Improvement, Operation, Expansion and Maintenance of Services *Plan de Mejoras, Operación, Expansión y Mantenimiento de los Servicios*
PPP	Public-private partnership
PTAR	Wastewater treatment plant *Planta de tratamiento de aguas residuales*
RENABAP	National Registry of Informal Settlements *Relevamiento Nacional de Barrios Populares*
RHN	National Hydrological Network *Red Hidrológica Nacional*
SAG	Secretariat of Agriculture, Livestock and Fisheries *Secretaría de Agricultura, Ganadería y Pesca*
SAyDS	Secretariat of the Environment and Sustainable Development *Secretaría de Ambiente y Desarrollo Sostenible*
SICAR	Cadastral and Registry Information System *Sistema de Información Catastral y Registral*
SINAGIR	National System of Integrated Risk Management *Sistema Nacional para la Gestión Integral del Riesgo*
SIPH	Secretariat of Infrastructure and Water Policy *Secretaría de Infraestructura y Política Hídrica*
SMIP	Secretariat of Mining Policy
SOE	State-owned enterprise
SSRH	Undersecretariat for Water Resources *Subsecretaría de Recursos Hídricos*
UN	United Nations
USD	United States Dollar
WUA	Water Users Association
WUPI	Water Utility Performance Index

Executive summary

Ensuring long-term water security is essential in the pathway towards climate change adaptation, inclusive growth and sustainable development in Argentina. Water policy has recently gained higher profile in the national agenda with the launch of an ambitious National Water Plan in 2016 and the creation of a dedicated Secretary of Infrastructure and Water Policy. Moving forward, managing concomitantly the risks of "too much", 'too little" and "too polluted" waters, while ensuring universal coverage to drinking water and sanitation is essential for the country to fit for the future. This requires action to strengthen multi-level and basin governance, as well as economic regulation, planning and investment frameworks.

Key findings

Water risks and megatrends

- Water risks are hampering sustainable development in Argentina. Floods are responsible for 95% of annual economic losses caused by disasters, severe droughts have a devastating impact on an economy where agriculture accounts for 6.4% of GDP, and the country is home to some of the most polluted basins in the world.
- Serious gaps in access to water services are also noteworthy, with only 54.7% of the rural population connected to drinking water supply (versus 87% for urban dwellers) and only 6.4% and 58.2% of the rural and urban population respectively connected to sewerage, while only 15-20% of wastewater is treated before disposal (2015).
- Megatrends such as climate, demographic change and urbanisation (informal settlements, in particular) will exacerbate further water risks as well as competition across domestic, industrial, agricultural and environmental uses. The current macro-economic downturn and fiscal consolidation efforts also seriously hinder the country's investment capacity in hard, costly grey infrastructure.
- The outstanding structural challenge linked to the fluctuating nature of the Argentinean economy both affect continuity and predictability of public policies at large, and water is no exception. However, this also means a unique momentum to transition faster and better from crisis to risk management, and set the right incentives for greater water use efficiency and enhanced demand management.
- Argentina's multi-level governance system implies a highly decentralised and complex water policy setting, which is primarily driven by the 23 provinces and the city of Buenos Aires, including for shared rivers. Nevertheless, it also provides opportunities to tailor policies to the diversity of places, and align strategies in a shared responsibility across levels of government.

Water resources management

- Argentina has achieved important milestones in improving water policy. The 2003 Federal Water Agreement laid down the foundations of a state water policy with a strong focus on water resources management with 49 guiding principles acknowledging the value of water, the historical importance of each jurisdiction and need to reconcile local, regional and national interests.
- Legal frameworks for water resources management vary widely across the country. Some provinces have well-developed legislations while others neither regulate important aspects such as irrigation systems, users organisations, water rights nor enforce the polluter-pays or user-pays principles. Seven provinces still do not have legal provisions for conjunctive management of surface and groundwater resources.
- Often, basin management is reactive, remedial and unplanned, rather than proactive, pre-emptive and planned. Key reasons include the insufficient use of economic instruments, patchy and insufficient data and information to guide water allocation, regulation and investment decisions, and insufficient stakeholder engagement.

Water services provision

- Although the efficiency of water service providers varies across the country, their performance remains low on average when compared to their Latin American peers, for instance in terms of staff efficiency (3.33 employees per 1 000 connections vs. 2.94) or micro-metering levels (27% vs. 70%).
- The prevailing tariff setting system does not encourage rational use of water, nor promote demand management since most users pay according to a "*canilla libre*" system under which a fixed rate is charged regardless of the water volume consumed. As a result, domestic water consumption averages 300 litres per inhabitant per day in the 20 largest service providers of the country, including in semi-arid areas of the country.
- With the termination of concessions contracts in the second half of the 2000s, water services were often transferred back to the public sector, but the regulatory framework remained largely unchanged. As a result, regulatory authorities tend to be control agencies, and find themselves hampered by economic and political interference, notably when tariffs continue to be reviewed and approved by political authorities.

Policy recommendations

Argentina must take critical decisions regarding its current and future water policy direction to fit for the future and better cope with pressing and emerging risks:

Raise further the profile of water in the national agenda

- Incentivise inter-governmental co-operation through a rejuvenated multi-level, enduring mechanism for better planning and strategic investment, basin governance, and regulation of water services. Federal Pacts, Councils or other

co-ordination mechanism set by federal countries such as Australia, Brazil or Canada provide a valuable source of inspiration.

- Establish an ambitious long-term planning framework at all levels to address issues of federative management, and factor in short-term economic, social and environmental considerations, as well as long-term projected impacts:
  - Federal planning should link water policy and the country's broader development strategy and provide strategic guidance to provinces.
  - Inter-jurisdictional basin planning should harmonise management criteria to encourage increased co-operation between the provinces sharing the river.
  - Provincial planning should translate national priorities at territorial level, and link water planning to regional development strategy.
- Strengthen the enabling environment for water-related investment to maximise their contribution to inclusive and sustainable growth, by:
  - Improving the efficiency of existing infrastructure by: seeking opportunities to capture economies of scale; shaping investments to build resilience to climate change; promoting investments in nature-based solutions; and improving cost recovery of water services operations
  - Selecting investment pathways that reduce water risks at the least cost over time, and effectively co-ordinating infrastructure investments across levels of government and sectoral ministries.
  - Scaling up financing through better risk allocation across parties, better and more strategic use of public funds, and adequate de-risking instruments; and introducing obligations in relation to long-term, risk-based asset management, planning, operational and financing strategies.
- Enhance cross-ministerial co-ordination to ensure decisions taken in other sectoral domains - such as agriculture, environment, health, mining, urban development or energy - do not work against water policy, and vice versa. Argentina counts with a wide range of federal councils (COHIFE, COFEMA, CONAL, COFESA, COFEMIN, CFE or CFA) that are well-placed to foster policy coherence and complementarities across these domains.
- Develop an integrated water information system building on the National Hydrological Network and the National Water Supply and Sanitation Indicator System to better reflect overall quality and performance of utilities.

Water resources management

- Shift from the old paradigm focusing on infrastructure solutions to more systematic strategic basin planning to address socio-economic, urbanisation, environmental pressures on water bodies, and drive water allocation and investment decisions while managing trade-offs among competing uses.
- Inter-jurisdictional river basin committees should also shift from mere conflict resolution mechanisms with often a single-issue focus, to effective basin governance entities. In the medium and long-term, they should turn into lasting and autonomous institutions, with financial capacity to invest in governance functions and implementation of plans.

- Leverage the potential of economic instruments as a key policy tool to drive water use efficiency improvements. To that effect, provinces should consider co-producing a methodological guidance that is fit to different places, addresses local needs and induces behavioural change and rational water use to ensure that those who generate future liabilities or benefit from resources also bear the related costs.

Water services provision

- Provide a national overarching legal framework to set common water supply and sanitation policy criteria across the country and support regulation consistency. The framework should provide minimum requirements for the quality of the service and suggest institutional and regulatory features.
- Consider making result-based plans (*Plan de Gestión de Resultados*) by water services operators compulsory to incentivise better performance and accountability. These tools are key to prioritise investment requiring national and provincial budget as well as to establish control and conditional mechanisms for granting transfers while considering the compliance with performance and efficiency indicators.
- Foster financial sustainability of water services, not only through revenues raised through tariffs (in addition to subsidies), but also by:
    - Seeking efficiency gains in operations and maintenance;
    - Developing a sound accounting system to enable an optimal accounting management and a documented tariff calculation;
    - Changing the tariff structure (towards progressive schemes) in areas where metering level is high; “canilla libre” system should be gradually phased out.
    - Improving and strengthening the subsidy scheme to ensure that vulnerable families have access to water services through better targeting and coordination with social policies

Chapter 1. Pressing and emerging water risks in Argentina

This chapter introduces basic facts and data on the main characteristics, challenges and uses of water in Argentina, linking with economic development, social inclusion and environmental performance. It pays particular attention to risks of "too much", 'too little" and "too polluted" waters, as well as ensuring universal coverage of drinking water supply and sanitation services. The chapter covers how megatrends related to the macroeconomic downturn, climate change, urbanisation and demography, exacerbate current water challenges, but also provide opportunities to drive inclusive and sustainable growth in Argentina.

Key data

Argentina is endowed with abundant water resources and home to one of the world's largest water basins - the Río de la Plata River Basin – but these resources are unevenly distributed. The average annual water flow amounts to 26 000 m^3/s, with a heterogeneous spatial distribution due to geological and climactic factors: 85% of the total surface water available in Argentina is found in the territory of the Río de la Plata River Basin, where the majority of the country's population and economic activity are concentrated (MCTeIP, 2012). On the other hand, in very arid and semiarid provinces, such as San Juan or La Rioja, there is very little annual rainfall with less than 1% of available surface runoff (MCTeIP, 2012).

Groundwater provides an important source of water for both rural and urban populations as well as for agriculture, but increasingly at risk due to pollution. Argentina is home to one of the world's largest aquifers, the 1 200 000 km^2 Guaraní aquifer, 19% of which (225 500 km^2) is within Argentina's jurisdiction. It has many large, exploitable aquifers, especially in the western provinces, which depend particularly on this supply source due to the aridity of the area and strong agricultural activity (e.g. Mendoza hosts 360 000 irrigated hectares, or 25% of total national irrigated land) (FAO, 2015). According to estimates, there is an annual exploitable availability of approximately 16 000 m^3 in Argentina's aquifers. The contribution of groundwater to total water withdrawal is approximately 30% (FAO, 2015), but in addition groundwater also ensures a multi-annual and inter-annual regulation of water resources, resulting in increased availability of water in times of drought. However, the use of these aquifers is limited due to their quality (many are affected by human and/or natural pollution) and vulnerability (overexploitation of the resources) (FAO, 2015).

Total water abstraction amounted to 4.3% of the total available freshwater (1 195 m^3/s) in 2011. Of this, agriculture accounted for 74% of total water withdrawal, human water supply for 15% and industry for 11%. However, water abstractions have increased by over 30% since 1995 (FAO, 2015), reflecting both population growth and economic development and difficulties to decouple water demand from macroeconomic and demographic patterns.

The average annual availability of surface water per inhabitant is approximately 20 400 m^3/s (40 117 096 inhabitants from the 2010 Census), which is far above the water stress threshold of 1 700 m^3/s per inhabitant per year (MCTeIP, 2012). However, water consumption and distribution is unequal throughout the territory, with more than 90% of the population living in urban centres of more than 10 000 inhabitants (MCTeIP, 2012). The Secretary of Infrastructure and Water Policy estimates that population served by the 20 largest water services providers consume an average of 299 litres per day per capita, and only 27% is micro-metered.

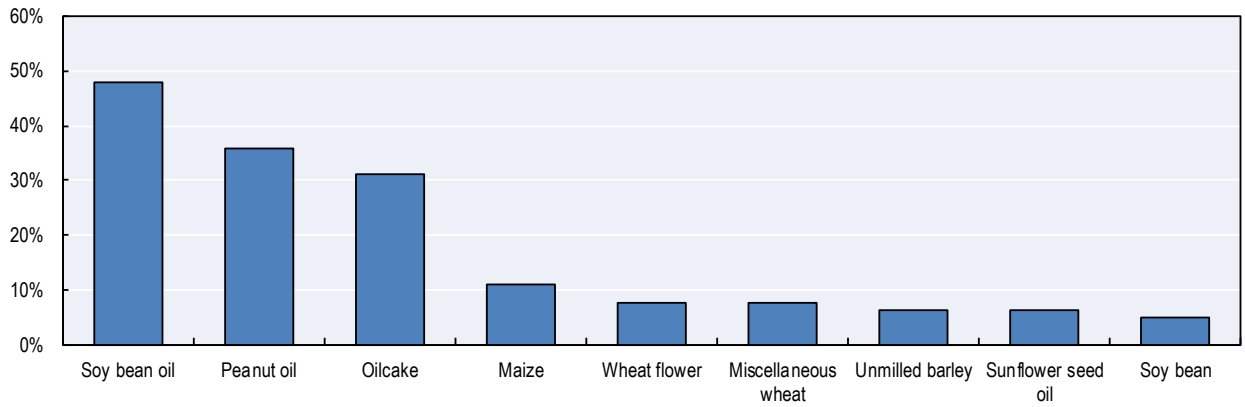
Water risks hinder inclusive and sustainable development

Water and the economy

Argentina's economy faces grave threats from periodic episodes of "too little" and "too much" water. Flooding is the greatest natural disaster threat in Argentina, causing 60% of all natural disaster events and 95% of economic damages due to disaster events (World Bank, 2016a). Droughts have also had a significant impact on Argentina's economy in recent years, in particular in the agricultural sector.

Due to favourable geological and climatic conditions, Argentina's agricultural sector is one of the most important economic sectors of the country. According to World Bank data, in 2016 the agricultural sector accounted for 6.4% of the country's gross domestic product (GDP), whereas the global average for this same period was 3.6% (World Bank, 2016b). Argentina's agricultural sector has grown considerably in the past decades, in terms of both the quantity of crops produced and the amount of cultivated land. Argentina is also one of the most productive global crop exporters (Figure 1.1), with an average of 100 million tonnes of seeds produced annually (SAyDS, 2015). The area sown with the four main export crops (soybean, sunflower, corn and wheat) occupies approximately 31 million hectares of land (MCTeIP, 2012) out of the total of 40 million hectares used for agriculture in 2012 (FAO, 2015). Approximately 54% of Argentina's total land surface supports agriculture (World Bank, 2017a).

Figure 1.1. Percentage of world exports represented by Argentina, 2017



Note: In 2017, Argentina was the world leader in exports of soy bean oil (48% of the global market), peanut oil (36%) and oilcake (15%). It was also the second world exporter of wheat flower (7.7%); third of soy bean (4.9%); fourth of maize (15%) and sunflower seed oil (6.3%); fifth of unmilled barley (6.2%); and sixth of miscellaneous wheat (7.5%).
Source: Simoes, A.J.C and Hidalgo, C.A (2011), *The Economic Complexity Observatory: An Analytical Tool for Understanding the Dynamics of Economic Development*. Workshops at the Twenty-Fifth AAAI Conference on Artificial Intelligence (2011), Exporters by product dataset, 2017, available at: https://oec.world/en/visualize/tree_map/sitc/export/show/all/5722/2017/

Argentina's exports structure, highly concentrated and dependent on the production of agricultural commodities, creates a strong dependency on water resources for agriculture. Out of the 2.1 million hectares currently irrigated, 65% use surface water and 35% use groundwater (FAO and PROSAP, 2015; SIPH, 2016a). This dependence on agriculture also makes the country extremely vulnerable to drought and flood risks. When these disasters occur, the agricultural sector can suffer losses that contribute adversely to the country's overall economic situation. In 2017-18, Argentina experienced one of the worst hydrological droughts in 50 years, with an estimated economic impact of around 2% of GDP (OECD, 2019). Production of maize and soybeans fell by 21% and 33%, respectively, compared to the previous year. These losses have also had direct effects on crop value chains (Bolsa de Cereales de Rosario, 2018). Moreover, the importance of water for agriculture is not only related to irrigation. Extensive rain-fed agriculture requires good soil management, especially in flat environments, such as the pampean region and the province of Chaco, where vegetation and soil are crucial for hydrological regulation.

At the same time, Argentina is one of the 15 countries in the world most affected by catastrophic floods. According to the United Nations Office for Disaster Risk Reduction, 39% of the disasters that occur in the country are floods, with such events having the most material impact in terms of people and assets affected in Argentina. Since 1957, 12 severe floods have caused casualties and great losses in agricultural production, infrastructure, private goods and economic activities. The World Bank estimates that, in 2012, floods caused losses of approximately USD 3.4 billion (equivalent to 0.7% of GDP) (World Bank, 2014).

Water and the environment

Argentina faces surface and groundwater quality challenges, which represent an increasing threat to the ecological status of water resources and a sustainable pattern of water supply.

The primary source of pollution in surface water bodies is the discharge of household and industrial wastewater effluents without adequate treatment. It is estimated that in 2015 only 58% of urban wastewater was collected and that only between 15% and 20% was treated before disposal (SIPH, 2016b). According to a recent survey from the National Directorate for Water Supply and Sanitation (Dirección Nacional de Agua Potable y Saneamiento, DNAPyS), only around 36% of total wastewater was treated in 2018. The main pollutants found in surface waters are organic matter, macronutrients, bacteria and other microorganisms, as well as organic and inorganic toxic substances. Circumstances such as the existence of cesspools filled with water containing faecal matter coupled with intensive urban and industrial development have led to very serious pollution of tributaries.

Unsustainable agricultural practices, deforestation, use of agrochemicals and land-use changes, particularly the impact of urbanisation, also affect the water balance and the quality of water resources (MCTeIP, 2012). For instance, the increase in the quantity of suspended solids due to greater water erosion because of deforestation, overgrazing or bad management of arable land is an issue in the province of Misiones and some of the surrounding areas of the Bermejo River Basin. On the other hand, pesticides have been detected in the waters of the Uruguay River. Other surface water reservoirs such as the Río Hondo reservoir in the province of Santiago del Estero or the San Roque and Los Molinos Lakes in the province of Córdoba are polluted as a result of the discharge of untreated sewage water, originating in nearby urban and industrial settlements. Well-known cases of water pollution are located near large urban areas, such as Matanza Riachuelo and Reconquista in Buenos Aires, Salí-Dulce in the province of Tucumán, or Suquía in the province of Córdoba. Serious deficiencies in the management and disposal of urban solid and industrial toxic waste, particularly in urban peripheries, significantly contribute to this situation (MCTeIP, 2012).

In semiarid and arid areas, inefficient irrigation and drainage systems are the source of salinisation of water resources and land, representing a serious threat to the sustainability of the agricultural sector given the large share of agricultural land in these conditions. According to estimates, 23.5% of irrigated land is subject to some degree of salinisation and/or sodification and others are in danger of being severely affected (FAO and INTA, 2015).

In groundwater bodies, quality problems are associated with pollutants of natural origin, namely arsenic and fluorine, as well as anthropogenic contaminants such as nitrates, faecal contaminants, pesticides and various pollutants of industrial origin. Pollution from natural arsenic in aquifers is especially serious in several provinces, notably those with higher rural populations. Levels of arsenic that significantly supersede thresholds recommended by the

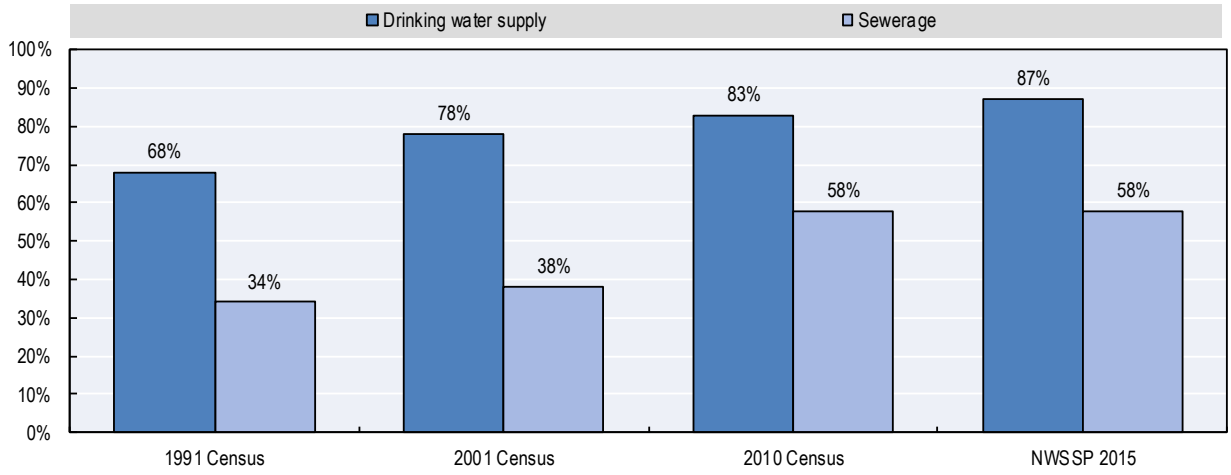
World Health Organization have been detected in drinking water supply sources in the northern and central regions of Argentina (Garzonio and Nuñez, 2012). According to some estimations, there are 435 000 km^2 of land (SIPH, 2016b) and 4 million people affected by arsenic in Argentina (RSA and CONICET, 2018). This type of pollution is a public health issue in Argentina due to arsenic's high risks to trigger carcinogenicity and neurotoxicity. However, the quantity and quality of information to evaluate the influence of arsenic on public health is heterogeneous. The Secretariat of Infrastructure and Water Policy has launched a study to analyse its effects and develop a national risk map (SIPH, forthcoming 2020).

Pollution of groundwater sources of water due to bad aquifer management (generalised overexploitation and localised overextraction as well as a lack of protection and conservation measures) and the deficiencies in the sanitation systems resulting in direct contamination of water supply sources are considered the most important environmental problems in Argentina (MCTeIP, 2012). Substituting groundwater resources with surface water can help limit exposure to natural contamination. However, with increasing surface water pollution, this option is less feasible and water treatment prior to consumption actually becomes mandatory.

Water and social inclusion

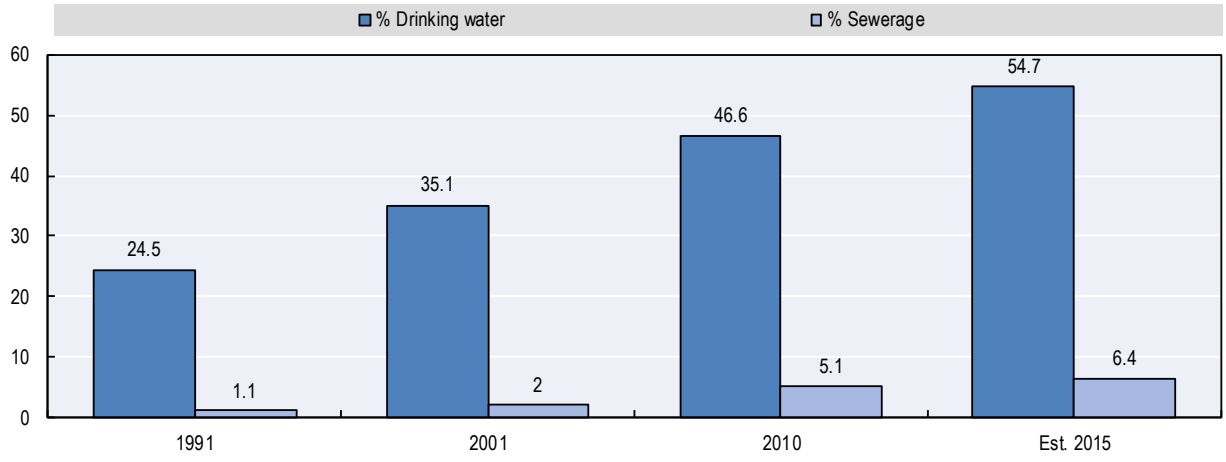
The gap in access to and quality of drinking water supply and sanitation services is also significant especially considering Argentina's income levels. In 2015, Argentina's gross national income (GNI) per capita was USD 12 150 (World Bank, 2015). During that year, access to drinking water supply in urban areas was estimated at around 87% and sewerage at around 58.2% (Figure 1.2). In rural areas, only 54.7% of the population had access to drinking water in 2015 and 6.4% to sewerage (SIPH, 2016a) (Figure 1.3). This contrasts with neighbouring Chile, a country with slightly higher GNI per capita rates (USD 14 310 in 2015), but that also made significant gains in achieving universal coverage (in 2017, drinking water coverage amounted to 99.97% in urban areas, 97.15% of households had sewerage, and wastewater treatment reached 99.97%; SSIS, 2017).

Figure 1.2. Water and sanitation services coverage in Argentina, 1991-2015



Sources: INDEC (2019), "Censo Nacional de Población, Hogares y Viviendas (1991-2001-2010)", oficial website, https://www.indec.gob.ar/indec/web/Nivel3-Tema-2-41 (consulted in May 2019) ; SIPH (2016a), "Plan Nacional de Agua", https://www.argentina.gob.ar/sites/default/files/2017-09-29_pna_version_final_baja_0.pdf.; SIPH (2016b), Plan Nacional de Agua Potable y Saneamiento, 2016, https://www.argentina.gob.ar/sites/default/files/interior_agua_plan_agua_saneamiento.pdf

Figure 1.3. Evolution of water and sanitation coverage by network in rural areas in Argentina, select years



Source: SIPH (2016a), "Plan Nacional de Agua", https://www.argentina.gob.ar/sites/default/files/2017-09-29_pna_version_final_baja_0.pdf.

This gap in access to and quality of drinking water supply and sanitation services not only occurs in respect of the divide between rural and urban settlements; it also has a material socio-economic dimension, affecting with more intensity the most vulnerable sectors of Argentina's society. In this sense, population with unsatisfied basic needs (NBI)[1] register an access to drinking water of 73%, compared to 85% for the rest of the population. Similarly, population with unsatisfied basic needs register an access to sewerage of 31.2%, compared to 56.3% for the rest of the population (SIPH, 2016a).

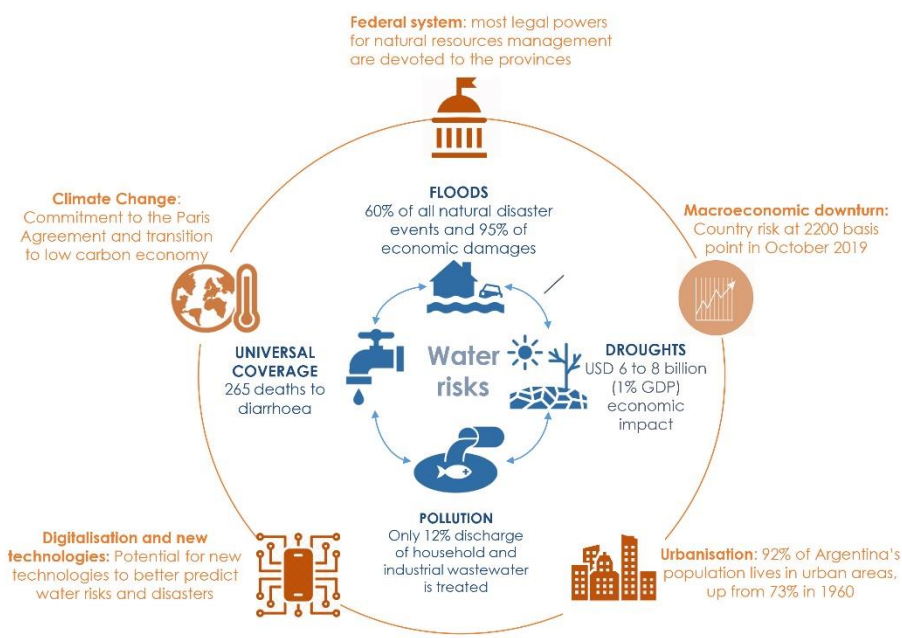
As a result of difficulties in accessing drinking water, rural regions and informal urban settlements often rely on wells and boreholes to access underground water sources, which

present associated health risks arising from water-borne diseases (Monteverde, Cipponeri and Angelaccio, 2018) due to the presence of arsenic affecting 17 out of 23 provinces[2] and approximately 4 million inhabitants (10% of the country's population) (RSA and CONICET, 2018). The combination of these factors results in an increased risk of contracting water-borne diseases from polluted water sources, especially from the discharge of untreated domestic wastewater effluents into rivers and lakes and the infiltration of excrements from septic tanks and poorly maintained sewerage networks. Though numbers vary, the most recent survey carried out by the DNAPyS in 2018 estimates that 36% of the wastewater collected receives either primary or secondary treatment. In 2012, 265 deaths to diarrhoea in Argentina were attributed directly to lack of adequate access to safe drinking water and sanitation and/or good hygienic practices (WHO, 2014).

At the same time, vulnerable communities are also more exposed to extreme climate events such as flooding than their relatively more well-off counterparts. It is estimated that in the provinces of Chaco, Corrientes, Entre Ríos, Formosa and Misiones, more than 1.5 million people are at risk, particularly because of precarious settlements in river and stream banks and other flood-prone areas. Of that total, more than 70% lack basic sanitation infrastructure as well as access to sewage in their homes and 30% lack access to safe drinking water (SIPH, 2016a).

Exogenous factors affecting water management in Argentina

Figure 1.4. Exogenous factors affecting water management in Argentina



Argentina's federal system

Argentina has a federal and multi-level governance system whereby most legal powers for natural resources management are devoted to the provinces. The current institutional setting for water services provision and water resources management is rooted in policy choices and reforms dating back to the 1980s and 1990s. In 1980, the provision of drinking water

and sanitation services was transferred to the 23 provinces, with the decentralisation of the state-owned enterprise Obras Sanitarias de La Nación (ONS). In 1994, Argentina underwent a constitutional reform that introduced an environmental clause (Article 124) acknowledging a historical right whereby the 23 provinces and the Autonomous City of Buenos Aires own the water resources and have jurisdiction over them, including for interjurisdictional rivers, as well as responsibility for the provision of water services within their boundaries.

The federal structure of the country offers opportunities for multi-level governance and place-based policies that are currently untapped. Federalism delineates rights, responsibilities, powers and functions between the national government and the provinces, and creates the potential for targeted localised action by provinces, which can also be underpinned by the financial support of the national government. This strong potential for multi-level partnership can aid in developing a shared forward-looking national strategic vision underpinned by the necessary investments in hard and soft infrastructure.

Macroeconomic environment

Argentina's current macroeconomic environment limits the opportunities for the much-needed, large-scale public investment in water infrastructure. After a favourable period of stability in 2016 and 2017, the abrupt macroeconomic shift in 2018 resulted in a high cost of borrowing, due to changes in country risk. The currency has depreciated sharply (from 19 Pesos/USD in January 2018 to 57 Pesos/USD in October 2019, a nominal depreciation of 67%), and as a result gross public debt reached 81% of GDP in the second quarter of 2019. In addition, the market-perceived risks of Argentinian assets have spiked (2200 basic points in October 2019). Moreover, the loan from the International Monetary Fund of USD 57 billion approved in June 2018 had strict fiscal requirements attached to it, including a zero deficit for 2019, which creates very challenging investment conditions for the government.

The fluctuating nature (recurrent cycles of growth and recession) of the Argentinian economy is unlikely to change in the short term. For instance, the economy recently fell into a recession after the financial turmoil in 2018. GDP is projected to decrease by 2.9% and 1.5% in 2019 and 2020, respectively. Similarly, gross investment is expected to decrease by 16% in 2019 and to grow by 2.3% in 2020 (OECD, 2019). Exports continue to lead the economy, now supported by the weaker real exchange rate and strong harvests. Yet, volatility also affects exports. They remained the same in 2019 (year over year) and grew by 22.6% in the middle of the recession, although it is projected that the slowdown in economic activity and international trade will affect also the exports.

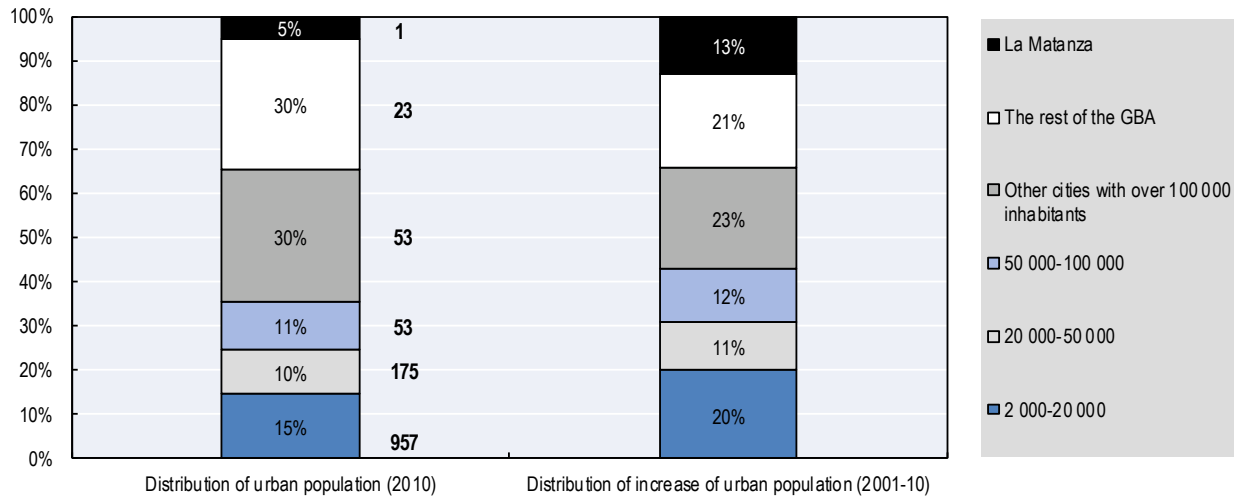
This context provides an opportunity to decouple water policy from the broader macroeconomic outlook. There is momentum to actively explore opportunities for efficiency gains within the country and, specifically, within the water sector – to do more and better with less. The limited funds to conduct large-scale investments should generate incentives to make any investment sustainable on a highly efficient basis and, most importantly, to find ways to operate and maintain existing assets in more efficient ways (without compromising, and potentially improving, current levels of service). An example of such an approach could be deferral of capital expenditure in favour of finding operating innovations and efficiencies, or setting up demand-side measures. For instance, provided large-scale investments to close evident gaps are not possible, investing in the production of energy and biogas from wastewater effluents can help reduce operating costs. Similarly, nature-based solutions (i.e. conservation, management and restoration of water-related

ecosystems or green urban infrastructure) can also be explored on a case-to-case basis, as they can be an alternative way of reducing costly investments.

Urbanisation and territorial development

Rapid urbanisation in Argentina has been a major contributor to continuing gaps in access to quality water services. Almost 92% of Argentina's population lives in urban areas, up from 73% in 1960, and over 40% live in population centres of more than 1 million inhabitants (World Bank, 2017b). Moreover, population increased by 12% between 2001 and 2010, mostly in urban areas. Cities of over 100 000 inhabitants contributed to 57% to this population growth, of which the Greater Buenos Aires area (GBA) accounted for 34%. Within the GBA, the area of La Matanza has contributed most to this urban growth, with over 42% of total growth (Figure 1.6). A lack of decent housing for low-income households has resulted in illegal occupation of non-serviced land without basic services in the peripheries of large cities, particularly low-lying and flood-prone land.

Figure 1.5. Urban population growth according to district size, Argentina



Note 1: GBA: Greater Buenos Aires refers to the urban agglomeration comprising the autonomous city of Buenos Aires and adjacent 24 districts in the province of Buenos Aires
Note 2: Numbers in bold refer to the amount of urban centres in Argentina according to size. For instance, in Argentina there are 957 cities with 2.000 to 20.000 inhabitants
Source: SIPH (2016b), "Plan Nacional de Agua Potable y Saneamiento", https://www.argentina.gob.ar/sites/default/files/interior_agua_plan_agua_saneamiento.pdf.

Large urban growth in cities of over 100 000 inhabitants has increased the water deficit in areas of low service coverage. Rapid urbanisation can put pressure on existing drinking water supply and sanitation infrastructure, including on stormwater infrastructure, and can increase service deficiencies. This problem is aggravated by the fact that in areas of coverage, wasteful water use habits are prevalent due to lack of consumption measurement.

This rapid urbanisation disproportionately affects low-income households, due to increasing land prices and ineffective land-use regulations. The average price of a 250 m² lot with legal title and access to sewerage is around 19 times greater than the annual disposable income of a low-income family (Monkonnen and Ronconi, 2013). As a result of gaps in access to decent housing, it is estimated that roughly one-fifth of the households living in the periphery of large Argentinian cities have illegally occupied land for housing,

almost half do not have a full legal title and only a third have access to sewerage (Monkonnen and Ronconi, 2013).

As these gaps persist, there is a correlative increase and consolidation of a greater number of precarious establishments and houses that require complete adaptation (or complete rebuild) to be able to deliver quality water services. In fact, in the Greater Metropolitan Area of Buenos Aires, 13.4% of homes have been considered irrecoverable (SIPH, 2016b) in terms of infrastructure for water services and sanitation. Achieving universal access to water services and water quality as well as sanitation not only depends on institutional capacity and financing, it also depends on improving the aptitude of urban design and housing. In order to achieve the sanitation objectives, users must be able to afford the installation costs of sanitation infrastructure that allows homes to be connected to water and sewerage services, taking into account that the deficit in universal access resides for the most part in lower income areas.

Though initially most urban settlements were built in high-altitude areas, the growth experienced during the dry period in the first half of the 20th century resulted in cities being expanded in low-lying and flood-prone lands. Moreover, change of land use in flood-prone areas, i.e. from natural vegetation to urban fabric, also contributes to increasing the intensity and impact of floods. As a result, at least 32 cities in Argentina have been affected by flooding and more than 1 million people are exposed to this risk (Kullock, 2007). Flooding in urban areas has led not only to large economic losses, but also to tragic consequences in the form of numerous deaths and missing persons, such as those that occurred in the city of Santa Fe in 2003 and in La Plata in 2013. These increasingly affect lower income groups who are more likely to lack access to safe drinking water and sanitation as well as decent living conditions.

Climate change

Climate change is a compounding factor that exacerbates water challenges. A combination of factors, such as higher average temperatures over the past 70 years and the recent *La Niña* meteorological event, gave rise to the 2017-18 drought. There will likely be an increased incidence of droughts in some parts of Argentina, and at the same time more intense and frequent rainfalls in others that will shift further water availability, uses and demand (IPCC, 2014). For instance, more water may be required to irrigate land, while at the same time evaporation in water bodies and reservoirs is likely to intensify with climate change effects.

Other expected impacts of climate change in Argentina include:

- Increase in the average rainfall in almost the entire country, although with inter-annual and interdecadal variations. The biggest changes were recorded in the east of the country and in semi-arid areas, with the result of facilitating the expansion of agriculture to the north and the west (SAyDS, 2015).
- Decrease of average rainfall in the Andes region, affecting the availability of water in the high-altitude basins of the rivers of the regions of northern Mendoza and San Juan (SAyDS, 2015).
- Increase of the frequency of extreme rainfall in much of the eastern and central parts of the country, magnifying urban flooding, particularly in areas where drainage and urban planning are lacking or existing systems lack proper implementation and/or maintenance (World Bank, 2016b).

- Increase of the duration of the dry winter periods in the west and north of the country, impacting water availability and creating more favourable conditions for grassland fires as well as greater stress on cattle (SAyDS, 2015).

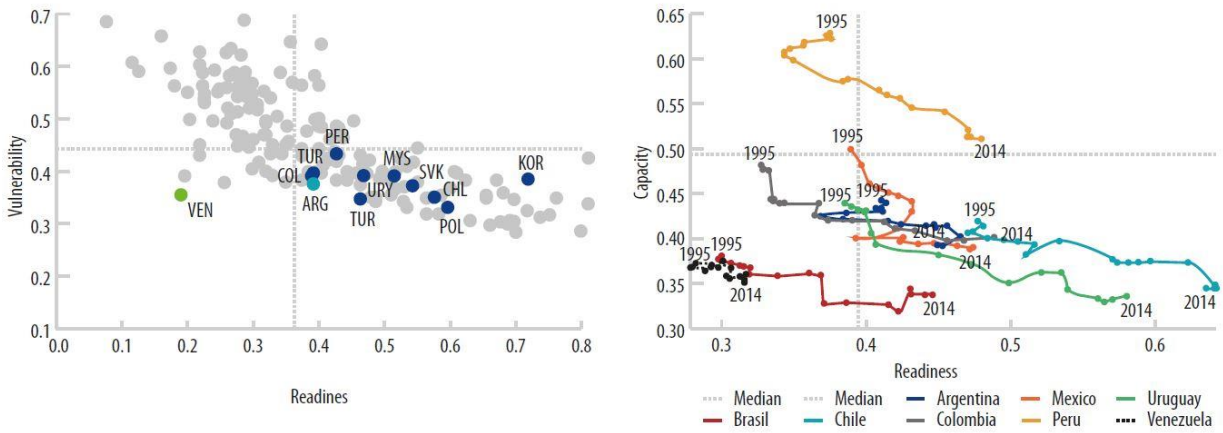
The agricultural sector is one of the sectors that will most suffer from the effects of climate change because of its strong dependence on water resources. The intensification of extreme water disasters such as rains, flooding, droughts and heat waves due to climate change will most probably amplify the inter-annual variability of crop production. Furthermore, the degradation of the environment in terms of the chemical composition of the land and the water, as well as the loss of biodiversity and the quality of the soil, will inevitably increase the agro-ecosystem's vulnerability to seasonal variability.

Although Argentina has launched some initiatives to adapt to climate change (Box 1.2), it still lags behind in terms of adaptation readiness. According to the World Bank (2018), Argentina is less vulnerable to climate change than most countries (it is ranked 40th out of 181 countries in terms of vulnerability), but its performance in reducing vulnerability, increasing readiness and adaptive capacity is lower than in other country peers (Colombia, Peru, Chile) (Figure 1.7). Among other reasons, it is claimed that the lack of an efficient business environment makes the country less ready than most of its peers to effectively leverage investments for adaptation.

Box 1.1. Argentina's National Cabinet for Climate Change

The issue of climate change has gained much traction in the Argentinian political agenda. In 2016, a National Cabinet for Climate Change comprising high-level representation from 17 key areas [3]of the government was established (Decree 891/16) under the co-ordination of the Secretariat of the Environment and Sustainable Development, and in consultation with the Federal Council of the Environment (COFEMA). The cabinet's activities have, in the past, focused on mitigation, but are increasingly covering adaptation measures. During its first two years of operation, the cabinet developed a National Mitigation Plan to support compliance with international agreements on greenhouse gases emissions. A National Adaptation Plan is under development to identify sectors, socio-economic systems and geographical regions that present a greater degree of vulnerability to the impacts of climate change, and prioritise adaptation measures. In addition, recent years have seen Argentina's disaster response shift towards greater prevention. The National System for Integrated Risk Management (SINAGIR), a programme that promotes the joint response of all state agencies to various crises and emergency situations, was launched in February 2017 (Law 27.287). A Climate Change Risk Map System (SIMARCC) was also released to identify territories and population that are most vulnerable to the threats of climate change.

Figure 1.6. Readiness to deal with climate change risks



Source: World Bank (2018), *Argentina: Escaping Crises, Sustaining Growth, Sharing Prosperity*, http://documents.worldbank.org/curated/en/696121537806645724/Argentina-Escaping-Crises-Sustaining-Growth-Sharing-Prosperity, reprinted from University of Notre Dame Global Adaptation Initiative (ND-GAIN), https://gain.nd.edu/

Digitalisation and technology

The uptake of technology could help improve many of the problematic aspects in the management of water resources and access to quality services for a larger proportion of the population. For instance, ICT systems and other cartographic applications could help better predict water risks and disasters, aiding water authorities in designing and implementing improved forward-looking safety protocols.

To maximise the potential of and opportunities from digitalisation, the national government is therefore working towards collecting more and better information and sharing it with other territorial authorities. The government aims to collect, process and stock basic data from the national water network for use by national, provincial and interjurisdictional water and environmental organisations to correctly design and build water infrastructure as well as improve the efficiency and sustainability of water consumption in its multiple facets. The availability of data is expected to enlarge significantly through both the installation of more measuring stations as well as the integration of information gathered by national, provincial and interjurisdictional bodies within the *Integrated Hydrological Database*, with the aim of further facilitating the exchange of information between territorial entities.

The Digital Cartography and Georeferenced Systems project, initiated in 1995, aims to use state-of-the-art computer tools in order to structure and manage information and data collected and produced by the national government and to provide technical assistance to the provinces. The integration with other cartographical databases from other national ministries, such as the GIS tool for Water Quality of the Secretariat of the Environment and Sustainable Development, can further expand the evidence base for decision making.

Nanotechnology shows the potential for cheaper, more effective, efficient and long-lasting alternatives in order to treat Argentina's water resources and rid it of contaminating substances such as bacteria, viruses, arsenic, mercury, pesticides and salt without the need of intensive labour, capital, land and energy in comparison to traditional treatment methods. However, more research is required in order to better determine the real impact of the use of nanotechnology for the treatment of water on the environment and on human health.

The National Water Plan as a response to water risks

The 2015-2019 administration has made a significant step towards setting a nationwide plan to deal with water-related risks as part of a long-term vision. Launched in 2016, the National Water Plan (NWP) sets ambitious objectives to place water at the core of economic and social development. By 2023, the national government aims to achieve universal access for drinking water supply and 75% for sewage connections. The NWP also aims to increase protection against floods and droughts through strategic actions that combine both hard infrastructures, such as building flood protection infrastructure in cities or increasing the number of dams, along with better early warning and information systems. In addition, the NWP seeks to support the irrigation needs of the agricultural sector by expanding the cultivated area by 300 000 ha by 2022 (a total increase of 17%). Finally, the NWP is intended as a commitment towards achieving the Agenda 2030, in particular Sustainable Development Goal 6 "Clean water and sanitation", to which Argentina committed for 2030. The NWP is further addressed in chapters 2 and 3 of this report.

Notes

[1.] According to the Argentinian Statistical Office (INDEC), a home has unsatisfied basic needs (NBI) if it presents at least one of the following deprivations: NBI1) inconvenient-type housing (i.e. precarious housing); NBI2) households without a bathroom; NBI3) critical overcrowding (more than three people per room); NBI4) households with school-aged children (6-12 years old) that are not schooled; NBI5) households with four or more persons per employed member and in which the head of household has a low level of education (two years or less at primary level).

[2]. Salta, Jujuy, Tucumán, La Rioja, Catamarca, San Juan, Chaco, Santiago del Estero, San Luis, Córdoba, Santa Fe, Mendoza, Entre Ríos, La Pampa, Neuquén, Río Negro and Buenos Aires reaching until the Atlantic coast.

[3] Environment, agribusiness, science and technology, culture, defense, social development, education, energy and mining, finance, economy, interior, public works and housing, production, foreign affairs, transport, tourism, health, security.

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Chapter 2. Multi-level governance of water management in Argentina

This chapter analyses water governance achievements and challenges in Argentina, in the light of major reforms carried out since the early 80s. It provides an institutional mapping of who does what across ministries and levels of government, and assesses how interdependencies across multiple stakeholders, public authorities and policy areas are managed. The chapter uses the 12 OECD Principles on Water Governance to identify water governance gaps in the country, and suggests policy recommendations to bridge them, building on international experience.

Water management in Argentina: A multi-level governance approach

The multi-level institutional setting for water services provision and water resources management in Argentina is rooted in policy choices and reforms dating back to the 1980s and 1990s. In 1980, the provision of drinking water and sanitation services was transferred to the provinces, with the decentralisation of the state-owned Obras Sanitarias de la Nacion (ONS). In 1994, Argentina underwent a constitutional reform that introduced an environmental provision (Article 124) acknowledging the historical right, whereby the 23 provinces and the Autonomous City of Buenos Aires own the water resources and have jurisdiction over them, including for interjurisdictional rivers. They are also responsible for the provision of water services within their own boundaries.

Water services provision

Between 1991 and 2002, in a broader context of liberalisation, fixed parity between the US dollar and the Argentinian Peso, and opening to international markets, a total of 13 provinces privatised the management of water services (Akhmouch, 2009), which required developing provincial regulatory frameworks as well as establishing dedicated economic regulators (or dedicated regulating agencies[1]). In particular,

- In 1991, Aguas de Corrientes is granted a concession to provide water and sanitation services in the city of Corrientes and 9 municipalities (Bella Vista, Curuzú Cuatiá, Esquina, Goya, Mercedes, Monte Casero, Paso de los Libres, Saladas y Santo Tomé).
- In 1993 Aguas Argentinas, a consortium led by the French company Lyonnaise des Eaux (SUEZ) was granted a 30 years concession to provide water and sanitation services in the City of Buenos Aires and 13 municipalities of the province of Buenos Aires.
- In 1995, the province of Santa Fe granted a concession contract for 30 years of drinking water and sanitation services of 15 cities, including Rosario (with over 1.2 million inhabitants), to Aguas Provinciales of Santa Fe owned by SUEZ.
- In the same year, the province of Tucuman also transferred for 30 years water services of a dozen cities, including San Miguel de Tucuman (with over 527 000 inhabitants), to the consortium Aguas del Aconquija (Vivendi Group).
- In 1997, the province of Córdoba awarded a concession contract for 30 years of the drinking water supply of the city of Córdoba to the private international consortium Aguas Cordobesas (ACSA) also led by SUEZ (while sewage services remained under the responsibility of the city of Córdoba).
- In 1998, the province of Mendoza awarded the French group Saur International a concession contract for 95 years (negotiable every 25 years) for both drinking water and sanitation services over the perimeter of the province.

The 2001-02 economic crisis led to the termination of most concession contracts on water services managed by multinational companies. One example is Aguas Argentinas (Metropolitan Area of Buenos Aires), which was transferred to the public sector in 2006 with the creation of Agua y Saneamientos Argentinos S.A (a public limited company owned by the state [90%] and its employees through their union [10%]). Several other provinces underwent similar processes, such as Santa Fe where the management of water services in the 15 municipalities was transferred back to Aguas Santafesinas S.A., publicly

owned by the provincial government (51%), municipalities in the concession area (39%) and employees (10%). In 2011, water services in the province of Mendoza were transferred to Aguas Mendocinas S.A. (90% owned by the provincial government and 10% by employees). In the province of Córdoba, Aguas Cordobesas S.A. was purchased by the local private sector (Group Roggio) through a concession contract that will expire in 2027. Currently, the drinking water and sanitation services of the largest urban areas in Argentina are all managed by public provincial providers with the exception of four cases: Córdoba, Corrientes, Misiones and Santiago del Estero.

Water resources management

In 2002, Law 25.688 "Regime of Environmental Management of Waters" was passed, with important implications for water resources management. It established nationwide minimum requirements for the environmental protection of water resources and also stated the need to establish interjurisdictional river basin committees to promote sustainable environmental management of interjurisdictional river basins. The law was subject to numerous criticisms by most provincial water authorities, notably claiming that it interfered with provincial legal powers, such as management of natural resources, development of local or basin institutions, planning, and water use and management (Pochat, 2005). Provincial authorities unsuccessfully sought to have the law declared unconstitutional.

In 2003, the 23 provinces, the city of Buenos Aires and the national government signed a Federal Water Agreement, which laid down the foundations of a national water policy with a strong focus on resources (rather than services) management. A total of 49 Guiding Principles for Water Policy acknowledged the value of water as a social and environmental resource, while respecting the historical importance of each jurisdiction and seeking to reconcile local, provincial and national interests. The Principles cover items related to the water cycle, environment, society, management, institutions, law, economics, amongst others. They define the basin as the appropriate scale for planning and managing water resources and call for long-term planning. In the aftermath of the Federal Water Agreement, all provinces without water laws gradually passed their own legislation.

The latest milestone in water policy in Argentina was the approval of the National Water Plan (NWP) by the national government in 2016. The NWP set ambitious objectives to face some of the country's most pressing water risks and place water at the core of economic and social development. By 2023, the national government aims to increase coverage to 100% for drinking water supply and 75% for sewage connections. The NWP also aims to increase protection against floods and droughts through strategic actions that combine both hard infrastructures, such as building flood protection infrastructure in cities or increasing the number of dams, along with better early warning and information systems. Finally, the NWP seeks to support the irrigation needs of the agricultural sector by expanding the cultivated area by 300 000 ha by 2022 (a total increase of 17%), with significant implications in terms of projected fertiliser use.

Institutional mapping of water roles and responsibilities

Water policy design and implementation in Argentina is, as often, highly fragmented and involves a wide range of stakeholders and authorities across levels of government and policy areas. From the point of view of water use abstraction (for households, agriculture, industry, energy conversion, etc.), up to the limits of the river basin (and beyond), there is a full span of administrative and political boundaries that correspond to institutions with

management responsibilities and accountabilities. In that context, mapping the responsible authorities, their duties and their interactions is essential (Figures 2.1 and 2.2).

Who does what at the national level

This section provides a mapping of the allocation of roles and responsibilities for water policy design, financing, regulation and implementation at the national and provincial level, both for water resources management and water services provision.

Figure 2.1. Institutional mapping for water resources management in Argentina

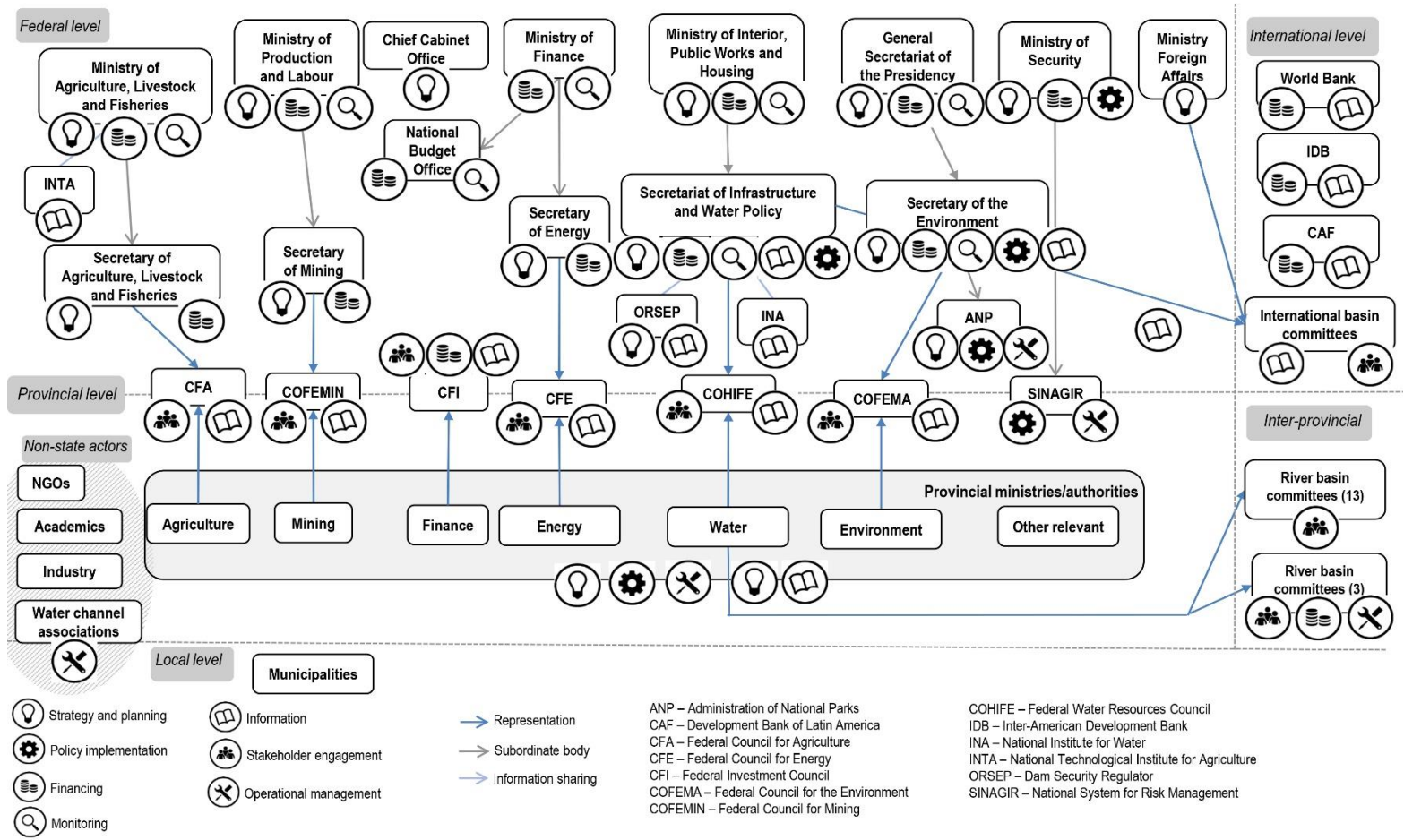
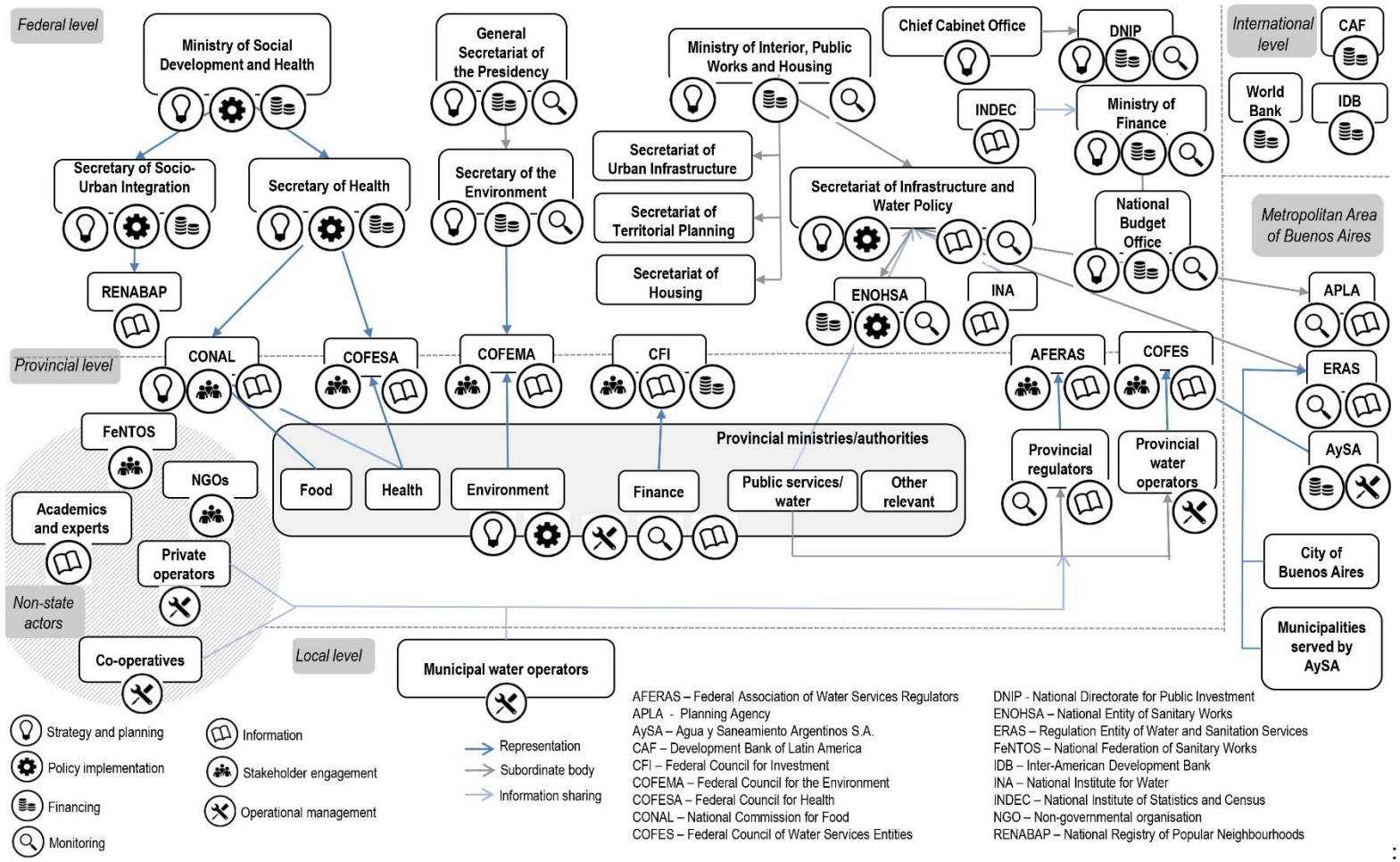


Figure 2.2. Institutional mapping for water and sanitation services in Argentina



The **Secretariat of Infrastructure and Water Policy** (Secretaría de Infraestructura y Política Hídrica, SIPH) (Ministry of Interior, Public Works and Housing) is the lead national entity for water policy. The SIPH's main responsibilities include strategy and planning for water resources management and water services provision and providing essential sector funding for infrastructure through a range of instruments, including national transfers and co-financing of projects. The provinces can voluntarily implement national goals set by the SIPH, as legal powers for water resources management and the provision of water services are decentralised. The SIPH is also one of the responsible authorities, together with the Autonomous City of Buenos Aires and the province of Buenos Aires, for policy design and implementation of water services provision in the Metropolitan Area of Buenos Aires. Under the umbrella of the SIPH are the following entities:

- **National Entity of Water Works of Sanitation** (Ente Nacional de Obras Hídricas de Saneamiento, ENOSA) is a decentralised body with legal status and administrative autonomy. It acts as a financial agency channelling national and external resources to provinces and service providers for the construction of sanitary works. Since 2004, it is entitled to tender and execute works, projects and acquisitions for the construction, maintenance and replacement of sanitation infrastructure.
- **Dam Security Regulator** (Organismo Regulador de Seguridad de Presas, ORSEP) controls that dams comply with international safety standards, both structurally and operationally. It supervises compliance with standards for dam safety established under hydropower concession contracts.
- **National Institute for Water** (Instituto Nacional del Agua, INA) is a decentralised scientific and technological body whose objective is to develop research and deliver specialised advisory services in the field of water use and preservation.

The **Ministry of Interior, Public Works and Housing** (line ministry) manages the relationships with the provinces and has responsibilities in relation to public works, housing and habitat policies. The line ministry houses the SIPH, as well as the following other secretariats with specific competences on water:

- The **Secretariat of Urban Infrastructure** designs and executes programmes to improve water services infrastructure in formal and informal settlements in urban areas.
- The **Secretariat of Territorial Planning** designs the projects executed by the ministry, including water infrastructure projects, such as sewerage and drainage networks, flood defence, etc.
- The **Secretariat of Housing** designs and executes programmes to improve intra-housing connections to water services, both drinking water supply and sewerage.

The **Secretariat of the Environment and Sustainable Development** (Secretaría de Ambiente y Desarrollo Sustentable, SAyDS) (within the General Secretariat of the Presidency) is the national authority on environmental policy. The SAyDS's main responsibilities include strategic planning to ensure environmental preservation and protection, promote sustainable development through a rational use of natural resources, and climate change adaptation and mitigation.

- **Administration of National Parks (ANP)** has jurisdiction over water resources in the territory of Argentina's national parks

The **Secretariat of Agriculture, Livestock and Fisheries** (Secretaría de Agricultura, Ganadería y Pesca, SAG) (Ministry of Agriculture, Livestock and Fisheries) is responsible for promoting more efficient and productive water use in agriculture. The SAG funds programmes in support of sustainable use of soil and water resources in agriculture and co-ordinates key actions and resources available at different levels of government (national and provincial) to achieve these goals. The National Irrigation Plan was developed by SAG.

The **Chief Cabinet Office** defines policy priorities, manages trade-offs across policy areas and co-ordinates with line ministries public action. The Chief Cabinet Office hosts the **National Directorate for Public Investment** (Dirección Nacional de Inversión Pública, DNIP), which updates the inventory of projects that are candidates to be funded through national public investment and elaborates the national investment plan. The inventory of projects is updated through the National Bank for Public Investment Projects (BAPIN). Each line ministry has to inform the DNIP of projected investments and register them in the BAPIN as a prior step to access financing through the national budget.

The **Ministry of Finance**, following policy priorities defined by the Chief Cabinet Office and after evaluating the pre-investment project of each line ministry, elaborates the draft budget law (to be discussed in the National Congress). Thus, it co-ordinates with institutions in the water sector on the corresponding investment programmes intended to improve water supply and sanitation services. The Ministry of Finance houses the **National Budget Office**, which intervenes in the formulation, execution programming, modification and evaluation of the public budget, including those allocated to the water sector.

The **Secretariat of Mining Policy** (SMP) (Ministry of Production and Labour) is responsible for promoting more productive mining activities. The SMP also funds programmes in support of mining developments.

The **Secretariat of Energy** (Ministry of Finance) is responsible for policy design and implementation on energy production (including hydropower), and in particular, for managing subsidies on gas and electricity, setting tariffs, enforcing regulations and managing the state oil company YPF.

The **Secretariat of Health** (Ministry of Health and Social Development) is responsible for enforcing the rules of the National Alimentation Code that set domestic water supply quality standards.

The **Secretariat Socio-Urban Integration** (Ministry of Health and Social Development) is responsible of the co-ordination of the National Registry of Disfavoured Neighbourhoods (Registro Nacional de Barrios Populares, RENABAP).

The **Secretariat of Civil Protection** (Ministry of Security) is responsible for the design and implementation of disaster management policies aiming at preventing, avoiding, diminishing or mitigating the effects of natural or man-made disasters, as well as for co-ordinating national and international support within the framework of international directives for risk reduction. The system used for co-ordinating effort is the SINAGIR.

The **Ministry of Foreign Affairs** is responsible for representing Argentina's interests in the negotiation of bilateral, multilateral and other international agreements regarding natural resources, and co-ordinating Argentina's participation in international efforts aimed at the conservation and environmental protection of species and natural resources.

The **National Institute of Statistics and Census** (Instituto Nacional de Estadística y Censos, INDEC) is a decentralised public agency within the scope of the Ministry of

Finance that produces all official statistics in Argentina, including data on access to water supply and sanitation services as part of the National Census.

The **National Technological Institute for Agriculture** (Instituto Nacional de Tecnología Agropecuaria, INTA) (Ministry of Agriculture, Livestock and Fishing) is a decentralised public body with operational and financial self-sufficiency that contributes to the sustainable development of the agricultural, agrifood and agroindustrial sector through research.

Federal councils seek to promote active participation of the provinces for the coordination, implementation and monitoring of federal policies. These bodies generally focus on a specific policy area and are made up of representatives from provincial sectoral ministries/authorities and the corresponding national ministry/authority. Water-related federal councils include: Federal Water Resources Council (Consejo Hidrico Federal, COHIFE), Federal Environmental Council (COFEMA), Federal Mining Council (COFEMIN), Federal Energy Council (CFE), Federal Agricultural Council (CFA) and Federal Health Council (COFESA). A particular body with water-related competences is the National Food Commission (CONAL), which provides advice and supports the National Food Control System where the quality parameters for drinking water are set (dictated by Chapter XII of the National Food Code).

The **Association of Regulatory Authorities for Water and Sanitation** (Asociación Federal de Entes Reguladores de Agua y Saneamiento, AFERAS) is a non-profit civil organisation, which gathers all regulatory entities of water and sanitation services from the different jurisdictions of Argentina. This association promotes research, knowledge brokerage and experience sharing in the field of water and sanitation services, and provides assistance, training and technical advice to its members and proposes training.

The **Federal Council of Sanitation Services Entities** (Consejo Federal de Entidades de Servicios Sanitarios, COFES) represents the interests of water supply and sanitation services providers throughout Argentina. This organisation acts as a spokesperson for its members for the establishment of sectoral strategies and consensus.

Who does what at the subnational level

The **Regulatory Authority for Water and Sanitation** (Ente Regulador de Agua y Saneamiento, ERAS) is a self-governing public body, created in 2006 by a tripartite agreement between the Ministry of Federal Planning, Public Investment and Services; the province of Buenos Aires; and the government of the Autonomous City of Buenos Aires. It is in charge of controlling Agua y Saneamientos Argentinos SA (AySA)'s compliance with its legal obligations as a service provider, including water pollution control. AySA is the water and sanitation service provider in the Metropolitan Area of Buenos Aires (Autonomous City of Buenos Aires and 26 municipalities in the province of Buenos Aires).

The **Planning Agency** (APLA) is a self-governing public body in charge of reviewing and co-ordinating the expansion and improvement works made by the concessionaire, AySA. It has legal powers on evaluating, planning, executing and controlling investments in the area of the concessionaire. Moreover, it liaises regularly with the municipalities and the concessionaire itself.

Provincial water authorities are also responsible for water resources management and the provision of water services within their boundaries. The latter includes strategy, planning, regulation, monitoring and evaluation, and operational competences over water. In the case of the Metropolitan Area of Buenos Aires, AySA provides water services as established by

the Tripartite Agreement (approved by Law 26.221). In this agreement, the representatives of the Autonomous City of Buenos Aires, the province of Buenos Aires and the national government have delegated to ERAS and APLA its regulating and control powers.

Provincial line ministries and secretaries are responsible for their respective policy area competence as provided by the national and provincial constitutions.

Provincial regulators have full competence over the regulation of water services in their jurisdiction. This includes evaluation, planning, execution and control of investments as well as controlling compliance with legal obligations as a service provider, including water pollution control.

Municipalities are the responsible authorities for water services in their jurisdiction. This typically excludes large urban areas where the service provider is usually under the purview of the provincial government.

Municipal water operators provide water services in their jurisdiction. Generally, there are two types of service providers at municipal level: municipal public companies owned by the municipality, and cooperatives, which provide services under a concession contract awarded by the municipalities.

The 16 inter-jurisdictional river basins committees provide a space to negotiate agreements between provinces on inter-provincial river basins.

International co-operation

Development banks (the Inter-American Development Bank [IDB], the Development Bank of Latin America [CAF], the World Bank) finance water-related programmes under framework agreements with the national government.

Other **international co-operation** activities are carried out with CEPAL (Comisión Económica para América Latina y el Caribe), CeReGAS (Centro Regional para la Gestión de Aguas Subterráneas para América Latina y el Caribe), CODIA (Conferencia de Directores Iberoamericanos del Agua), FAO (Food and Agriculture Organisation), Delta Coalition, Fonplata (Fondo Financiero para el Desarrollo de la Cuenca de la Plata), FMAM / GEF (Fondo para el Medio Ambiente Mundial), GWP (Global Water Partnership), IHP UNESCO (International Hydrological Programme), IWA (International Water Association), MAWAC (Megacities Alliance for Water and Climate), OEA (Organización de los Estados Americanos), OECD Water Governance Initiative, PAHO (Pan American Health Organization), TNC (The Nature Convervancy), UNEP (United Nations Environment Programme), WHO (World Health Organisation) and the **co-operation agencies** of France (AFD), of Denmark, Germany (GIZ), the Netherlands and Spain (AECID).

Key governance challenges to water security

The following sections analyse how the institutional framework for water management is performing in Argentina against the OECD Principles on Water Governance (Box 2.1).

Effectiveness of water governance

Fragmentation

The water governance system in Argentina is highly decentralised. The 23 provinces and the city of Buenos Aires have jurisdiction over water resources, including for interjurisdictional rivers, and are responsible for the provision of water services within their boundaries. Their powers include policy making, policy implementation, operational management, financing and regulation of both subsectors. For the specific case of the Metropolitan Area of Buenos Aires, the national government together with the city of Buenos Aires and the province of Buenos Aires are responsible for the provision of water services. In practice, the national government can establish a national water policy, strategy, programme or plan, but needs the acceptance and support of the provinces to implement it, even within the Metropolitan Area of Buenos Aires.

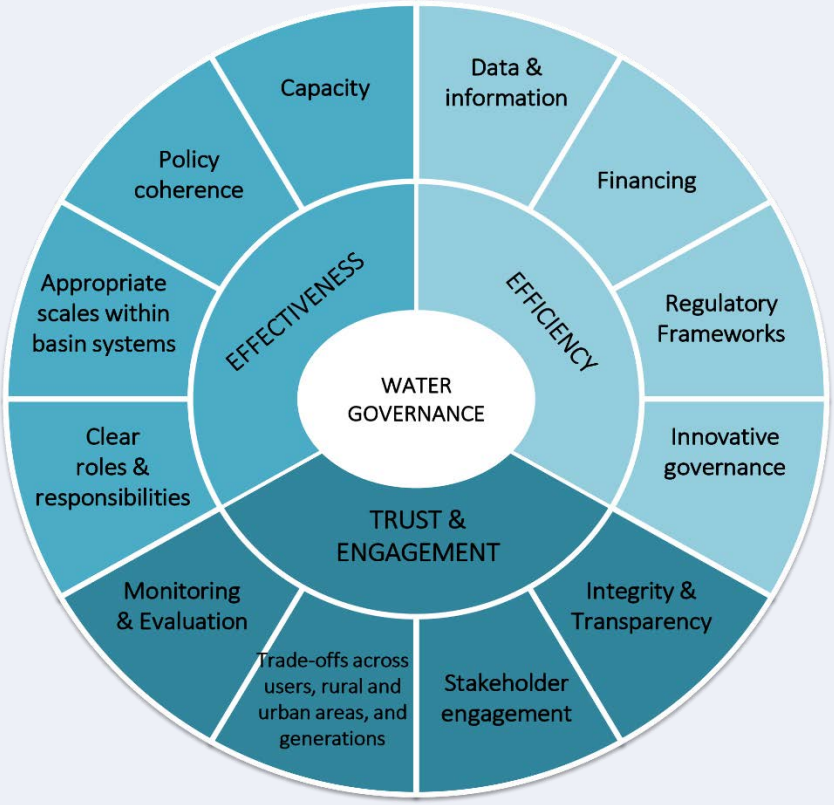
Box 2.1. OECD Principles on Water Governance

Coping with current and future challenges requires robust public policies, targeting measurable objectives in pre-determined time schedules at the appropriate scale, relying on a clear assignment of duties across responsible authorities and subject to regular monitoring and evaluation. Water governance can greatly contribute to the design and implementation of such policies, in a shared responsibility across levels of government, civil society, business and the broader range of stakeholders who have an important role to play alongside policy makers to reap the economic, social and environmental benefits of good water governance.

The OECD Principles on Water Governance aim to enhance water governance systems that help manage “too much”, “too little” and “too polluted” water and foster universal access to drinking water and sanitation, in a sustainable, integrated and inclusive way, at an acceptable cost, and in a reasonable time frame. The principles acknowledge that good governance is a means to an end to master complexity and managing trade-offs in a policy domain that is highly sensitive to fragmentation, silos, scale mismatch, negative externalities, monopolies and large capital-intensive investment. The principles consider that governance is good if it can help to solve key water challenges, using a combination of bottom-up and top-down processes while fostering constructive state-society relations. It is bad if it generates undue transaction costs and does not respond to place-based needs.

The OECD Principles on Water Governance intend to contribute to tangible and outcome-oriented public policies, based on three mutually reinforcing and complementary dimensions of water governance (Figure 2.3).

Figure 2.3. Dimensions of water governance



1. Effectiveness relates to the contribution of governance to define clear sustainable water policy goals and targets at all levels of government, to implement those policy goals, and to meet expected targets.
2. Efficiency relates to the contribution of governance to maximise the benefits of sustainable water management and welfare at the least cost to society.
3. Trust and engagement relate to the contribution of governance to building public confidence and ensuring inclusiveness of stakeholders through democratic legitimacy and fairness for society at large.

Enhancing the effectiveness of water governance

- Principle 1. Clearly allocate and distinguish roles and responsibilities for water policy making, policy implementation, operational management and regulation, and foster co-ordination across these responsible authorities.
- Principle 2. Manage water at the appropriate scale(s) within integrated basin governance systems to reflect local conditions, and foster co-ordination between the different scales.
- Principle 3. Encourage policy coherence through effective cross-sectoral co-ordination, especially between policies for water and the environment, health, energy, agriculture, industry, spatial planning and land use.

- Principle 4. Adapt the level of capacity of responsible authorities to the complexity of water challenges to be met, and to the set of competencies required to carry out their duties.

Enhancing the efficiency of water governance

- Principle 5. Produce, update and share timely, consistent, comparable and policy-relevant water and water-related data and information, and use it to guide, assess and improve water policy.
- Principle 6. Ensure that governance arrangements help mobilise water finance and allocate financial resources in an efficient, transparent and timely manner.
- Principle 7. Ensure that sound water management regulatory frameworks are effectively implemented and enforced in pursuit of the public interest.
- Principle 8. Promote the adoption and implementation of innovative water governance practices across responsible authorities, levels of government and relevant stakeholders.

Enhancing trust and engagement in water governance

- Principle 9. Mainstream integrity and transparency practices across water policies, water institutions and water governance frameworks for greater accountability and trust in decision making.
- Principle 10. Promote stakeholder engagement for informed and outcome-oriented contributions to water policy design and implementation.
- Principle 11. Encourage water governance frameworks that help manage trade-offs across water users, rural and urban areas, and generations.
- Principle 12. Promote regular monitoring and evaluation of water policy and governance where appropriate, share the results with the public and make adjustments when needed.

Source: OECD (2015a), *OECD Water Governance Principles*, https://www.oecd.org/gov/regional-policy/OECD-Principles-on-Water-Governance-brochure.pdf.

While the 2003 Federal Water Agreement sets a vision for water policy in Argentina, it did not provide an enduring mechanism for incentivising inter-governmental co-operation for its implementation, nor an accountability mechanism for the national government and the provinces to work together on achieving the agreement's vision. Other federal agreements, such as the Federal Energy Agreement and the Fiscal Pact, could serve as inspiration to drive more effective implementation of national, provincial and local policies (Box 2.2).

Box 2.2. Examples of recent multi-level agreements in Argentina: Fiscal Pact and Federal Energy Agreement

Fiscal Pact

The Fiscal Pact signed in November 2017 between the national government, the provinces and the city of Buenos Aires aimed at reforming the national fiscal system. It is structured around three pillars:

1. Common commitments: Includes specific measures such as modifying existing fiscal laws (i.e. the Fiscal Responsibility Law and the Income Tax Law), approving changes in the 2018 national budget, passing a new law on property fiscal evaluation, or reforming the fossil fuel tax system. It also includes other softer commitments. In particular, the pact lays down the political willingness from the signatory parties to pass a new co-participation law (a long-standing issue in the Argentinian fiscal policy agenda) as well as a state modernisation law.
2. National commitments: The national government commits to provide the provinces and the Autonomous City of Buenos Aires (CABA) with the fiscal resources needed to compensate the decrease in revenues. It does so through several channels, such as inter-governmental fiscal transfers, bond emissions, the Social National Fund, transferring funds to provincial social security mechanisms, or retirement programmes.
3. Provincial and CABA commitments: Align provincial tax policy with national tax policy. National tax policy implies reducing the provincial base of taxes such as the income, property or stamp tax. It also committed the provinces to eliminate any taxes applicable according to workers' attributes (place of birth, residence, etc.) and to establish a similar fiscal responsibility regime with municipalities.

Federal Energy Agreement

The Federal Energy Agreement signed in April 2017 between the national government, 20 provinces and CABA seeks to support the implementation of reliable, competitive and environmentally sustainable national policies on energy. Parties thereby committed to co-ordinate energy policies respecting the allocation of competencies foreseen in the national Constitution, the provincial constitutions and other competing laws. The agreement also created the Federal Energy Council (Consejo Federal de Energía, CFE), whose mission is to act as an advisory and co-ordination body on issues related to energy policies in the country (e.g. programmes to promote renewable energies and energy efficiency, tariff setting, investment projects, and functioning and compliance of energy regulators). The CFE also has an important role to prevent the overlapping of the competences of national, provincial or public service companies and to support common criteria on the application and/or setting of energy-related taxes at national, provincial and municipal levels. The harmonisation of taxes can affect services, contracts and/or energy works, and aims to encourage investment and achieve an adequate balance of jurisdictional revenue. The council is chaired by the Minister of Finance (which houses the Secretary of Energy) and composed of a representative of each of the jurisdictions and the presidents and vice-presidents of the energy commissions of both the parliament and the senate.

Sources: Ministry of Finance (2017), "Pacto Fiscal", https://www.minhacienda.gob.ar/wp-content/uploads/2017/11/consenso_fiscal.pdf; Federal Energy Council (2017), "Federal Energy Agreement", https://www.argentina.gob.ar/energia/consejo-federal-de-energia.

The 2016 National Water Plan (NWP) sets an ambitious agenda to address pressing and emerging water risks. Although other measures have been carried out, such as establishing new interjurisdictional river basin committees (in shared river basins across provinces) and generating more and better hydro-meteorological information, the greatest efforts have been placed on delivering infrastructure. For instance, the national government has set the pre-condition that large-scale infrastructure projects will only be financed in interjurisdictional river basins if there is an agreement between all provinces within the corresponding basin. Beyond this conditionality, there are limited horizontal and vertical co-ordination mechanisms for the implementation of the NWP.

With a view to fostering co-ordination across water-related institutions and levels of government, several federal councils have been created, but their mandate is rather limited and they have overall low enforcement powers. One example is the Federal Water Resources Council (COHIFE) created in 2003 to promote a coherent implementation of the vision set by the Federal Water Agreement across sectoral ministries related to water at national and provincial level. However, COHIFE's current role is merely that of providing a platform to exchange ideas and experiences as is the case of other councils (e.g. environment or agriculture). Moving forward, there is a significant room for upscaling the potential of federal councils in Argentina to drive policy coherence more effectively and strategically, and to align incentives and better manage trade-offs across water uses for instance.

Scale

While the Federal Water Agreement acknowledges basins as the appropriate scale for water management, sound basin governance is the exception rather than the rule in Argentina. The role of the existing 16 interjurisdictional river basin committees is essentially to provide a neutral space to negotiate agreements across provinces on shared rivers and reach consensus on identifying problematics and possible ways forward. However, their creation has overall not contained conflicts over water uses between provinces. Such conflicts arise for reasons such as a lack of effective inter-provincial co-ordination, communication and exchange of information. Moreover, there are cases where for the provincial authorities co-ordinating actions with other provinces is not optimal from an economic standpoint. For instance, the province of Tucumán has historically avoided meaningful action to reduce water pollution in the Salí-Dulce River produced by citrus and sugar cane farmers, who contribute strongly to the provincial economy. The river runs through Tucumán and then enters the provinces of Santiago del Estero and Córdoba, which have complained for decades about high pollution levels generated upstream (Berardo, Olivier and Meyer, 2013).

In practice, water management in Argentina often does not respond to long-term economic, social and environmental objectives. Policy objectives are not always co-ordinated across the various national plans. Overall Argentina's approach to water management is mostly project-based rather strategic and at basin scale, although there are efforts from the national government to promote planning at basin scale. Interjurisdictional plans identify, define and prioritise projects to solve challenges in the basin. However, they are limited in scope, since they focus on individual projects to solve specific issues rather than seeking to align national and provincial policy priorities and objectives with a long-term, sustainable perspective. A good practice for instance lies in the Secretariat of Infrastructure and Water Policy (SIPH) financing infrastructure under the condition that the project is the result of a decision taken and based through a basin planning process.

The potential of water management instruments to drive demand management and water use efficiency is not fully exploited. The use of economic instruments varies across jurisdictions, and is too low to drive behavioural change, collect sufficient revenues or promote efficient water use. Some provinces do not charge for bulk water withdrawal or the discharge of untreated polluting effluents; others charge according to the water use or the category of users; and some apply, to a limited extent, the polluter-pays principle. In many cases, the level of tariffs or fees does not reflect the economic value of water, and the current system does not offer incentives to be more efficient (Andino, 2015).

Policy coherence

There is no formal national inter-ministerial co-ordination mechanism to align water, agriculture, energy, environment, urban and mining policies. Federal councils provide for a bridge across national and provincial levels for each sector, but do not drive horizontal policy coherence overall nor manage trade-offs related to siloed decisions. A clear example is the National Food Commission (CONAL), which is responsible for designing the National Food Code with the 23 provinces, the Autonomous City of Buenos Aires and the national government, including water quality standards for human consumption. However, in doing so, CONAL does not systematically consult with the ministries that have a stake in such standards, such as the SIPH or the Secretary of Environment and Sustainable Development (SAyDS). Overall, horizontal co-ordination for water-related policies rather relies on *ad hoc* initiatives or exchanges between peers.

There is also limited co-ordination between sectoral policy objectives across the various national plans. For instance, the NWP strives to ensure through environmental impact assessments that projects do not have a negative impact on the environment. However, there is much room for its greater coordination with national environmental objectives. Similarly, the National Irrigation Plan aims at developing new irrigation systems and improving the technical efficiency of the irrigation sector, but it also has limited connections to broader national (or even basin level) environmental or water objectives.

There is also a lack of horizontal co-ordination at metropolitan scale, in particular across health, land use, environment and service provision, which has ultimately resulted in water pollution, floods and poor service provision in large metropolitan areas. Overall, both water resources management at the basin level and land-use management remain fragmented. Provincial jurisdictions are in charge of regulating natural resources (water, mining, etc.), while land regulation is under the responsibility of local governments exclusively. In the Matanza-Riachuelo River Basin (Metropolitan Area of Buenos Aires) industrial activity, uncontrolled settlements in the urban area and lack of water and sanitation services have caused serious contamination with consequences on human health. Another example is the Suquia River (city of Córdoba), where economic and urban development together with the lack of sanitation infrastructure have also caused environmental damage to the river (Novello, 2015).

Capacity at the subnational level

The capacity of provinces to design and implement water-related policies, as well as to plan, operate, maintain and finance water infrastructure varies across the country. Capacity gaps relate to diverse issues such as infrastructure and investment planning, water resources and basin management, enforcement of regulatory frameworks, or data and information. From an infrastructure standpoint, on the one hand, provinces such as Santa Fe have shown abilities to plan, deliver and operate large infrastructure in an effective way through, for

instance, a 30-year strategic plan (in 2008) foreseeing 12 large pipelines to secure high-quality drinking water supply in the western part of the province. On the other hand, the ten provinces featured in the Belgrano Plan lack the capacity to deliver, operate and maintain infrastructure projects, as is the case of La Rioja where the World Bank has been supporting provincial authorities in several planning, budgeting, co-ordination and management areas (World Bank, 2019). International cooperation efforts have also documented subnational capacity challenges for water management (Box 2.3).

Box 2.3. Water management capacity challenges in the Tandil–Lavalle basin, province of Buenos Aires

Blue Deal cooperation: Province of Buenos Aires (Water Authority - ADA) and the Dutch Water Authorities

The Tandil-Lavalle river basin in the rural area of the province of Buenos Aires suffers from severe floods and droughts, salt intrusion during high tides as well as polluted groundwater sources due to inadequate wastewater treatment. Climate change, and is predicted to exacerbate current water challenges. All these factors are already having an impact on agricultural productivity and can jeopardise drinking water supply sources.

The Dutch Water Authorities (DWA), together with the Water Authority of the province of Buenos Aires (ADA), have conducted an assessment of core water management capacity challenges in the basin:

- Lack of capacity for the design and delivery of water infrastructure (dams, dikes, channels)
- Absence of infrastructure investments on O&M
- No daily management of water levels, and uncontrolled water releases during floods and droughts

Within the Blue Deal cooperation scheme, DWA and ADA have signed an agreement to improve flood protection, water availability and water quality in the Tandil-Lavalle river basin. DWA and ADA have co-designed an action plan, including financial estimations, to implement hard and soft measures that help tackle water challenges and enhance water management capacities at basin level. During Phase 1 (2019-2022), the project efforts will focus specifically on the Tandil-Lavalle basin, and in Phase 2 and 3 (2023-2031), the province aims to upscale lessons-learned to other rural basins (such as the Rio Salado basin) covering more than 80% of the surface of the province.

Source: Contribution by Dutch Water Authority (DWA) and Water Authority of the province of Buenos Aires (Autoridad del Agua de la provincia de Buenos Aires, ADA).

Municipalities also face capacity gaps, for example, in enforcing land-use regulations, which is a key challenge for water management in a highly urbanised country such as Argentina. Because of the division of competences for water management and land use across provincial and municipal levels, there is a considerable spatial heterogeneity in terms of how urban development is featuring in water constraints or not. However, there is a moderate application of local land-use regulations. For example, in 2018, only 34% of local governments had adopted territorial plans. (National Presidency Report, 2017).

Efficiency of water governance

Data and information

Water-related data are scattered across levels of government, and among a wide range of sources, which include the public sector (at national, provincial and municipal level), regulators, water operators (public, private and co-operatives), users' associations and others. Each province produces its own data for assessing water resources management and access to water services, which is of varying quality. However, there is neither a formal requirement to share such data with the national government, nor a unified collection or monitoring system. Beyond the SIPH, several ministries and secretaries also produce water-related data at national level, for instance, the Environmental Monitoring Federal Network or the Water Quality GIS tool hosted by the SAyDS, or the Evaluation and Monitoring Network of Aquatic Ecosystems (REM.AQUA) developed by the National Council of Technology and Science (Consejo Nacional de Investigaciones Científicas y Técnicas, CONICET) and the SAyDS.

Dispersion of data gives rise to a lack of basic information at national level, including on basic indicators such as abstraction rate by water use at basin level and household drinking water consumption rate in urban areas. Further, there is no integrated national or provincial information system relating to infrastructure maintenance data for water services and water resources or on availability and use of groundwater sources.

Relevant efforts are underway to harmonise data across levels of government (both for water resources and water services), although there remains room for improvement. The *Integrated National Hydrological Database* is a nationwide database that incorporates data from the SIPH's gauging stations as well as from other institutions that have adhered voluntarily to the database. Such institutions include national research institutes and the provinces of Chaco, Corrientes, Entre Rios, Mendoza and Rio Negro (see Chapter 3). Each of these feeds the database by incorporating data from the respective networks for which they are responsible. Moreover, the National Directorate for Drinking Water and Sanitation (Dirección Nacional de Agua Potable y Saneamiento, DNAPyS) is leading an initiative, National Information System for Drinking Water and Sanitation Services, to gather relevant information from large water service providers (see Chapter 4).

Better data and information could underpin an ambitious monitoring and evaluation of water policies and their outcomes, which currently does not exist. With the exception of the registry that tracks public budget execution, there is no regular monitoring and reporting mechanism to assess, for instance, progress made in the implementation of the National Water Plan. Monitoring progress is crucial to enhance transparency, hold the public administration accountable and, most importantly, to inform and guide future policy reforms and enhancements of the NWP.

Investment framework

The current investment framework does not enable the mobilisation of the finance required to achieve Argentina's water policy objectives. Several factors contribute to this situation. First, the macroeconomic downturn, and related fiscal consolidation policies, have an impact on the ability of the national government to execute international financing due to limited fiscal space. Second, the absence of comprehensive investment strategies lowers the impact of public investment because there is no sustainability of projects over time (many projects are not bankable) and limited synergies with investments in other policy areas. Third, the lack of capacity of some provinces to plan, operate, maintain and finance

water infrastructure poses challenges to make the most of public investment. Fourth, favouring capital investment does not promote investments in water-use efficiency measures or other less-costly solutions such as green infrastructure. And lastly, the absence of a system to prioritise projects according to objective and measurable criteria implies that project selection may not always be the most adequate nor free from political interference. The combination of these factors has made it difficult to catalyse, amongst others, the funding required for meeting the NWP's objectives (Box 2.4).

Box 2.4. Sources of financing for the National Water Plan

The national government planned to achieve the objectives of the National Water Plan (NWP) through a mix of public, private and multilateral funding sources. For 2018, it aimed to increase infrastructure investment by 50% in real terms, with a target of 3.5% of gross domestic product (GDP) (2.6% in 2017). Half of this increase would derive from the National Treasury, where there would be a considerable increase in water infrastructure investment (from 0.2% of GDP in 2017 to 0.4%). The remaining part is intended to come in the form of public-private financing schemes. For that purpose, Congress passed a law (No. 27328) on Public-Private Partnerships in 2017, together with an article of the Budget Law allowing public service providers to seek external financing without increasing the fiscal deficit of the national or provincial budget.

As a consequence, starting January 2018, the publicly owned water and sanitation service provider in the Metropolitan Area of Buenos Aires (Agua y Saneamientos Argentinos S.A., AySA), raised USD 500 million in private sector bonds to support the foreseen large-scale infrastructure programmes. This experience in accessing debt financing on international capital markets is interesting because it required a process of strengthening the company's financial processes (audit and credit rating).

Sources: Chief of Cabinet (2017), "En 2018 la inversión en infraestructura va a aumentar un 50 por ciento en términos reales", https://www.argentina.gob.ar/noticias/en-2018-la-inversion-en-infraestructura-va-aumentar-un-50-por-ciento-en-terminos-reales; Ministry of Interior, Public Works and Housing (2018), "AySA obtuvo 500 millones de dólares de inversores internacionales para obras de agua potable y saneamiento", https://www.argentina.gob.ar/noticias/aysa-obtuvo-500-millones-de-dolares-de-inversores-internacionales-para-obras-de-agua.

Argentina's macroeconomic situation has brought tight fiscal constraints to the public budget as well as reluctance from private investors to engage in water-related projects due to uncertainty and high-risk perception levels (see Chapter 1). However, beyond the macroeconomic situation, the overall current weak enabling environment does not promote effective investments. This is due to poor strategic investment planning, a lack of incentives to move focus from new capital investment (new infrastructure for example) to promoting efficiency in the operation of existing capital assets, and a weakness in the economic assessment processes which underpin any necessary capital investment decisions. For instance, construction of new water treatment plants has been seen to be prioritised over measures to reduce non-revenue-water (where physical and commercial losses are huge) that are equally important to drive water efficiency (World Bank, 2018).

The absence of comprehensive investment strategies to steer water infrastructure delivery and promote sustainability of projects over time is a challenge, which is partly due to the lack of both horizontal and vertical co-ordination in investment planning. The national government has established a financial incentive (around 70% of funding comes from

national sources) to deliver projects foreseen in the NWP. However, these incentives do not entail commitments as to how the financial feasibility of the projects will be sustainable over time.

Budgetary capacity to fund public investment and ensure the financial sustainability of projects can be extremely uneven between provinces. Revenue-generating capacity is crucial when facing economic instability, in particular where the economy relies on international commodity prices such as in the provinces of Buenos Aires, Córdoba and Santa Fe, which present self-generating revenue rates around or above national average (around 35%). While southern provinces such as Chubut, Santa Cruz and Tierra del Fuego generally show much higher rates of this kind of revenue (45-60% of subnational GDP), northern provinces (Formosa, Jujuy, La Rioja, Santiago del Estero) are below 10% of subnational GDP (OECD, 2016). In Argentina, the current (dis)incentive scheme drives large-scale infrastructure investment rather than promoting investments in efficiency measures. As a result, operational efficiency opportunities may be foregone. In the framework of the NWP, funds are allocated to large infrastructure targeting to close gaps in access to water services in the Metropolitan Area of Buenos Aires, while the average consumption in the main water services providers of the country remains at 299 litres per capita (with a minimum of 148 litres per capita and a maximum of 422 litres per capita) and water losses in the network range from 30% to 60% (except for Aguas de Córdoba that registers 19%).

It is claimed that the delay in raising tariff levels has posed difficulties in funding operation and maintenance expenditures. Starting in 2015, general subsidies to the water tariff have been progressively removed, increasing the cost recovery of operation and maintenance costs from 42% to 81% in 2018 (AySA S.A., 2018). However, tariffs are just one way of promoting financial operational cost recovery, and technical efficiency gains can also lower the cost per unit of the service.

There is no system in place to prioritise projects according to objective and measurable criteria (World Bank, 2019). The Ministry of Finance together with the Chief Cabinet Office establish the budget cap and prioritise investments, but it is unclear which criteria are used or how selection is made. There is overall limited assessment of how water investments are resulting in competitive advantages, growth, innovation or job creation in the provinces, or how the infrastructure supports equity and environmental sustainability. All this results in *ad hoc* delivery of infrastructure based on the availability of funding and the willingness of different levels of government to finance.

Economic regulation

The absence of a nationwide legal framework or regulatory principles for drinking water and sanitation management has led to over-regulation at the provincial level. Any benefits that might arise from economic regulation are diluted or unavailable, as key regulatory functions – such as service standards and tariff regulation, setting incentives for efficient investment, and information and data gathering – cannot be effectively enforced in the absence of an overarching framework. Regulation at provincial level has not fostered effective and efficient investments to close gaps of access to services and to promote efficiency in service delivery. Additionally, there are no standardised and integrated processes to issue and evaluate water-related regulatory frameworks through an evidence-based method, such as *ex ante* or *ex post* regulatory impact assessment.

The prevailing tariff system for drinking water and sanitation is disconnected from production costs and local conditions of service delivery, preventing regulators from

assessing efficiency and setting tariffs accordingly to drive behavioural change. The predominant tariff system is the "*canilla libre*", whereby users pay a flat rate regardless of the volume consumed. This fixed rate is based on an assumed consumption criterion depending on the size, location and age of the estate property. According to the Argentinian Federal Association of Water and Sanitation Regulators, the most common price-setting methodology across the country is a price cap. However, in practice, hybrid methods do exist since in all jurisdictions, periodic price reviews are carried out following different methodologies, mainly addressing cost increases. Periodic or ordinary tariff reviews are the exception rather than the rule, especially in state-owned companies. In general, rates have been increased by so-called revisions due to cost (closely linked to the inflation rate) or extraordinary amendments.

There are no requirements for water operators to develop (or deliver) medium or long-term investment plans. Nevertheless, since the end of 2016, results-based plans have started to be put into place, setting out information on the prioritisation of actions and projects based on objective criteria assessment. An ongoing initiative by the SIPH together with the World Bank and the Inter-American Development Bank, seeks to make these plans compulsory if water service providers are to access finance from them. The results-based plans are developed by water services providers and have to be approved by the application authority of each province as well as by the relevant economic regulator.

There are limited efficiency incentives for operators overall. The regulatory system only promotes financial operating cost recovery through tariff increases, not through efficiency gains (as noted earlier, capital is generally provided by grant funding and operators therefore do not require, and should not earn, a return on that capital). Current financial and institutional incentives focus on closing evident gaps in access to services. These gaps limit investments in other areas that could help improve technical or financial efficiency, therefore making more resources available to invest in closing services gaps. An illustration of this missed opportunity can be seen in the levels of water losses, which are high (45% leakage rate on average).

The fragmentation of regulation responsibilities on regulation across levels of government together with the lack of coherence and enforcement power of provincial regulators make it difficult for the national government to compile information (coverage, quality and tariffs) from operators. In this sense, the SIPH has been working towards a *National Information System on Drinking Water and Sanitation Services*, which will process, analyse and publish performance management indicators of large water services providers. This initiative will be a milestone since there is no such information system regarding water services providers in Argentina. At the same time, the main source of statistical data at the national level, the National Institute of Statistics and Censuses (INDEC), which is in charge of preparing the National Household Expenditure Survey (ENGhO), does not have updated information to measure the share of the water bill over household expenditure for instance, which is a critical element for assessing affordability of water services and their distributional impacts. The current reference are data produced in 2004, since INDEC recommended not using the 2016 survey due to a methodological issue. However, INDEC is working to update this information in some jurisdictions, such as CABA, where it produces statistics on the percentage of family spending on water and sanitation services.

Innovation

The NWP identifies innovation as a key driver to overcome water challenges in Argentina. In particular, more and better production of knowledge, embracing technology, and driving

organisational innovations are seen as priority areas within the NWP. Some of these innovations are already present in Argentina:

- The National Registry of Disfavoured Neighbourhoods (RENABAP) provides an unprecedented mapping of existing informal settlements in Argentina. RENABAP not only identifies buildings within these disfavoured neighbourhoods, but registers building characteristics and the socio-economic status of households. Together with RENABAP, the Family Housing Certificate is a new ID for households living in disfavoured neighbourhoods and provides the right to request connection to public services (water, electricity, gas and sewers).
- The province of Santa Fe shows promising perspectives in terms of non-technical innovation. The provincial regulator, unlike other provincial peers, goes beyond simply enforcing norms to also build capacities amongst small water services providers (co-operatives and small municipalities) on how to calculate costs or set tariffs.

However, there might be room for a stronger role for evidence-based decision making in Argentina. Universities can be a powerful tool to guide the decision-making process and to inform the public with objective data, information and analysis. For instance, in the last two years, there has been a noticeable increase of water services tariffs. However, it does not appear that universities have provided an independent assessment to document, for instance, the underpinning economic rationale nor the affordability consequences of those increases.

Trust and engagement

Integrity and transparency

Argentina has, on the paper, the overarching institutional and legal architecture to hold decision makers accountable (Box 2.5), such as the right to information and independent authorities to investigate water-related issues and law enforcement; but implementation has been uneven throughout the provinces. For instance, provincial regulators and operators disclose information and data to the public through annual reports freely accessible on their website. However, some regulators have difficulties accessing information produced by water operators within their own jurisdiction (even if the operator is owned by the public sector), which results in a lack of information for basic indicators.

Box 2.5. Legal frameworks and key institutions to promote integrity and transparency in Argentina at the national level

Legal framework

- The **National Constitution** (Article 42) establishes that consumers and users of goods and services have the right to adequate and truthful information.
- The **Law on the Right to Access Public Information** (Law 27.275) was passed in 2016 and established the possibility to search, access, request, receive, copy, analyse, reprocess, reuse and redistribute freely information.
- The **Law on Free Access to Environmental Public Information** (Law 25.831) is applicable at national, provincial and municipal levels, and guarantees the right to

access environmental public information produced by any level of government as well as public enterprises and public service providers (water or others).

Institutions

- The **Nation's General Audit** is a constitutional entity with functional autonomy that technically assists the National Congress to control the efficient, economic and effective use of public resources in pursuit of public interest (National Constitution, Article 85). Its key functions are to: oversee the use of public resources; conduct assessments of financial statements by national administrative agencies, the central bank, and state-owned companies and corporations; monitor the use of resources from public credit operations.
- The **General Syndicature of the Nation** (Law 24.156) is the internal control body of the national executive power. It ensures that the public sector achieves the government's objectives through the appropriate use of resources. Its key functions are: supervising the enforcement of internal auditing standards; co-ordinating independent financial audits and special investigations; monitoring enforcement of accounting regulations issued by the General Accounting Office of the Nation; informing the president of activities that have caused or may cause significant damage to the public good.
- The **National Ombudsman's Office** is an independent body under the umbrella of the Congress that acts with full functional autonomy (National Constitution, Article 86). The ombudsman is appointed and dismissed by the Congress through the vote of two-thirds of the members present in the parliament and senate. The ombudsman holds office for five years and may be reappointed only once. It has procedural legitimacy, i.e. authorised to appear in court, and is the only Argentinian institution recognised by the United Nations as a national human rights institution. The recognition includes A-class status, the highest possible, since the ombudsman complies with the Paris Principles. However, it should be noted that the Ombusman Office has been vacant since 2009. This situation was considered by the Supreme Court of Argentina as an "unconstitutional omission" that has to be solved by the Congress.

The current institutional and legal framework for water integrity and transparency promotes a reactive approach (investigation and supervision) rather than a preventive (managing integrity risks) one. There is currently no mechanism to diagnose and map out existing or potential drivers of corruption and risks in water-related institutions at different levels (national, provincial, municipal), including for public procurement. For instance, the NWP implies a large amount of investment, mostly by provincial governments or provincial water services providers. However, it is difficult to identify whether integrity risks are analysed before transferring funds to subnational authorities or operators.

Stakeholder engagement

In general, water users are poorly engaged in the planning, management and control of water resources. Formal or informal mechanisms to engage stakeholders are not well known and in many instances, there has been little political will to engage non-governmental actors in strategic policy and infrastructure choices. For instance, the Federal Water Resources Council (COHIFE) is mostly restricted to governmental authorities (national and provincial) and does not convene non-governmental actors. Finally, there is

a persistent lack of awareness and insufficient technical knowledge in non-governmental organisations with regards to rational and sustainable use of water resources (FADA-IARH, 2015), which could be addressed through greater investment in capacity building and communication campaigns with and for stakeholder groups.

Policy recommendations

There is a window of opportunity for decision makers to propose an ambitious water policy agenda for Argentina and raise its profile as a driver for inclusive and sustainable development. The macroeconomic downturn makes the search for efficiency gains an essential goal and the political context calls for strengthening the multi-level governance system. The creation within the national government of a dedicated Secretariat of Infrastructure and Water Policy somewhat testifies to the higher rank of water in the political agenda.

As that window is now open, Argentina must take critical decisions regarding its current and future water policy direction. This will require adjusting the existing model of governance to make the most of interdependencies across levels of government and sectors and set up incentives to better cope with pressing and emerging water risks. The alternative, preservation of the *status quo*, would be an acknowledgment that Argentina is not "ready" for a truly integrated and multi-level governance model, and the significant social, economic and environmental benefits available from water reform would be lost.

Securing inter-governmental agreements towards water security

The 2003 Federal Water Agreement was a significant step towards strengthening multi-level governance of water policy in Argentina. It acknowledged the need for flexibility and context-specific solutions in a diverse federal country, and introduced topics often overlooked in the country's policy context, such as basin management, economic value of water, interdependence of water and the environment, and long-term planning.

Sixteen years later, there has been progress in making the principles operational, but important challenges remain to foster water security. They include, among others, interjurisdictional conflicts over waters; long-term planning is the exception rather than the rule as planning is often *ad hoc* or short term; lack of a solid investment framework to close the infrastructure gaps in both water resources management and the provision of water services; or discretional investments carried out with no evidence-based decision support system.

Many of these challenges relate to the mistaken idea that Argentina is in a deadlock with respect to water policies due to its federal system. Indeed, many stakeholders concur that the fragmentation of rights, roles, powers, functions and accountability lines in relation to water are a major challenge to effective, efficient and inclusive water policy. However, federalism also offers strong potential for multi-level partnership, and dealing with water challenges at the best level of government.

Argentina should establish a common political, economic, environmental and social narrative about the need to capture the potential benefits of effective water policy. A rejuvenated agreement or pact across national and provincial levels is needed to adjust institutional frameworks, where necessary. The new water narrative should stress the risk and costs of inaction, and provide a compelling and holistic vision for both water resources management and water services provision, since many of the governance challenges are cross-cutting rather than specific to a sub-sector.

A way forward to build such a strategic vision and commitment could be through convening a national summit gathering national, provincial, and local governments and policy makers where nationwide agreements could be prepared, debated and executed, delineating clear legal and outcomes roles, responsibilities and accountabilities for all levels of government. It would be important to involve prominently national and provincial sectoral ministries on environment, energy, agriculture, food, urban and rural development, or mining.

Argentina should use the rejuvenation of the federal agreement as an opportunity to set up an enduring mechanism for incentivising inter-governmental co-operation to improve planning and strategic investment, basin management, or regulation of water services, among others. It could be inspired by other federal countries such as Australia, Brazil or Canada, where such intergovernmental co-ordination mechanisms have proven successful:

- The Australian National Water Initiative (NWI) is an explicit commitment by the Commonwealth Government, and state and territory (provincial) governments to implement a common water policy with clear objectives. Under the relevant NWI, each state and territory developed implementation plans to apply the objectives of the NWI to their particular jurisdictional requirements and circumstances.
- The Canada Water Act provides an enabling framework for collaboration among the federal and provincial/territorial governments in matters relating to water resources.
- In Brazil, the Water Management Pact is a multi-level governance contract aiming to strengthen states' capacity to implement integrated water resources management approaches in close co-operation with the National Water Agency (Box 2.6).

Box 2.6. International experience on inter-governmental agreements

Australian National Water Initiative

In response to the deteriorating health of the nation's waterways in the 1980s and a growing awareness that traditional approaches to providing water infrastructure was costly and inefficient, Australian governments began reforming aspects of water policy. In 1994 the Council of Australian Governments' (CoAG) Water Reform Framework was agreed to, which set an ambitious agenda covering: water pricing; institutional reform (including corporatisation); the clarification of property rights; allocation of water to the environment; and the development of water trading.

An Intergovernmental Agreement on a National Water Initiative (NWI) was given effect in 2004 by CoAG to maintain the momentum of national water reforms that commenced a decade earlier. The NWI sought to address the over allocation of water resources, and provided a collaborative mechanism to address water scarcity issues arising from the early years of what was later to become known as the Millennium Drought. The NWI provides a platform of government commitments relating to the efficient and sustainable use of water, and continue to underpin governments' water planning activities, including: the preparation of statutory water plans; dealing with over-allocated or stressed water systems; securing water rights and implementing standards for water accounting; and, improving pricing arrangements for water storage and delivery.

The NWI aims to create a nationally compatible water market, and a regulatory and planning based system of managing surface and groundwater resources for rural and urban

use that optimises economic, social and environmental outcomes by achieving the following objectives:

- clear and nationally compatible characteristics for secure water access entitlements
- transparent, statutory based water planning
- statutory provision for environmental and other public benefit outcomes, and improved environmental management practices
- complete the return of all currently overallocated or overused systems to environmentally sustainable levels of extraction
- progressive removal of barriers to trade in water and meeting other requirements to facilitate the broadening and deepening of the water market, with an open trading market to be in place
- clarity around the assignment of risk arising from future changes in the availability of water for the consumptive pool
- water accounting which is able to meet the information needs of different water systems in respect to planning, monitoring, trading, environmental management and on farm management
- policy settings that facilitate water use efficiency and innovation in urban and rural areas
- addressing future adjustment issues that may impact on water users and communities
- recognition of the connectivity between surface and groundwater resources and connected systems managed as a single resource.

To fulfil these objectives, the NWI included eight key elements for which there were agreed outcomes and actions:

- Water access entitlements and planning frameworks
- Water markets and trading
- Best practice water pricing and institutional arrangements
- Integrated management of water for environmental and other public benefit outcomes
- Water resource accounting
- Urban water reform
- Knowledge and capacity building
- Community partnerships and adjustment.

In 2007, the Australian Government introduced the National Plan for Water Security, which led to a range of further reforms, principally focused on the management of the Murray-Darling Basin. The Commonwealth *Water Act 2007*, was also passed, which included statutory requirements for the establishment of the Murray-Darling Basin

Authority, and the development of a (Murray-Darling) Basin Plan (2012) and accredited sub-basin water resource plans.

CoAG also agreed to a range of specific measures in 2008, 2009 and 2013 to clarify and provide more detailed policy guidance on several aspects of the NWI, including urban water, water markets, and knowledge and capacity building. In 2017, NWI modules were published for '*Considering climate change and extreme events in water planning and management*' and '*Engaging Indigenous peoples in water planning and management*'.

The *Water Act 2007* requires three-yearly reviews of the NWI aimed at assessing progress against NWI objectives and commitments. The most recent review, undertaken in 2017 found that the NWI has generally served Australia well and is widely regarded as a successful reform initiative, both within Australia and internationally. It also acknowledged the importance of maintaining the momentum of water reform, particularly in areas of urban water, Indigenous water interests, and management of environmental water. Australian governments are now working together on a strategy to action the key findings of the 2017 review.

Canada Water Act

The Canada Water Act proclaimed on 30 September 1970 provides the framework for co-operation with the provinces and territories in the conservation, development and use of Canada's water resources. Each level of government has different roles related to the management of water resources. Joint projects involve the regulation, apportionment, monitoring or surveying of water resources, and the planning and implementation of programmes relating to water resources. As well, there are many areas of shared responsibility.

Canadian provinces, Yukon and Northwest Territories have responsibility over most areas of water management and protection. Most of these governments delegate some authority to municipalities, in particular drinking water treatment and distribution, and wastewater treatment operations in urban areas. In certain cases, local authorities responsible for a particular area or river basin take on some water resource management functions when requested by government. The federal government has responsibility for managing water on federal lands (e.g. national parks), federal facilities (e.g. office buildings, laboratories, penitentiaries, military bases), First Nations reserves and in Nunavut. The federal government also has jurisdiction to make laws in relation to fisheries and navigation, both of which play a role in water management.

Agreements for specific water programmes require participating governments to specify the amount of funding each will pay and the information and expertise they will provide, in agreed ratios. For ongoing activities such as the hydrometric monitoring agreements with each provincial and territorial government, cost-sharing is in accordance with each party's need for the data. For study and planning agreements, generally the federal government and the specific provincial or territorial government each assume half of the costs. The planning studies encompass interprovincial, international or other water basins where federal interests are important. Implementation of planning recommendations also occurs on a federal, provincial/territorial and federal provincial/territorial basis. Cost-sharing for infrastructure often includes a contribution from local governments.

Brazil's National Water Management Pact

In 2013, the Ministry of the Environment and the National Water Agency (ANA) launched a national programme, known as the National Pact for Water Management (Progestão). It was designed as a multi-level governance contract aiming to strengthen states' capacity to implement integrated water resources management approaches. The pact is an incentive-based programme following three principles: integrated, decentralised and participative. It has the following objectives:

- establishing commitments among federative units to overcome common challenges and lack of harmonisation
- encouraging multiple and sustainable use of water resources, especially in shared river basins
- promoting effective co-ordination between water resources management and regulation processes at national and state levels
- empowering states towards greater capacity and awareness in dealing with water risks.

In 2015, the 27 states signed the National Water Management Pact with the ANA. The contracts support the implementation of federative targets (defined by the ANA, common to all states, and to be completed each year) and state targets (defined by the states, with the ANA's technical support). Targets aim to improve water resources management in the state, in terms of planning, information sharing and policy implementation, all responsibilities of the states, but not yet fully addressed in some cases.

In 2017, the second cycle of the Progestão started and 18 federative units (out of 19) that had completed the first cycle of the programme signed the contract for the second cycle. At this stage, each federative unit can receive up to EUR 1.2 million at the end of five years, through compliance with the agreed targets as well as conducting investments with their own annual budget ranging from EUR 5 840 to EUR 58 400. Until 2018, a total of EUR 21.6 million were transferred to the federative units. In 2018, the ANA launched the "Improvement of state tools for the management of water resources in the scope of Progestao" project together with the Institute of Applied Economic Research. The project aims to support water resources managers in the development or improvement of management tools to improve water resources management.

Source: Contribution by Adam Wilson, peer reviewer, Essential Services Commission of South Australia; OECD (2015b), *Water Resources Governance in Brazil*, https://doi.org/10.1787/9789264238121-en; Government of Canada (2019), *Canada Water Act*, https://laws-lois.justice.gc.ca/eng/acts/c-11/index.html (accessed in June 2019).

Strengthening the planning framework to ensure water is managed at the right scale

Water-related tasks in Argentina are fragmented across ministries and public agencies at the national level, and across provincial and municipal authorities. These silo approaches result in significant inconsistencies between subnational policy needs and national policy initiatives, and suboptimal outcomes across water-related policy domains. In the absence of effective co-ordination mechanisms, the opportunity for a whole-of-government approache is minimised. Moreover, the generalised sense of water abundance in some basins in Argentina does not help to fully engage all ministries and levels of government in the shift from crisis management to risk management.

Planning can be a powerful co-ordinating vehicle across ministries and levels of government, but its potential has not been fully exploited. Argentina should establish a comprehensive, effective and efficient long-term planning framework at all levels to address issues of federative management, and factor in both short-term considerations (economic, social and environmental performance) and long-term projected impacts (e.g. climate change).

Plans should have a different focus depending on the level:

- National planning should be the link between water policy and the country's broader development strategy and provide strategic and targeted guidance to provinces on allocation regimes, water entitlements, infrastructure development, etc.
- Interjurisdictional basin planning should standardise certain water management criteria to allow for increased co-operation between provinces sharing the river, for example, allocation regimes and environmental flows, level of the tariff of economic instruments, etc.
- Provincial planning should tailor national priorities to the territorial specificities, link water planning to the broader regional development strategy and put in place policy tools to achieve the objectives set: deciding on allocation regimes (water uses), developing a project portfolio, setting the level of tariffs, etc.

These national, provincial and interjurisdictional plans should essentially promote integrated water resources management approaches at basin scale, which then are translated into sectoral policies and specific investment planning. They should consider the entire water cycle and the basin or watershed as the unit of analysis and planning.

It is important that such plans be developed in a bottom-up fashion, engaging relevant stakeholders (subnational authorities, service providers, water users, property developers, academics, non-governmental organisations, etc.), and co-ordinated with relevant ministries at national level. National planning should be co-designed together with provinces to account for territorial differences and create ownership on the goals set, in consultation with the relevant stakeholders. One of the issues of the NWP is the lack of ownership by the provinces (they currently set their own portfolio of projects without aligning with national priorities) and by relevant ministries at national level (given, for instance, the focus on economic and social development without explicit references to environmental objectives).

Plans should also be realistic and translate into budgetary priorities, with the required technical and financial capacity to implement them. There must be a clear link between water planning and public investment decisions. For instance, if interjurisdictional river basin committees are to become planning agencies, they should have the financial capacity (either through collecting their own revenues or receiving fiscal transfers) to implement the plans and be accountable for the programme of measures included in the plan. Currently, infrastructure financing, such as financial transfers and/or co-financing, are examples of incentives being used by the SIPH to enhance these bodies' role as planning agencies. The national government has set a pre-condition that large-scale infrastructure projects will only be financed in interjurisdictional river basins if there is an agreement between all provinces within the corresponding basin. Agreements should be further pursued to transition from a mere pipeline of projects to actual integrated planning at basin level.

Last but not least, plans have to be based on updated, timely, consistent, comparable and policy-relevant data and information, and should be regularly monitored and evaluated. The intrinsic relationship between water and other public policies requires a good understanding of scientific and technical terms, and awareness at a high political level that water is not a sectoral domain, but a vehicle to sustainable growth. While water experts often seek an integrated approach, decision makers (with more political weight) tend to be driven by crisis management rather than risk management. Objective data and evidence can help manage trade-offs across water-related policy areas and move the discussions to technical terms rather than political priorities.

Enhancing cross-sector co-ordination through existing federal councils for greater policy coherence and consistency

Argentina could build on existing federal committees or councils in sectoral domains such as water, environment, food, health, mining, energy or agriculture (COHIFE, COFEMA, CONAL, COFESA, COFEMIN, CFE or CFA), to favour exchanges and dialogues across policy areas that have a stake in water policy. For instance, COFEMA and COHIFE could organise joint sessions on water resources and environmental policies when convening to stimulate policy coherence and trade-off management. Similarly, CONAL could invite water services authorities to the discussions on drinking water quality. The Cabinet of Climate Change (see Chapter 1) could be a good platform to discuss how all types of infrastructure contribute to climate change adaptation, as well as what the needs are for the future. In addition, a variety of complementary co-ordination mechanisms used by OECD countries can be inspiring (Box 2.7).

Box 2.7. Examples for co-ordinating water policies across ministries and public agencies

In **Australia**, the Council of Australian Governments (CoAG) is the peak intergovernmental forum. The members of CoAG are the prime minister, state and territory premiers and chief ministers, and the president of the Australian Local Government Association (ALGA). It is chaired by the prime minister. CoAG's role is to promote policy reforms that are of national significance, or which need co-ordinated action by all Australian governments. CoAG is supported by interjurisdictional, inter-ministerial councils that facilitate consultation and co-operation between the Commonwealth and the states and territories in specific policy areas such as health, education, indigenous rights and the economy. Together, these councils constitute the CoAG Council System. CoAG councils pursue and monitor priority issues of national significance and take joint action to resolve issues that arise between governments. Councils also develop policy reforms for consideration by CoAG, and oversee the implementation of policy reforms agreed by CoAG. CoAG has been the co-ordinating and driving force behind the water reforms undertaken across Australian jurisdictions for more than 20 years.

In **Mexico**, there has been notable progress in addressing institutional fragmentation of water policy at the federal level. Some of these efforts were undertaken through the National Water Commission (CONAGUA)'s Technical Council. The council is an inter-ministerial body in charge of approving and evaluating the commission's programmes, projects, budget and operations, as well as co-ordinating water policies and defining common strategies across multiple ministries and agencies (SEMARNAT; SEDESOL; Secretary of Agriculture, Livestock, Rural Development, Fisheries and Food; Treasury; Energy; CONAFOR; and IMTA).

The National Water Council in **Spain** is a high-level consultative agency created in 2009, which includes autonomous communities, local entities, river basin authorities, and professional and economic unions related to water. Horizontal co-ordination of water policies is ensured by the participation of the main directors-general of the Ministry of Environment, Rural and Maritime Affairs (water, quality and environmental protection, sustainable development, and rural affairs).

Sources: OECD (2015b), *Water Resources Governance in Brazil*, http://dx.doi.org/10.1787/9789264238121-en; OECD (2011), *Water Governance in OECD Countries: A Multi-level Approach*, http://dx.doi.org/10.1787/9789264119284-en.

Building capacity of responsible authorities at subnational level to adapt their level of expertise to the complexity of the water challenges to be met

Strengthening the capacity of provincial governments to deal with water challenges is critical since most responsibilities in Argentina are held at the subnational level. A place-based approach is very relevant for Argentina, where the diversity of situations in terms of legal, institutional and policy frameworks are noticeable. Some provinces may face understaffing and underfunding, while others may be searching for technical and scientific trained professionals. Training and capacity development tailored to the needs of each province could help to link plans and budgets, and monitor and enforce water services and environmental regulations. The Brazilian National Water Management Pact can provide inspiration in designing a capacity-building programme tailored to subnational governments' needs (Box 2.8).

Box 2.8. Brazil's National Water Management Pact: An instrument to build tailored capacity across levels of government

Through a sophisticated and ambitious multi-level process to foster the convergence of federal and state water resources management systems in Brazil, the 27 states that adhered to the National Water Management Pact located themselves across four categories, according to their respective degree of complexity in water management and the corresponding institutional model. The categories, from A to D, identified several degrees of complexity, from low to very high, according to the scope, intensity, number and dispersion of conflicts in the water regions analysed. They also identified increasingly complex institutional frameworks and management actions, from basic to advanced, which envisaged the implementation of water charges in the most advanced class (D).

After signing the pact, the states and the Brazilian National Agency (ANA) gathered in a workshop to identify water management gaps according to a set of criteria, including legal, institutional and social planning, information and operational variables. The diagnosis for each state determined the degree of complexity of water management and helped to define the goal and level of ambition towards water security. In some cases the states will be not able to implement the targets on their own and co-operation with the federal government and the neighbouring states was be needed. Among the existing options, there are instruments for federal co-operation, such as technical co-operation agreements, public and private funds, and public consortia. The ANA made available to each contributing state a financial implementation mechanism, the Progestão (see Box 2.6), based on a pay-for-

result approach. In practice, financial resources were allocated for each contract, and calculated proportionally to the accomplishment of agreed targets.

Source: OECD (2015b), *Water Resources Governance in Brazil*, http://dx.doi.org/10.1787/9789264238121-en

In practice, tailored capacity-building programmes for provincial authorities should aim to:

- Ensure the technical capacity of provincial authorities, namely their ability to collect and use data, plan and execute projects, evaluate risks, and ensure water management duties are effectively delivered. Recruitment should be based on professional capacity. Ensuring a thick layer of competent public officials is crucial for public policy continuity. National research institutes can play a key role (such as INA or INTA) by providing technical assistance to provinces.
- Secure sustainable funding through implementing water charges as a policy instrument, where relevant and needed. Not only could economic instruments generate resources in quite impoverished provincial authorities, they can also trigger greater engagement of water users (interest-pay-say principle) and foster rational use of water resources. On the other hand, relevant tariffs for water services and sanitation can help better operate and maintain the ageing water services infrastructure, and contribute to demand management. The willingness to pay of the various sectors and affordability of water bills should be analysed thoroughly, based on sound economic analysis that can effectively guide policy choices and decisions.

Developing an integrated water information system through sound incentives across levels of government

Argentina should reinforce existing information systems for better decision making both in the water resources and services sectors. Options include:

- Leverage the National Hydrological Network (RHN) to transition to a full-fledged integrated water resources information system. First, the RHN should produce more socio-economic data and information related to: economic instruments, water pricing, agricultural production and water use, and investments on water infrastructure. Second, data should be up-to-date and disaggregated by level of government (interjurisdictional basins, provinces, provincial basins and municipalities).
- Foster continuous, consistent and standardised collection of data on water services performance across the country to design relevant water services policy targets, produce mid-term reviews and monitor achievements. It can also be used to implement result-based funding allocations for investment projects and be a central element for incentive mechanisms. The set of indicators defined by the DNAPyS could be supplemented with additional indicators to better reflect overall quality and performance of utilities. Additions could include: continuity of service, collection period, collection ratio, metering level, sewer blockages or overflows, pipe breaks, average revenue per cubic metre produced and sold (see Chapter 4).

Strengthening the enabling environment for water-related investment

While the macroeconomic downturn in Argentina poses significant challenges, it also provides the opportunity to reach federal agreements on fiscal discipline and to decouple

water investment policy from the macroeconomic outlook. On the one hand, the national government and the provinces have reached a Fiscal Pact that has been effective for the fiscal year 2019 and has contributed to healthier provincial public finances. This agreement strengthens federal relations and allows the provinces to undertake investments with national and international financing. On the other hand, it is a good time to increase efficiency gains within the country and, specifically, within the water sector – to do more and better with less. Notably, making best use of existing financing and assets should be a priority; including robust financial systems to cover OPEX costs of existing infrastructure once CAPEX investments are made.

Building a robust environment that can improve the efficiency and effectiveness of investment, minimise investment needs, and harness additional finance (from both public and private sources), is all much needed. The response to the limitation of funds could consist in implementing sound approaches to planning, prioritising and delivering investments, with a focus on increasing water security. An example of such an approach could be deferral of capital expenditure in favour of finding operating innovations and efficiencies, or setting up demand-side measures.

Argentina should maximise the value of water security investments. First, by improving the efficiency of existing infrastructure, for example through:

- Better operation and maintenance of infrastructure, demand management measures, engagement with stakeholders to reduce water-related risks.
- Seeking opportunities for capturing economies of scale (e.g. designing water services agglomerations at the relevant scale; inter-municipal cooperation agreements, etc.), and shaping investments to build resilience to climate change (i.e. planning investments that are flexible to deliver under the uncertainty of future conditions).
- Ensuring synergies and complementarities with investments in other sectors. A better alignment of policies and investments across the urban development, environment, food and energy sectors will enhance water security.
- Promoting investments in nature-based solutions, for example, conservation or expansion of floodplains. This can increase water infiltration and reduce flood risks to cities, while simultaneously supporting agricultural production and wildlife, and providing recreational and tourism benefits.
- Building on recent reforms to improve cost recovery of water services operations to ensure that infrastructure built will be operational over its designed lifetime.

Second, by selecting investment pathways that reduce water risks at the least cost over time. Effectively co-ordinating infrastructure investments across levels of government can help maximise the value of investments. The OECD *Recommendation of the Council on Effective Public Investment across Levels of Government* could provide a reading template for Argentina on how to improve its federal arrangements for public investment (Box 2.9). The Netherlands' long-standing Delta Programme is an example of how to maximise investment in infrastructure to reduce water risks related to climate change (Box 2.10). Fostering the enabling environment for investment will also require strengthening information systems to better evaluate the impacts of projects and the consequences on economic, social and environmental systems in the territory. Institutions should set up criteria and a methodology to conduct cost-benefit analysis, and ultimately a system that helps prioritise projects according to the benefit for the society. An example of an effective

and efficient public investment system can be found in Chile where the National Investment System (SNI) rules and governs the country's public investment process. It gathers the methodologies, norms and procedures that guide the formulation, execution and evaluation of the investment initiatives that postulate public funds (Box 2.11).

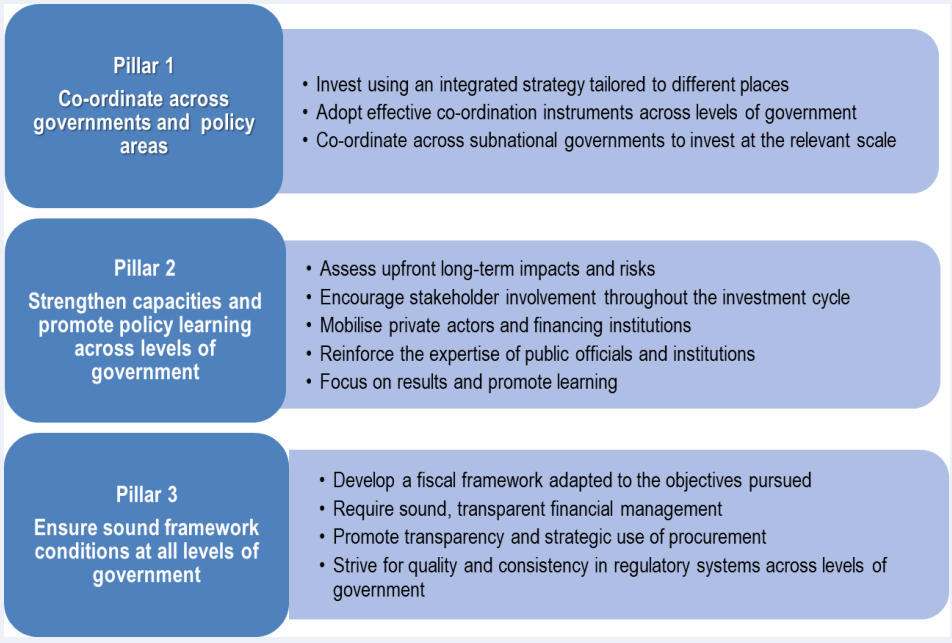
Third, by scaling up financing through better risk allocation across parties. Mobilising additional sources of capital (including private capital) requires better, more strategic use of public funds as well as adequate de-risking instruments to help share the remainder with the public sector (or commercial co-investors), or even take a certain level of risk on the financier's own book. However, for such instruments to work risks associated with an investment should be transparent and quantifiable (OECD, 2019b). The existing 70% financing scheme to encourage provinces to develop projects within the NWP or the recent Fiscal Pact are good practices to build on. It could be a trigger to introduce obligations in relation to long-term, risk-based asset management, planning, operational and financing strategies at national and provincial level.

Box 2.9. OECD Recommendation of the Council on Effective Public Investment across Levels of Government

When done well, public investment can be a powerful tool to boost growth and provide a solid infrastructure for economic and social development as well as to leverage private investment. In contrast, poor investment choices or poor management of investments is a waste of resources. It erodes public trust and may hamper growth opportunities.

OECD member countries have acknowledged the importance of better governance for public investment by adopting the *Recommendation of the Council on Effective Public Investment across Levels of Government* in March 2014. The Recommendation groups 12 principles into 3 pillars which represent 3 systematic challenges for efficiently managing public investment: co-ordination challenges, subnational capacity challenges and challenges in framework conditions.

Figure 2.4. OECD Recommendation of the Council on Effective Public Investment across Levels of Government



The Recommendation's implementation toolkit, which provides basic guidance, helps policy makers at all levels of government implement this principle in practice, providing concrete examples and best practices for countries at any stage of decentralisation.

Five years after its adoption, the OECD conducted a monitoring exercise to assess the implementation of the Recommendation by member and non-member countries that have adhered to it. The monitoring exercise shows that the practices of many adherents align with the Recommendation, in particular by developing integrated investment strategies and implemented mechanisms to co-ordinate public investments across levels of governments. However, there remains room for improvement in key areas of public investment, notably on the implementation of mechanisms to assess the long-term impact of public investment and on the mobilisation of private actors to finance investments at the subnational level

Source: OECD (2014), *Recommendation of the Council on Effective Public Investment across Levels of Government*, www.oecd.org/regional/regional-policy/Principles-Public-Investment.pdf; OECD (2019), *Implementation Toolkit of the Recommendation of the Council on Effective Public Investment across Levels of Government*, www.oecd.org/effective-public-investment-toolkit.

Box 2.10. The Netherlands' Delta Plan: Water security strategic investment planning

The Delta Programme is a national programme to ensure water security in the Netherlands in the long term (horizon 100 years). The core objective is to protect the Netherlands from flooding while securing sufficient supply of freshwater. The programme is a nationwide effort that brings together central government, provincial and municipal authorities, and water authorities. It also involves civil society organisations, the business community and

organisations with specialised water expertise. The Delta Programme is designed through an integrated policy analysis, called the Delta Model, that aims to manage key trade-offs between water resources management and the economy. The Delta model is a set of climate change scenarios and physical models that supports long-term analyses of the various decisions incorporated in the Delta Programme. The Delta Programme is one of the five elements of this long-term investment plan, which also includes the Delta Decisions, Delta Commissioner, Delta Fund and Delta Act.

A top-down and bottom-up process to shared responsibility in implementation

The success of the programme is grounded on an effective combination of bottom-up and top-down processes in its design, which ensures ownership and long-term commitment for implementation. At the regional level there is a bottom-up process to feed creative and innovative ideas. Regional steering committees involve local stakeholders to ensure that programme investments are consistent with local development plans. At the same time, at the top of the programme is the Delta Commissioner, who strategically guides the design and implementation of the programme (to ensure consistency with wider national development objectives), keeps tracks of progress and reports annually to parliament.

Adaptive Delta Management

The 2015 Delta Programme adopted an adaptive delta management approach. This innovation was triggered by two key facts. First, the Dutch society and economy could no longer afford to manage floods and droughts in a reactive manner. Second, existing planning approaches were insufficient due to growing uncertainties of climate change and socio-economic developments. The need to invest in expensive water-related infrastructure required an approach that supported decision making under uncertainty scenarios. Adaptive delta management seeks to ensure long-term development of coastal areas, while dealing with uncertainty. The 2015 programme also incorporated "Delta Decisions", strategic actions related to flood risk management, freshwater supply and spatial adaptation, and sand replenishment along the coast. These actions were formalised through legislative and administrative agreements, and the commissioner must report yearly on progress made (as specified in the Delta Act).

Funding

In the 2019 Delta Programme "Adapting the Netherlands to Climate Change", approximately EUR 7 billion are annually invested across levels of government. The Ministry of Infrastructure and Water, municipalities, and drinking water companies invest around EUR 1.4 billion each, while waterboards invest in the order of EUR 2.8 billion. The programme is also supported by the Delta Fund, which has a dedicated annual budget of more than EUR 1 billion until the end of 2028.

Source: Contribution by Monica A. Altamirano, peer reviewer, Deltares, the Netherlands' institute for applied research in the field of water.

Box 2.11. Chile's National Investment System

Chile's National Investment System (SNI) is composed of four subsystems that define the investment process:

1. *Ex ante* evaluation subsystem: Set of rules, guidelines and procedures that defines a portfolio of socially profitable investment initiatives. This process is managed at the central level by the Social Evaluation Division, and at the regional level by the regional secretariats of social development.
2. *Ex post* evaluation subsystem: Analysis of the results achieved once the project starts operating. It focuses on measuring effective and efficient use of public resources. These analyses also feedback to the system in order to improve the ex ante evaluation methodologies
3. Budgetary formulation subsystem: Allocation of financial resources to sectoral, regional and state enterprises' projects. It harmonises, regulates and co-ordinates information on the process of allocating funds. This is the responsibility of the Ministry of Finance.
4. Budget execution subsystem: Supervision of public expenditure and financing (regulated by the Public Sector Budgeting Law)

In parallel, the Ministry of Social Development provides investment information via the Integrated Project Bank on all SNI projects. This platform allows users to monitor the status of each project during the investment cycle (from pre-investment to execution). The Integrated Project Bank breaks down the information by region and municipality and by sector and thematic area. It also allows users to access information on the SNI process itself, for instance, the percentage of projects that obtain approval (investment initiatives), average number days that an initiative takes to be approved, etc.

Source: Ministry of Social Development in Chile (2019), "Sistema Nacional de Inversiones", http://sni.ministeriodesarrollosocial.gob.cl/quienes-somos/descripcion-del-sni (consulted in May 2019).

Strengthening economic regulation

While acknowledging the subsidiary principle and current decentralised setting for water services management in Argentina, a national law for water supply and sanitation (or at least a set of guidelines) could support consistency of regulation across the country and foster good regulatory principles for drinking water and sanitation. Such an overarching legal framework or guidance could provide "national guidelines or principles for water and sanitation services", such as universality of access, efficiency and economic sustainability, transparency, and social control. Each province, municipality or service provider could then tailor implementation to specific places under their purview.

A co-ordination platform convening the National Directorate on Drinking Water and Sanitation and the provincial departments in charge of water services policies could also foster vertical co-ordination and dialogue on best practices. This convening platform, which could be similar to the Federal Water Resources Council (COHIFE) for water services (or be a special commission within COHIFE itself) would offer a much needed venue for the definition and co-design of water supply and sanitation policy priorities, thus fostering consensus-sharing financial instruments and diffusing potential conflicts.

Routinely conducting sound and standardised investment assessments would help prioritise projects according to their cost-effectiveness and cost-beneficial contribution to the economy and society. This would also allow effectively channelling national funds to ensure the best use of fiscal resources and external funding. As such, the allocation of national funds based on *ex ante* assessment will help align local investment projects with national objectives, thus increasing the enforcement capacity of the national law.

Argentina should make the preparation of business plans (e.g. the existing *planes de gestión y resultados*) compulsory to obtain national funding. As business plans include planning and financial projections over a five-year period, they are essential tools to prioritise investment requiring national and provincial budget resources. They also establish control and conditional mechanisms for granting the aforementioned transfers considering the compliance with performance and efficiency indicators.

Corporate governance of utilities should ensure a clear separation of functions and responsibilities between utilities and local governments. This would help promote transparency and accountability, and avoid political capture. Good corporate culture of public water utilities is shaped by the chief executive and top management and involves moral, social and behavioural norms that inspire staff and managers to excel.

Current difficulties to progress on cost recovery should not only be approached through increases in tariff levels. Financial sustainability of water services crucially depends on revenues raised through tariffs (in addition to subsidies) to cover operation and maintenance costs. The politicisation of tariff setting is an important barrier to a more effective use of tariffs to promote financial sustainability. Making tariff regulation transparent and disclosing information and technical reports on the use of revenues would help build a more consensual understanding on the link between tariffs and sustainability of service provision. However, several other actions could be taken:

- operators should seek efficiency gains to improve financial sustainability
- developing a sound accounting system to enable an optimal accounting management and a documented tariff calculation
- changes in the tariff structure (towards more progressive schemes) could also be explored in areas where metering level is high; the "*canilla libre*" system should be gradually phased out.
- improve and strengthen the subsidies scheme to ensure vulnerable families have access to water services

Leveraging innovation and technology to manage water risks

Leveraging the potential of technology to drive efficiency, effectiveness and inclusiveness of water policy is also key to better manage water risks:

- ICT systems and other cartographic applications can help better predict water risks and disasters, consequently helping water authorities to design and implement improved safety protocols. The Digital Cartography and Georeferenced Systems provide state-of-the-art computer tools in order to structure and manage national water information and to provide technical assistance to other levels of government in emergency water-environmental situations. The availability of more information, especially concerning water consumption, coincides with a growing demand for more information by the population. ICTs can help reduce consumption

and pollution of water through more efficient control, measurement and irrigation systems, use of pesticides, and river basin and water disaster management.

- Cutting-edge meteorological radars can help manage flood risks. "Double polarisation" radars can distinguish between hail and rain, the volume and state of water in suspension, and are able to estimate the amount of precipitation that will take place. They also report the speed and direction of the wind. Overall, these radars allow monitoring hydro-meteorological events from various angles, understanding their dynamic and provide more knowledge about the number of meteorological events taking place.
- Nanotechnology offers cheaper, more effective, efficient and long-lasting alternatives to clean water resources and eliminates contaminating substances such as bacteria, virus, arsenic, mercury, pesticides and salt. It can save intensive labour, capital, land and energy in comparison to traditional treatment methods. More research is required in order to better determine the real impact of the use of nanotechnology for the treatment of water on the environment and on human health.

To benefit from all these technologies, Argentina should strengthen the public-private-academic knowledge triangle to make adequate use of the high-level expertise of the country to accelerate change.

Notes

[1] Some regulatory agencies created in the 1990s include the Tripartite Entity of Sanitation Services Works (ETOSS) (1992), the Regulatory Entity of Sanitation Services of Santa Fe (1995), Regulatory Entity of Water and Sanitation Services of Tucuman (1995), Regulatory Entity of Public Services of Córdoba (2001), and Provincial Entity of Water and Sanitation Services of Mendoza (1995) (Akhmouch, 2009).

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Chapter 3. Water resources governance in Argentina

This chapter assess water resources governance at different levels, including international, national, basin, provincial and metropolitan scales, aiming to identify key features and gaps of the existing multi-level system. Building on the assessment, the chapter highlights bottlenecks related to cooperation across levels of government, water planning, and basin management, and concludes with policy recommendations to better cope with water challenges in the face of climate change.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

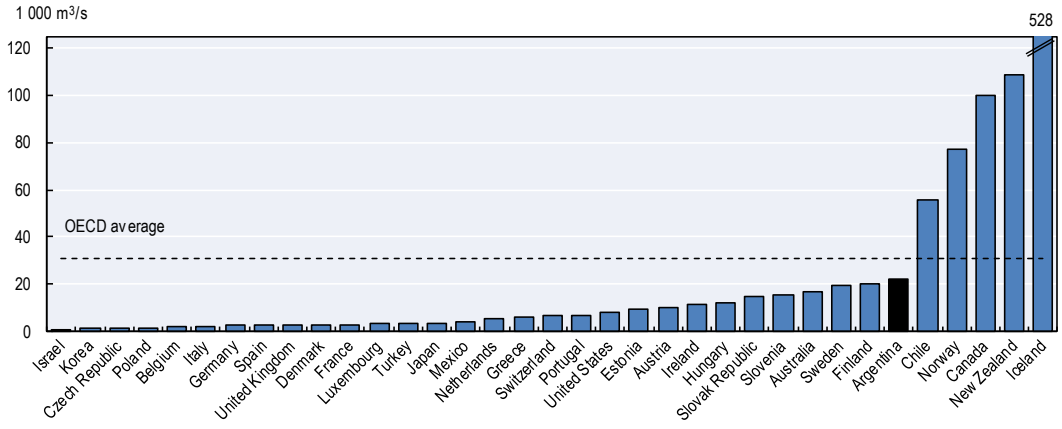
Argentina's climatic, hydrological and river basin system

Argentina is a large country with strong climate variability. The country extends longitudinally over 3 700 km and the continental portion of the territory is about 2 800 000 km² (around 5.5 times the size of Spain). The great latitudinal extension (between 22º and 55º south latitude) and the altimetry variation create wide climate variety from subtropical climates in the northern part of the country to the very cold weather in Patagonia. However, there is a predominance of mild climate in most of the country. When considering climatic and hydrological conditions, three regions can be identified in Argentina:

1. Humid region (Northeast, Litoral and the Pampa Húmeda region, the Tucuman Oranense Forest in the northwest and the Patagonian Andean Forests in the southwest): receives more than 800 mm/year of precipitation and occupies an area of 665 000 km² (24% of total country area). This region concentrates nearly 70% of the national population, 80% of agricultural production (essentially rainfed) and 85% of industrial activity.
2. Semi-arid region (central strip of the country north of the Colorado River): limited by the isohyets 500 mm to the west and 800 mm to the east, it occupies 405 000 km² (15% of total country area). The region concentrates 28% of the national population and irrigation is essential for the development of certain crops given the important water deficits during a large part of the year.
3. Arid region (most of the Northwest and central west of the country, the Patagonian Region and the Island of Tierra del Fuego): located to the west of the isohyet 500 mm up to near the foothills of the Andes mountain range, it occupies 61% of the country's total area. The region concentrates only 6% of the population (density of 1.1 inhabitants/km²) and agricultural production is completely dependent on irrigation.

Argentina is a water-rich country with uneven distribution of water resources. Renewable resources in Argentina, accounting for long-term averages, are approximately 20 400 m^3 per capita, which is above that of most OECD countries (Figure 3.1) and well above the water stress threshold defined by the United Nations Development Programme, as equivalent to 1 700 m^3 per capita (MCTeIP, 2012). Around 76% of the national territory is subject to conditions of aridity or semi-aridity, with average rainfall of less than 800 mm per year. The Plate River Basin, which concentrates more than 85% of total national water resources, is the largest centre for human settlements, urban development and economic activity in the country. Outside the Sistema of La Plata, the most important rivers in Argentina are those that drain into the Atlantic Ocean (approx. 10% of total national resources), as they act as fluvial corridors of great economic and ecological importance. This is where the most important population settlements of the southern region of the country are located. The total contribution of the Atlantic slope, which includes the Cuenca del Plata, adds almost 95% of the total surface water supply of the country.

Figure 3.1. Total renewable freshwater resources per capita, long-term annual average values, 2014



Note: Data for Argentina for 2012.
Source: OECD (2015b), "Total renewable freshwater resources per capita, long-term annual average values", in *Environment at a Glance 2015*, http://dx.doi.org/10.1787/9789264235199-graph23-en.

Legal framework for water resources management

National level

In 1994, Argentina underwent a constitutional reform that introduced an environmental provision (Article 124) acknowledging the historical right, whereby the 23 provinces and the Autonomous City of Buenos Aires own the water resources and have jurisdiction over them, including for interjurisdictional rivers. Their powers include policy making, policy implementation, operational management, financing and regulation. In practice, the national government can establish a national water policy, strategy, programme or plan, but needs the support of the provinces to implement it.

There is currently no water law or code at national level for water resources management or water services provision. The 2002 Law 25.688 "Regime of Environmental Management of Waters" created the interjurisdictional river basin committees to promote sustainable environmental management of inter-provincial river basins. This law was subject to numerous criticisms by most provincial water authorities. Provinces claimed that the law colluded with provincial competences that had not been delegated to the national government, such as river basin institutionalisation, management of natural resources, development of local institutions, and water planning and management (Pochat, 2005). Consequently, the 2002 law has not been fully enforced to date.

However, a plethora of laws in other sectors include water-related provisions (Box 3.1). The current national legislation is constituted by norms such as the Civil Code, the Commercial Code, the Mining Code, the Penal Code and other national laws related to energy, navigation, natural resources, etc., which contain provisions directly or indirectly related to water.

Box 3.1. Environmental laws concerning river basin management in Argentina

Law 25.688 "Regime of Environmental Management of Waters" (2002) establishes the minimum requirements for environmental preservation and use of water resources.

Law 25.675 "General Law of the Environment" (2002) establishes the minimum requirements for sustainable management of the environment and biodiversity preservation and protection.

Law 25.612 "Integral Management of Industrial and Services Waste" (2002) establishes the minimum requirements for sustainable management of all waste resources derived from industrial processes or service activities.

Law 25.831 "Free Access to Environmental Public Information" (2004) guarantees the right to access environmental information produced by national, provincial, and municipal governments, as well as from entities and companies (public, private or mixed) providing public services.

Law 25.916 "Management of Household Waste" (2004) establishes the minimum requirements for environmental protection with regards to household waste management.

Law 26.093 "Regime of Regulation and Promotion for the Sustainable Production and Use of Biofuels" (2006) establishes the normative framework for sustainable production and use of biofuels.

Law 26.331 "Minimum Budgets for Environmental Protection of Native Forests" (2007) establishes the minimum requirements for environmental protection of native forests.

Law 26.639 "Minimum Budgets for the Protection of Glaciers" (2010) establishes the minimum requirements for the preservation of glaciers and the periglacial environment.

In 2003, the 23 provinces, the Autonomous City of Buenos Aires and the national government signed a Federal Water Agreement that laid down the foundations of a national water policy. Through that agreement, the parties adopted 49 Guiding Principles for Water Policy, which acknowledge the value of water as a social and environmental resource for the society. The process to develop the 49 guiding principles involved about 3 000 participants through multiple workshops. The principles respect the historical importance of each jurisdiction and try to reconcile local, provincial and national interests. The principles call for the protection of the resource around the following building blocks: water cycle, water and the environment, water and society, water management, water institutions, water law, water economics, and water management tools. For example, some principles define the river basin as the appropriate scale for planning and managing water resources (No. 19) or call for long-term planning (No. 20) (COHIFE, 2003).

Sixteen years later, there has been some progress in making the principles operative, but important challenges remain. They include, among others, interjurisdictional conflicts over waters; planning focuses mainly on the delivery of hard infrastructure (and long-term planning is the exception rather than the rule, as planning is often *ad hoc* or short term); or discretional investments carried out with no evidence-based decision support system.

Provincial level

To date, all provinces have set their own water codes or laws (Table 3.1). The evolution of the provincial legal framework has gone through different periods (Pochat, 2005):

- The first provincial water law was passed by the province of Mendoza in 1884. In this semi-arid province, the law established the General Irrigation Department (DGI), an autarkic institution with water police power, which should ensure irrigators' participation in water management decisions. This law was an exception in the country landscape. In other provinces, without specific water laws, references to water were scattered throughout rural codes or other laws in topics such as drainage, sanitation works, construction of irrigation systems, etc.
- 1940s-1960s: Several water laws were passed in different provinces (e.g. Jujuy or Santiago del Estero). They included the definitions of public and private water sources, surface and groundwater, water quality, police power, and concessions of use of water resources, etc.
- In the 1970s, more complex water codes were passed in the provinces of Córdoba, La Pampa, La Rioja, San Juan and San Luis. These codes included principles for water policy and established institutions with an interdisciplinary approach. They also introduced economic concepts such as valuing water.
- 1990s Water laws started to consider water as a resource of the wider natural environment (e.g. Water Code of the province of Buenos Aires, in 1999). These laws included concepts such as water policy and planning, water disasters, water risk, environmental impact, business concessions for works and services related to water, water registers, flexible water allocation regimes, river basin committees, protection of surface and groundwater sources, and river basins as a planning unit.
- 2000s onwards: Following the Federal Water Agreement (2003), the remaining provinces without a water code/law passed their own legislations as was the case for the provinces of Santa Fe and Tierra del Fuego.

Legal frameworks for water resources management vary widely across provinces (Bergez, 2008) (Foro Argentino del Agua/SIPH, 2017) (Table 3.1). Some provinces have well-developed legislations while others do not regulate important aspects such as irrigation systems, users organisations, water rights nor enforce the polluter-pays or user-pays principles (FADA-IARH, 2015). To date, seven provinces do not have legal provisions for conjunctive management of surface and groundwater resources.

Overall, few provincial water laws refer explicitly to river basin management as a concept and appropriate scale. The Water Code of the Province of Buenos Aires (Law No. 12.257) has a full provision on basin committees and consortiums. In Santa Fe, Law 9.830 (1986) authorises "the establishment of basin committees that will act as legal entities under public law", while in Chubut, Law 5.178 states that the executive power will establish and operate management units in river basins of its jurisdiction.

Table 3.1. Water laws and codes in Argentinian provinces

Province	Year	Water law/code	Groundwater article
Buenos Aires	1999	12.257 – Water Code	Arts. 82-89
Catamarca	1973	2.577 – General Water Law (Legislative Decree)	Arts. 13, 193, 195, 197, 199
Chaco	1986	3.230 – Water Code	Chapter 6 (Arts. 44-57)
Chubut	1996	4.148 – Water Code (Legislative Decree)	-
City of Buenos Aires	2009	3.295 – Water Code	-
Córdoba	1973	5.589 – Water Code (Legislative Decree)	Arts. 19, 132, 160-162, 175
Corrientes	2001	191/01 – Water Code	Chapter 6 (Arts. 42-55)
Entre Ríos	1998	4 9.172 – Water Law	Chapter 11 (Arts. 36-37)
Formosa	1997	1.246 – Water Code	Title 8 (Arts. 184-222)
Jujuy	1950	161 – Water Code	Art. 82
La Pampa	2010	2.581 – Water Code	Title 3, Chapter 9 (Arts. 44-60)
La Rioja	1983	4.295 – Water Code	Title 6 (Arts. 162-185)
Mendoza	1884	General Water Law of Mendoza	-
Misiones	1983	1.838 – Water Code	Chapter 7 (Arts. 98-106)
Neuquén	1976	899 – Water Code (law)	Title 6 (Arts. 59-79)
Río Negro	1995	2.952 – Water Code	Title 5, Chapter I (Arts. 123-153)
Salta	1946	7.017 – Water Code (law)	Chapter 7 (Arts. 140-158)
San Juan	1997	4.392 – Water Code	Title 2 (Arts. 165-196)
San Luis	2004	5.122 – Water Law	Title 4 (Arts. 95-112)
Santa Cruz	1982	1.451 – Water Code	Chapter 8 (Arts. 74-84)
Santa Fe	2017	13.740 – Water Law	-
Santiago del Estero	1950	4.869 – Water Code (law)	Arts. 158-170
Tierra del Fuego	2016	1.126 – Water Code	Title 8 (Arts. 77-81)
Tucumán	2001	7.139 – Water Law	-

Source: OECD Questionnaire.

Institutional framework

National level

The Secretariat of Infrastructure and Water Policy (Secretaría de Infraestructura y Política Hídrica, SIPH), created in 2018 within the Ministry of Interior, Public Works and Housing, is the lead institution for water policy at the national level (see Chapter 2). The change from Undersecretary to Secretary of the SIPH somewhat testifies to the higher rank of water in the political agenda. Until the new structure of the SIPH in 2018, the Undersecretariat of Water Resources was responsible for water resources management at the national level. In addition to its leadership in national planning and investment related to water policy and infrastructure, the SIPH represents the national government in interjurisdictional river basin committees.

The Federal Water Resources Council (Consejo Hidrico Federal, COHIFE) was created in 2003 to promote a coherent implementation of the vision set in the 2003 Federal Water Agreement. COHIFE is made up of the SIPH and representatives from the ministries/ secretariats/authorities in charge of water resources of the 23 provinces and the Autonomous City of Buenos Aires. COHIFE's role is to provide a platform to exchange ideas and experiences, in particular between provinces that are not part of a same river basin.

The Secretariat of Environment and Sustainable Development (Secretaría de Ambiente y Desarrollo Sustentable, SAyDS) (within the General Secretariat of the Presidency) is the

responsible authority for environmental policy at the national level. The SAyDS' main responsibilities include strategy and planning to ensure environmental preservation and protection, promoting sustainable development through the rational use of natural resources, and climate change adaptation and mitigation.

There are many other national agencies with water resources competences. For instance, the Ministry of Foreign Affairs represents Argentina in transboundary river basins institutions, the Ministry of Production and Labour leads the implementation of programmes to develop sustainable irrigation practices, the Ministry of Security deals with disaster risk management, or the Ministry of Energy leads hydroelectric power.

Interjurisdictional level

The role of interjurisdictional river basin committees is to provide a space to promote a common vision on water resources management and negotiate agreements across provinces on shared rivers to prioritise actions. In total, there are 16 interjurisdictional river basin committees in Argentina. When conflicts between provinces cannot be resolved, COHIFE may act as a mediating body to facilitate agreements (COHIFE, 2006). The Supreme Court of Justice is the official channel to settle conflicts.

The functions of an interjurisdictional river basin committee are granted by the provinces that establish the committee and, generally, with the endorsement of the national government. Therefore, functions can vary from one committee to another (Table 3.2). In addition to conflict management, the following four interjurisdictional river basin committees have water resources management competences, such as the operation of reservoirs, control of water quality or early warning systems for water-related disasters:

1. **Interjurisdictional Committee of the Colorado River** (Comité Interjurisdiccional del Río Colorado, COIRCO): Created in 1976, this committee has representation from the provinces of Buenos Aires, Mendoza, Neuquén, La Pampa and Río Negro, and from the national government. Its main role is to implement sustainable irrigation programmes in the basin. Throughout the years, the committee's powers have been extended to water resources planning, environmental control, public water dominion definition, construction, operation and maintenance of dams. COIRCO also enforces water management and environmental standards for dams in the basin.
2. **Regional Commission of the Bermejo River** (Comisión Regional del Río Bermejo, COREBE): Created in 1981, this commission has representation from the provinces of Chaco, Formosa, Jujuy, Salta, Santa Fe, Santiago del Estero and the national government. COREBE's main objective is to achieve integrated water resources management in the basin. It also has international agreements with the Regional Development Corporation of Tarija (the Plurinational State of Bolivia) to manage water resources in the upper basin of the Bermejo River and of the Rio Grande de Tarija.
3. **Interjurisdictional Authority of the Limay, Neuquén and Negro River Basins** (Autoridad Interjurisdiccional de las Cuencas de los ríos Limay, Neuquén y Negro, AIC): Created in 1985 after a federal pact between the provinces of Buenos Aires, Neuquén, Río Negro and the national government, which was ratified in three provincial laws in 1986 and in a national law in 1990. The key objective of the authority is to promote the sustainable use of water resources in the basin. The authority manages concession contracts related to hydroelectricity; enforces water

management, environmental and dam safety regulations; co-ordinates the use of water resources by each of the provinces; monitors water quality; and produces climate, hydrological and environmental data.

4. **La Picasa Lagoon Basin Committee** (Comisión Interjurisdiccional de la laguna La Picasa, CILP) was created by the provinces of Buenos Aires, Córdoba and Santa Fe in 1999 to jointly face the challenges posed by the unprecedented growth of water height in the lagoon (due to more overflows from agricultural activities in the three provinces). In 2016, the committee was formally established and, besides the three provinces, the SIPH also participates in the committee. The SIPH has promoted the construction of infrastructure and the establishment of a water quality monitoring system. The committee has achieved important milestones, such as the agreement to conduct a water transfer to the Salado River Basin in the province of Buenos Aires to reduce the risk of uncontrollable overflows of the lagoon. However, remaining challenges persist in mitigating conflicts across the provinces.

Table 3.2. Interjurisdictional river basin committees in Argentina

Role	Name of the committee	Provinces	Year
Deliberative, consultative	Inter-provincial Commission of the Lower Atuel (CIAI)	La Pampa, Mendoza and the national government	2017
	Interjurisdictional Commission of the Arroyo Medrano Basin (CICAM)	Autonomous City of Buenos Aires, Buenos Aires and the national government	2016
	Interjurisdictional Organisation of the Senguerr River Basin (SENGUERR)	Chubut and Santa Cruz	2006
	Interjurisdictional Committee of the Chubut River Basin (COIRCHU)	Chubut, Río Negro and the national government	2004
Decision making; deliberative, consultative	Interjurisdictional Committee of the Vila-Cululú and Northeast Stream Basin of the Province of Córdoba (CAVICU)	Córdoba, Santa Fe and the national government	2018
	Interjurisdictional Committee of the Submeridional Lowlands (CIRHBAS)	Chaco, Santa Fe, Santiago del Estero and the national government	2018
	Interjurisdictional Commission of the La Picasa Basin (CICL)	Buenos Aires, Còrdoba, Santa Fe and the national government	2016
	Interjurisdictional Committee of the Hydrological Region of the Northwest of the Pampas Plain (CIRHNOP)	Buenos Aires, Còrdoba, La Pampa, Santa Fe and the national government	2016
	Interjurisdictional Commission for the Carcarañá River Basin (CIRC)	Córdoba, Santa Fe and the national government	2016
	Monitoring Commission of the Water Region of the Desaguadero River (DESAGUADERO)	Buenos Aires, La Pampa, La Rioja, Mendoza, Neuquén, Rio Negro, San Juan, San Luis and the national government	2010
	Interjurisdictional Committee of the Pilcomayo River Basin (National) (PILCOMAYO)	Formosa, Jujuy, Salta and the national government	2008
	Río Azul River Basin Authority (ACRA)	Chubut and Río Negro	1997
	Juramento River Basin Committee – Salado (JURAMENTO)	Catamarca, Salta, Santa Fe, Santiago del Estero, Tucumán and the national government	1972
	Interjurisdictional Committee of the Sali Dulce Basin (SALI DULCE)	Catamarca, Córdoba, Salta, Santiago del Estero, Tucumán and the national government	1971
Decision making; deliberative, consultative	Interjurisdictional Authority of the Limay, Neuquén and Negro River Basins (AIC)	Buenos Aires, Neuquén, Río Negro and the national government	1985
	Regional Committee of the Bermejo River (COREBE)	Chaco, Formosa, Jujuy, Salta, Santa Fe, Santiago del Estero and the national government	1981
	Interjurisdictional Committee of the Colorado River (COIRCO)	Buenos Aires, La Pampa, Mendoza, Neuquén, Río Negro and the national government	1957

Notes: Role: decision making (decisions on water resources management are taken within the river basin organisation), deliberative (deliberates on water policy and issues recommendations for action), consultative (decisions are consulted with the river basin organisation), executive (executes the mandate of provinces or the national government).
Sources: OECD Questionnaire.

The financial and staff capacity of interjurisdictional committees also vary across provinces. COIRCO, COREBE and AIC have their own legal status and budget for operational, managerial, technical and administrative personnel costs. In the case of the La Picasa Lagoon Basin Committee, the national government funds the committee's activities, including the development of infrastructure. The other committees do not have a legal status nor a dedicated budget for their activities and function in a similar manner to the CILP. Staff working in the committees are often officials from provincial governments, and financial resources to sustain the committee's activities come from diverse sources, including the provinces, the national government or international co-operation (development banks).

Provincial level

There are a plethora of water authorities at the provincial level, including ministries, secretariats, undersecretariats, directorates, authorities, departments and institutes (Table 3.3).

Table 3.3. Subnational authorities in charge of water resources management in Argentina

Province	Institution	Autarkic (Yes/no)
Buenos Aires	Water Authority	No
Catamarca	Secretariat of Water Resources (MOySP)	No
Chaco	Provincial Water Administration	No
Chubut	Provincial Water Institute	No
Córdoba	Ministry of Water, Environment and Energy	No
Corrientes	Institute of Water and Environment of Corrientes	Yes
Entre Ríos	Ministry of Planning, Infrastructure and Services	No
Formosa	Provincial Unit for Water Co-ordination	No
Jujuy	Ministry of Infrastructure, Public Services, Land and Housing	No
La Pampa	Secretariat of Water Resources	No
La Rioja	La Rioja Provincial Water Institute (IPALAR)	Yes
Mendoza	General Department of Irrigation	Yes
Misiones	Water and Sanitation Institute of Misiones	Yes
Neuquén	Undersecretariat of Water Resources	No
Río Negro	Provincial Water Department	No
Salta	Ministry of Environment and Sustainable Production	No
San Juan	Hydraulic Department of San Juan	No
San Luis	San Luis Agua S.E.	No
Santa Cruz	Ministry of Economy and Public Works	No
Santa Fe	Ministry of Infrastructure and Transport	No
Santiago del Estero	Ministry of Water and the Environment	No
Tierra del Fuego	Secretariat of Environment, Sustainable Development and Climate Change	No
Tucumán	Water Resources Directorate of Tucumán	No

Source: COHIFE (2019), "Representantes jurisdiccionales", www.cohife.org/s52/representantes-fundacionales (accessed in June 2019).

At the provincial level, two basic institutional frameworks can be observed for water resources management:

1. Centralised administration: In such situations, the key institution with water responsibilities is dependent of the provincial government. In the majority of provinces, the institution in charge of the water portfolio is the line ministry or secretariat within the government.
2. Decentralised management: In some provinces, the lead institution for water resources management enjoys significant independence from the government. This is the case of Mendoza for instance, where the General Irrigation Department (DGI) is institutionally and financially independent from the provincial government. Among others, the DGI plans and implements allocation regimes, controls and administers water concessions for different uses (a large part of water rights are for agricultural use), and collects water charges. According to their water law, other provinces with autarkic institutions in charge of water resources management are Corrientes, La Rioja and Misiones.

A few provinces, such as Chubut and Santa Fe, have provincial river basin committees and others provinces have created more *ad hoc* river basin committees such as the Committee for the Sustainable Development of the San Roque Lake Basin, constituted in the province of Córdoba to deal with a water pollution issue.

Metropolitan level

Argentina has 92% of its population living in urban areas (higher than the Latin American region average of 80.2%). The Metropolitan Area of Buenos Aires hosts more than 37% of the total population, followed by large cities with more than 1 million inhabitants (Córdoba, Mendoza, Rosario and Tucumán) and 34 cities with a population between 100 000 and 1 million inhabitants.

Key urban water management challenges include:

- Geographic location: The geographic position of cities determines the main challenges they are exposed to as well as their capacity to respond due to possible physical constraints. In Argentina, delta cities, such as the Metropolitan Area of Buenos Aires (AMBA) face different water-related risks than those located in mountainous dry areas (e.g. city of Mendoza). For instance, the AMBA must deal with flood risks while in Mendoza scarcity is the most pressing water challenge.
- Size: Large water demands in metropolitan areas can have an impact on water quality and quantity. For instance, in the Matanza-Riachuelo and Reconquista Basin located within the AMBA, water quality has been impaired by lack of access to sanitation services as well as industrial activities generating water pollution. Another well-known case of water pollution located near a large urban area is the Salí-Dulce Basin in the province of Tucuman.
- Spatial organisation has an impact on water consumption trends and infrastructure development. Urban sprawl is high in Argentinian agglomerations. According to the inter-census data for 2001 and 2010, a higher density loss was identified for the most fragmented agglomerations, i.e. in those with a larger number of municipalities (National Presidency Report, 2017). Urban sprawl puts greater pressure on the environment than compact cities, due to land-use stress, fragmentation of natural habitats and increasing air pollution emissions. As a result

of poor urban planning, settlements are developed in areas with poor infrastructure conditions or which are highly vulnerable to floods. This is the case of the metropolitan area of Córdoba, where the lack of proper water infrastructure results in turn in a higher impact on water quality that altogether brings the city into a downward spiral of environmental quality

- Demographic dynamics affect water demand and supply and can challenge the capacity of local governments to meet increasing demands for water and sanitation services. In Argentina, informal housing settlements for low-income households raise particular challenges, reinforcing the growth of precarious areas in places that already have limited access to basic infrastructure. The National Registry of Disfavoured Neighbourhoods (RENABAP) estimates that 4 million people currently live in more than 4 400 precarious settlements, which often lack access to water or basic services and have no property rights.

The last 15 years have seen the establishment of four basin committees to manage urban water risks in the Metropolitan Area of Buenos Aires:

1. Committee of the Reconquista River Basin (COMIREC) was created in 2001 (Law 12.653) to manage water pollution risks in the Reconquista River Basin, which covers 1 700 km^2 including 18 municipalities of the AMBA. Among others, the Reconquista River is the second most polluted river in Argentina, registering high levels of heavy metals and pathogenic microorganisms, due to poor industrial wastewater treatment. COMIREC has legal capacity to plan, co-ordinate, execute and control aspects related to basin management.
2. Matanza Riachuelo Basin Authority (ACUMAR): The most well-known case in Argentina of a river basin approach to manage urban water risks is located in the Matanza-Riachuelo River Basin (Figure 3.2). The Matanza-Riachuelo River Basin has been suffering from a long-standing severe water pollution problem. Around 80% of pollution comes from untreated wastewater of urban households, while 20% is from industrial activities (ACUMAR, 2019). ACUMAR was created in 2006 (Law 26.168) in response to the worrying situation of environmental deterioration. It is an autonomous, self-governing and interjurisdictional entity (national government, province of Buenos Aires and Autonomous City of Buenos Aires). In 2008, the Supreme Court of Justice of the Nation urged ACUMAR to implement a sanitation plan in response to the legal case known as "Causa Mendoza", a claim filed in 2004 by a group of neighbours (Box 3.2). Launched in 2009 (and updated in 2016), the Comprehensive Environmental Sanitation Plan (*Plan Integral de Saneamiento Ambiental*, PISA) guides the activities of ACUMAR. PISA is organised around 14 action lines that compile projects in the AMBA to control, prevent and manage environmental degradation. Despite improvements in the past years, the basin has not achieved yet established water quality and ecosystems biodiversity goals.
3. Interjurisdictional Commission of the Arroyo Medrano Basin (CICAM): The Arroyo Medrano Basin cuts across the administrative boundaries of the Autonomous City of Buenos Aires and the municipalities of San Martín, Tres de Febrero and Vicente López in the province of Buenos Aires. Numerous floods throughout the years, some of them with important consequences such as the flood in April 2013 which killed eight people, have triggered the creation of the CICAM. The commission was created in 2016 and is comprised of the Autonomous

City of Buenos Aires, the province of Buenos Aires and the national government, to reduce the impact of floods in the basin.

4. Committee of the Lujan River Basin (COMILU) was created in 2016 (Law 14.817) mainly to mitigate the serious consequences of floods of the Lujan River Basin in the AMBA. The Luján River Basin is one of the most populous, with an area of 2 690 km^2, and partially crosses 15 municipalities of the Metropolitan Area of Buenos Aires (Campana, Chacabuco, Escobar, Exaltación de la Cruz, General Rodríguez, José C. Paz, Luján, Malvinas Argentinas, Mercedes, Moreno, Pilar, San Andrés de Giles, San Fernando, Suipacha, Tigre). COMILU's main responsibilities are territorial and environmental planning, and control of clandestine channels and pollution of the basin.

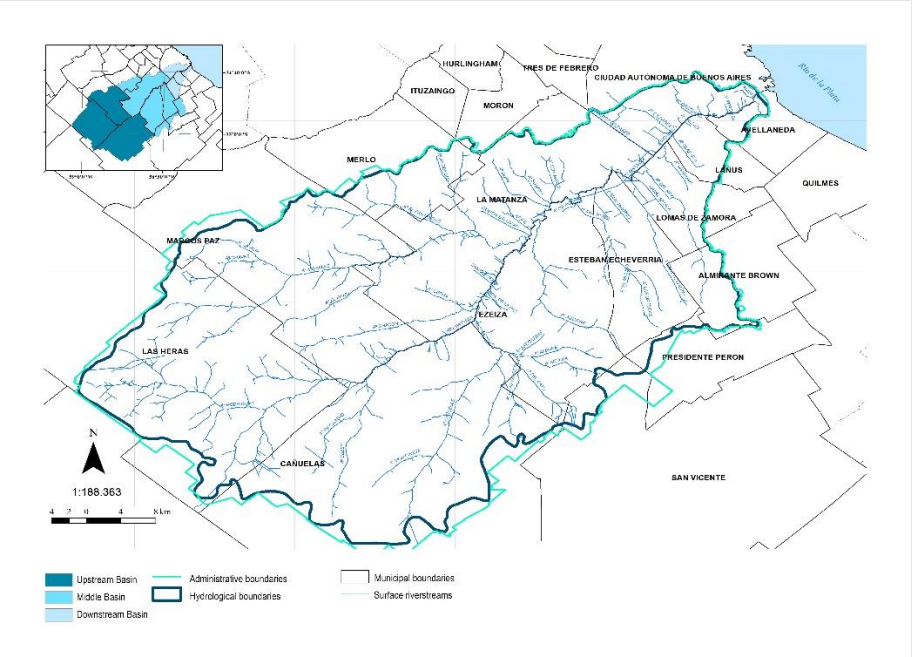
Box 3.2. The judicial case of the Matanza Riachuelo (The "Mendoza Case")

The Matanza Riachuelo Basin, located in the Metropolitan Area of Buenos Aires, is the largest most polluted basin in Argentina. It covers the southern part of the Autonomous City of Buenos Aires and 14 municipalities of the province of Buenos Aires (see Figure 3.2). Although the pollution issue dates back to the industrial development of the Metropolitan Area of Buenos Aires, it was in the last decades that it gained political and media visibility.

In 2004, residents of the neighbourhood of Avellaneda filed a lawsuit about the environmental deterioration of the basin, based on the right to a healthy environment established in Article 41 of the national Constitution. The claim took legal-institutional viability when, in 2006, the Supreme Court of Justice of the Nation declared its competence in the matter. The court dictated that the state has the obligation to restore the environmental damage caused to the ecosystems as well as to prevent future damage. The three administrations with jurisdiction in the area (national government, province of Buenos Aires and the Autonomous City of Buenos Aires) were thus required to design an Integral Plan for Environmental Sanitation of the basin. The Matanza Riachuelo Basin Authority (ACUMAR) was created to design such a plan. Since 2008, several advances have been achieved (cleaning of margins and waste dumps, eliminating towpaths, controlling

industrial pollution, etc.), although serious challenges still persist to achieve the full environmental recovery of the basin.

Figure 3.2. The Matanza-Riachuelo river basin



Source: ACUMAR (2019a), "Mapas de la cuenca", www.acumar.gob.ar/institucional/mapa (accessed in June 2019); ACUMAR (2019b), "Institucional", http://www.acumar.gob.ar/institucional/ (accessed in June 2019).

International level

Argentina shares water resources with its neighbouring countries (Bolivia, Brazil, Chile, Paraguay and Uruguay), with varying institutional arrangements:

- Institutions established to manage water at basin or sub-basin level: Intergovernmental Co-ordinating Committee of the Plata Basin (Argentina, Bolivia, Brazil, Paraguay and Uruguay), Binational Administrative Commission of the Lower Basin of the Pilcomayo River (Argentina and Paraguay), Binational Commission for the Development of the Upper Bermejo River Basin and the Rio Grande de Tarija (Argentina and Bolivia), Trinational Commission for the Development of the Basin of the Pilcomayo River (Argentina, Bolivia and Paraguay).
- Institutions established to manage water in some river sections: Administrative Commission of the Plata River (Argentina and Uruguay), Mixed Technical Commission of the Maritime Front (Argentina and Uruguay), Administrative Commission of the Uruguay River (Argentina and Uruguay), Argentine-Paraguayan Joint Commission of the Paraná River (Argentina and Paraguay).
- Institutions established to manage one issue or project: large multi-purpose reservoir, such as Mixed Technical Commission of Salto Grande (Argentina and Uruguay) and Yacyretá Binational Entity (Argentina and Paraguay); or navigation

such as the Intergovernmental Committee of the Paraguay-Paraná Waterway (Argentina, Bolivia, Brazil, Paraguay and Uruguay).

- Argentine-Chilean Working Group on Shared Water Resources, which is responsible for inventorying and planning tasks for shared water resources.

Provinces and the national level should agree on or coordinate actions in international committees (e.g. signature of agreements or other negotiations), which will have an impact at subnational level. Provinces and the national level should therefore define consultation mechanisms that help establish a common federal position in international committees.

Water resources governance challenges

Fragmentation of roles and responsibilities

As in many countries, water resources governance in Argentina is scattered across ministries, public agencies and levels of government. There is no national water authority or equivalent concentrating most water-related competences. In the absence of effective co-ordination, silo approaches can result in incoherence between subnational policy needs and national policy initiatives, and deliver suboptimal outcomes. At the provincial level, the overlapping of competences with regards to water resources is also frequent and poses challenges for integrated water resources management (Berardo, Olivier and Meyer, 2013).

The absence of comprehensive legal frameworks at the national level does not help address this institutional complexity. Existing mechanisms to co-ordinate water resources policies across levels of government have not been effective. The Federal Water Resources Council (COHIFE), created in 2003 to promote a coherent implementation of the vision set in the Federal Water Agreement, has neither enforcement nor coercive powers. Moreover, COHIFE faces capacity challenges due to shortage of a dedicated secretariat (presidency rotates every year) and permanent technical staff. This can potentially undermine the continuity of knowledge-sharing activities as well as other initiatives undertaken by COHIFE.

Even when interjurisdictional river basin committees are in place, the fragmentation of competences, heterogeneity of water management capacity, and difficulties to reach agreements, have generated conflicts between provinces (Box 3.3). In Argentina, 90% of water availability is inter-provincial, which necessitates co-operation and co-ordination among provinces (Rodriguez and Dardis, 2011). The large heterogeneity of provincial water agencies' technical and financial capacity makes inter-provincial management of water resources a complicated daunting task. There are cases such as the province of Mendoza, with a sophisticated framework of water regulations, while other provinces have only recently begun to develop their water management institutions, with many of them passing provincial water codes/laws in the last two decades. Moreover, there are cases where it is not optimal from an economic standpoint for the provincial authorities to co-ordinate actions with other provinces. For instance, the province of Tucumán has historically avoided meaningful action to reduce water pollution in the Salí River produced by citrus and sugar cane farmers, who contribute greatly to the provincial economy. The river runs through Tucumán and then enters the provinces of Santiago del Estero and Córdoba, which have complained for decades about high pollution levels generated upstream (Berardo, Olivier and Meyer, 2013). Lastly, it is not clear whether COHIFE can serve as an effective platform to solve conflicts of a large magnitude. Despite the fact that one of its goals is to "become a mediating or arbitrating venue (when the parties in conflict

request it) in all issues related to interjurisdictional waters", conflicts have remained even after COHIFE established a voluntary mechanism to solve this type of conflict.

The interface between water resources at the river basin scale and land-use management is also highly fragmented. While provincial jurisdictions are in charge of regulating resources (water, mining, etc.), land regulation is under the exclusive responsibility of local governments. Because of the split of competences for water management and land use across provincial and municipal levels, there is a considerable spatial heterogeneity in terms of compliance and enforcement for two main reasons. First, land-use planning and management tools at local and provincial level are not widely used. In 2018, only 34% of local governments had territorial plans (National Presidency Report, 2017). Second, there is a mismatch in how water and territorial development are managed across multiple scales. There is an absence of provincial integrated land-use plans to guide municipal plans and that would factor in water resources.

Box 3.3. Water conflicts across jurisdictions in Argentina

Allocation regimes

The inter-provincial conflict between Mendoza and La Pampa over the Atuel River is an illustrative example of disputes over river allocation regimes. The Atuel flows from the southern area of the province of Mendoza (upstream user) into the northern section of the province of La Pampa (downstream user). Both provinces depend heavily on this body of water for the well-being of their economies largely made up by the agriculture and tourism industries, and struggle to find agreements on water allocation.

Flood management

The management of the La Picasa lagoon, which flows through the provinces of Buenos Aires, Córdoba and Santa Fe, has generated long-standing conflicts between these provinces since the 1990s. Land-use changes due to the growth of agricultural activities in the land surrounding the lagoon led to increased works by the different provinces to carry water from the lagoon into neighbouring land. Due to the uncoordinated nature of these works by different provincial authorities as well as clandestine channelling of water into private land, the lagoon ballooned in size as a result of increased drainage. It grew from 8 000 ha to approximately 35 000 ha, with the result of exceptional flooding in the surrounding provinces and the consequent destruction of crops and properties. Works conducted by the different provinces have also altered the natural regime of the basin systems, resulting in lawsuits among them. Even after the establishment of the La Picasa Lagoon Basin Committee, conflicts have continued to arise during times of flooding.

Water quality

The Salí-Dulce River Basin shared by the provinces of Santiago del Estero and Tucumán has created entrenched conflict between the two provinces. Human activity has caused massive pollution of surface water, in the form of waste from the sugar, paper, textile and mining industries; alcohol distillers; citrus and refrigeration activities; compounded with the generation of urban solid waste from neighbouring urban centres. The water from the Salí-Dulce River carries an elevated amount of organic matter into the Hondo River Reservoir, causing massive fish mortalities and the appearance of a large amount of algae. The resulting foul smell stemming from the decomposition of the detritus in the water negatively affects the tourism industry of the Hondo River, which is its main source of

income. This situation motivated the creation of the Interjurisdictional Committee of the Salí-Dulce River Basin as a way to encourage co-operation, collaboration and co-ordination between the provinces that make up the basin and the national authorities involved in the matter.

Sources: Berardo, R., T. Olivier and M. Meyer (2013), "Adaptive governance and integrated water resources management in Argentina", https://dx.doi.org/10.7564/13-IJWG9; SAyDS (2019), "Río Salí Dulce", https://www.argentina.gob.ar/ambiente/agua/cuencas/salidulce (consulted in June 2019).

Weak water planning framework at all levels of government

National water-related planning focuses on infrastructure delivery

Policy objectives are weakly co-ordinated across the various national plans, but good co-operation can be found at project level. The ethos of the National Water Plan (NWP) is to consider water as a key aspect for economic performance and to bridge social gaps through better access to services and infrastructure. Water resources preservation and ensuring projects respect environmental standards (namely, through environmental impact assessments) are key features of the implementation of the NWP. However, the NWP could also be more prominently linked to overall national environmental objectives. For instance, through a more systemic approach to water security looking at all water risks. Currently there is a strong focus on universal access to water services (Axis 1 of the NWP) and on managing floods and droughts risks (Axis 2 of the NWP), but no systemic approach to deal with risks related to the disruption of aquatic ecosystems. Similarly, the National Irrigation Plan aims to develop new irrigation systems and improve the efficiency of the irrigation sector, but also has limited connections to broader national environmental objectives. The Belgrano Plan focuses on delivering infrastructure in ten provinces in the north of the country, which together with the Metropolitan Area of Buenos Aires are home to the largest number of poor households in the country (Box 3.4). However, at project level there are examples of good co-operation across national level ministries and secretaries as well as with provinces. For instance, to define multi-purpose infrastructure developments, the National Directorate of Multipurpose Achievements is working jointly with the Secretariat of Energy; the Secretariat of Environment and Sustainable Development; the Secretariat of Agriculture, Livestock and Fisheries; and the Secretariat of Tourism. Through this co-operation, the secretariats share the information they have on specific projects and help determine the socio-economic and environmental impacts of the project. This work is also closely co-ordinated with the provinces that will benefit from the investment.

Interjurisdictional river basin committees are still not equipped to operate as planning agencies

Where they exist, interjurisdictional river basin committees are still not equipped to operate as planning entities, with few exceptions. The NWP encourages the development of plans for interjurisdictional river basins and in shared basins with neighbouring countries. These plans identify, define and prioritise measures to solve specific problematics of the basin. However, they have been limited in scope, since they usually focus on individual projects to solve specific issues rather than seeking to align national and provincial policy priorities and objectives. The NWP aims to change the current project-based approach followed by the interjurisdictional river basin plans towards more systemic drought and flood management (i.e. plans that combine both structural and non-structural measures to deal

with water risks). Moreover, most of the committees still do not have technical or financial capacity to develop or implement such plans, despite recent support by SIPH. Their main role has traditionally consisted of providing a space to negotiate agreements between provinces on interjurisdictional rivers. The objective of the current administration is to enlarge the role of the committees towards planning and management of water resources. For instance, AIC is one of the committees that has solid capacities on operational hydrology (flood forecasting, drought forecasting), hydrometeorological predictions, defining water quality standards, or inventorying water resources, among others, and that could become a planning entity.

Box 3.4. National water-related plans in Argentina

The **National Water Plan (NWP)**, launched in 2016, set ambitious objectives to manage water risks and place water at the core of economic and social development. By 2023, the national government aims to increase coverage to 100% for drinking water supply and 75% for sewage connections. The NWP also aims to increase protection against floods and droughts through strategic actions that combine both hard infrastructure – such as building flood protection infrastructure in cities or increasing the number of dams – along with better early warning and information systems, including a network of meteorological double polarization radars (SINARAME). Finally, the NWP seeks to support the irrigation needs of the agricultural sector by expanding the cultivated area by 300 000 ha by 2022 (an increase of 17%). To achieve these objectives the plan set ambitious targets to deliver infrastructure projects through both public and private investment (see Box 2.). It also proposed implementing actions on four cross-sectoral axis:

- Preservation of water resources, including mitigation and recovery of disrupted ecosystems, by ensuring infrastructure projects respect the natural environment
- Capacity building: the Plan aims to develop knowledge and tools that help implement policies more effectively and efficiently
- Advancing technological developments related to the preservation of the quality and quantity of water
- Using the plan as an engagement mechanism through which perspectives and opinions of water stakeholders help choose the best solutions and investments to achieve the objectives of the plan.

The main goal of the **National Irrigation Plan (NIP)**, developed by the Ministry of Agriculture, Livestock and Fisheries, is to promote sustainable development of irrigated agriculture throughout the country. The NIP aims to duplicate the current irrigated area to reach 4 million hectares by 2030 and to increase water efficiency for irrigation. For this purpose, the plan has seven specific action lines:

1. public and private institutions: strengthen the capacities of national and provincial public actors, as well as of irrigator organisations and private agents
2. education and training: train public and private agents in the design, implementation and management of policies required for the use, expansion, renovation and maintenance of the different irrigation systems

3. research and information: co-ordinate research conducted by different institutions on water resources use in irrigation, adapting agriculture to climate change, and technologies to improve irrigation
4. public investment: co-ordinate public investment on irrigation systems across national and provincial levels of government
5. financing: stimulate public and private financing to fund investments in the expansion and renewal of irrigation systems
6. environment: strengthen activities to increase environmental preservation, in particular by raising awareness for the need to preserve land and water to adapt to climate change
7. legislation: co-ordinate activities across national and provincial governments to establish a clear and homogenous legislative scheme of water use and ownership.

The **Belgrano Plan**, launched in 2015, seeks to compensate the historic lack of investments in the north of Argentina, promote productive development, combat drug trafficking and improve security. The plan focuses heavily on investment in large infrastructure projects (e.g. roads, railways, airports) as well as on promoting infrastructure for the production of renewable energies and gas. It also focuses on improving poor and remote neighbourhoods, including providing better water and sanitation services and street lighting, building decent housing (the plan proposes housing for over 250 000 families), providing childcare infrastructure and improving telecommunications. Total investment amounts to USD 16 billion over ten years. The water section of the Belgrano Plan focuses on water and sanitation services and is under the portfolio of the SIPH, which finances infrastructure through loans from multilateral banks (Inter-American Development Bank, the World Bank and the Development Bank of Latin America). In the last 3 years, 11 projects have been executed for a total of Argentinian pesos 6.5 billion.

Sources: SIPH (2016), "Plan Nacional de Agua", Ministry of the Interior, Public Works and Housing, Buenos Aires, https://www.argentina.gob.ar/sites/default/files/2017-09-29_pna_version_final_baja_0.pdf. ; Ministry of Agriculture, Livestock and Fisheries (n.d.), "Plan Nacional de Riego", https://www.agroindustria.gob.ar/sitio/areas/riego/plan_riego (consulted in June 2019); Chief of Cabinet (2019), "Unidad Plan Belgrano", https://www.argentina.gob.ar/planbelgrano (consulted in June 2019).

Provincial water planning varies across jurisdictions

Provincial water plans are the exception rather than the rule in Argentina, and where they do exist, they usually have an exclusive infrastructure or sectoral focus. For instance, the province of Entre Rios has a Plan on Water Supply that focuses on expanding coverage of water services, but it does not address water resources management.

However, some provinces are well-advanced in developing long-term water planning linked to regional development objectives. For instance, in the province of San Luis, water features prominently in the strategic goal of the province. The Province of San Luis Water Plan 2012-2025 prompts the use of policy instruments to deal with water risks at provincial level. In particular, the plan is structured around six strategic axes: infrastructure, planning, monitoring, culture, quality and management (Province of San Luis, 2011).

Challenges to co-ordinate national, provincial and basin planning

There are multiple challenges to implementing the national plans, at the provincial level. These include the need of further engagement from the provinces in the design process; complex, multiple, and heterogeneous legal and institutional frameworks at subnational level; and difficulties in aligning political priorities across levels of government:

- The design of national water-related plans could be better co-ordinated across levels of government. Provinces are not involved in the national planning process, which can lead to a lack of ownership over the goals, objectives and measures included in them. For instance, the design process of the NWP, the National Irrigation Plan (NIP) or the Belgrano Plan could have better engaged the provinces to target and align with their infrastructural capacities, needs and priorities.
- Shifting policy priorities and agendas also challenge the possibility of aligning national and provincial planning. Provinces usually design their own portfolio of projects and seek national funding to implement them, although not necessarily always linked to national plans (even with the financial incentive of the national government to cover 67/70% of projects related to the NWP). The risk of overinvestment in large infrastructure often due to the lack of alignment of policy priorities across levels of government, should be contained by a systematic economic, social and environmental assessment of the proposed infrastructure developments. There are examples of projects delivered not because they will add the maximum value to the economy or close a large social divide, but because they are appealing in terms of their multi-level financial agreements.
- Heterogeneous legal and institutional frameworks across provinces are also a source of complexity. For instance, ten provinces are expected to execute the Belgrano Plan water supply and sanitation infrastructure. In such cases, there are important differences in concession contracts to service providers (e.g. Córdoba, Corrientes, Misiones and Santiago del Estero have private operators, while other utilities in the country are publicly owned), and regulators for water supply and sanitation, which range from the existence of a dedicated multi-sectoral regulator in the cases of Catamarca, Formosa, Jujuy, Salta and Tucumán, to a series of provincial water and sanitation regulators for Chaco, Corrientes, Misiones and Santiago del Estero. Thus, ten very different water services governance models have to be taken into account to implement the Belgrano Plan.

Weak basin management practices

The general sense of water abundance in some basins in Argentina (e.g. La Plata Basin) does not help to fully engage all ministries and levels of government in the shift from crisis management to risk management. At metropolitan, provincial and interjurisdictional scale, basin management is reactive, remedial and unplanned, rather than proactive, pre-emptive and planned, with few exceptions. It also obscures problems of water pollution, demand, availability and conflicts. While basins are acknowledged as the appropriate scale for water management by the 2003 Federal Water Agreement, sound basin management is overall the exception rather than the rule in Argentina. In terms of water resources management, optimisation at the provincial level leads to suboptimal results, and can lead to serious maladaptation, thus failing to achieve or worsening water risks in the face of climate change in the medium to long term in the use of scarce (financial and water) resources, constraining economic growth and preventing efficiency gains.

Insufficient use of economic instruments

The use of economic instruments varies across jurisdictions: some provinces do not charge for bulk water withdrawal or for pollution; others charge according to the water use or the category of users; and some apply, to a certain extent, the polluter-pays principle. It is common to have tariffs for certain industrial uses such as petroleum activities, while other categories of users do not pay for water abstraction use and pollution. Irrigators pay a "*canon*" expressed in an annual fee per hectare, under the concept of water-land ownership.

The current, insufficient, level of implementation of economic instruments in Argentina (Foro Argentino del Agua/SIPH, 2017) does not promote the efficient use of water resources. In many cases, the level of tariffs or fees does not reflect the economic value of water, and the current system does not offer incentives to change behaviours, promote water use efficiency and better manage water demand. Water charges focus on recovering costs related to the activities required for water management, and are not designed to increase efficiency, improve equity in water use or reduce consumption. A cross-sectoral analysis of economic instruments in the city of Buenos Aires and the provinces of Buenos Aires, Córdoba, Corrientes, Entre Ríos, La Pampa and Santa Fe concluded that as they currently exist, economic instruments for water use do not encourage efficient use of water resources (Deraiopian, 2016). The analysis reveals, for example, that in the case of the province of Córdoba, the payments for water use are regressive (i.e. water users with higher volumetric consumption pay less per volume unit). It also reveals that, with the exception of the provinces of Buenos Aires and Córdoba and the city of Buenos Aires, economic instruments for water pollution lack a methodology for calculating tariffs. In fact, there are quite a few emblematic cases where the externalities associated with the use of water have resulted in grave environmental degradation, for example, groundwater (Puelches in Buenos Aires), rivers (Matanza Riachuelo River, in Buenos Aires, Salado in Santa Fe) or lakes (San Roque in Córdoba). Similar results were found in a similar exercise conducted by Padin Goodall (2015) between provinces located in the regions of Cuyo and Patagonia. This could be an indication that current use of economic instruments throughout Argentina is not fit-for-purpose (Andino, 2016).

Patchy and insufficient data and information

Water-related data are dispersed among a wide range of sources, which include the public sector (at national, provincial and municipal level), users associations, research institutions and others. Each province produces its own water-related data, and there is no formal requirement to share such data with the national government, nor a unified collection or monitoring system. Dispersion of data is resulting in a lack of basic water information at national and provincial level on indicators such as abstraction rate by water use at basin level or infrastructure maintenance data. Moreover, the quality of data collected can vary across provinces.

Important efforts are underway to harmonise data across levels of government, although there is still room for improvement (Foro Argentino del Agua/SIPH, 2017). The largest databank in relation to water resources management is the *National Hydrological Network* (RHN) established in 1907. The RHN is a nationwide database that incorporates data from the SIPH's gauging stations as well as from other institutions that have adhered voluntarily to the database. Such institutions include national and provincial research institutes: National Institute for Water (Instituto Nacional del Agua, INA), National Technological Institute for Agriculture (Instituto Nacional de Tecnología Agropecuaria, INTA) and the Argentine Institute of Nivology, Glaciology and Environmental Sciences (Instituto

Argentino de Nivología, Glaciología y Ciencias Ambientales, IANIGLA) (which operates under the umbrella of the National Scientific and Technical Research Council [CONICET], the National University of Cuyo and the Government of the Province of Mendoza). It also includes data from the provincial water authorities/departments Corrientes, Chaco, Entre Rios and Río Negro. The RHN is being modernised and expanded. It has incorporated new instruments and technology for the transmission of real-time data via cellular and satellite networks in 422 existing stations and the objective is to have more than 650 stations by 2023, of which more than 500 will transmit data several times a day. Once the expansion of the RHN is completed, it will provide a comprehensive inventory on water resources as well as real-time data and information.

However, in order to become a comprehensive information system on water resources, the RHN should be complemented with other types of data and information. First, there is a lack of data and information in a large number of domains. For instance, there is no information on which type of economic instruments exist at provincial level nor the levels of the tariff, no data on agricultural production or industrial activities and water use, no economic analysis on the impact of water-related decisions, etc. Second, it is difficult to find disaggregated data and information at different scales and levels of government (interjurisdictional basins, provinces, provincial basins and municipalities) and from different jurisdictions. Third, there is also a need to expand groundwater data and information availability (Foro Argentino del Agua/SIPH, 2017).

Stakeholder engagement

In general, water users are rather poorly engaged in the planning, management and control of water resources. When assessing stakeholder engagement mechanisms in Argentina against OECD standards (Box 3.5), several flaws can be observed. First, formal or informal mechanisms to engage stakeholders are not well-known among non-governmental actors (FADA-IARH, 2015). Second, in many instances, there is little political will to engage non-governmental actors in decision-making processes. For instance, although COHIFE provides a multi-level forum to help governmental representatives take decisions on water resources management issues, no mechanisms exist to involve non-governmental actors in decision making. Lastly, there is a lack of technical knowledge in non-governmental organisations with regards to rational and sustainable use of water resources (FADA-IARH, 2015).

When stakeholder engagement mechanisms do exist, they can be limited in scope and it is difficult to assess whether they are effectively delivering their functions. One of the few institutions that has a dedicated space to involve stakeholders in the decision-making process can be found in the province of Salta. The provincial water law passed in 1998 (Law 7.017) created the Provincial Water Council. The objective of this entity is to advise responsible public authorities on water resources planning and management. Five representatives from the agricultural sector, one from the industrial sector and one from the mining sector compose the council. The provincial application authority must gather the Provincial Water Council at least once a month to discuss and inform about water policy (Province of Salta, 1998). However, the scope of the Provincial Water Council seems somewhat limited. The province of Salta has around 1.3 million inhabitants and hosts one of the largest indigenous communities; however, households and indigenous groups do not have a seat in the council. Moreover, it is difficult to assess the accountability of the council's activities. There are no public reporting systems on the council's discussions, or on how inputs provided by stakeholders influenced the decision-making process.

Box 3.5. OECD stakeholder engagement in the water sector: Key principles

The OECD (2015a) proposes a set of key principles and a Checklist for Public Action, with indicators, international references and self-assessment questions that can help guide stakeholder engagement processes and identify areas for improvement. The key principles of this framework are:

- Principle 1: Map all stakeholders who have a stake in the outcome or that are likely to be affected, as well as their responsibility, core motivations and interactions.
- Principle 2: Define the ultimate line of decision making, the objectives of stakeholder engagement and the expected use of inputs.
- Principle 3: Allocate proper financial and human resources and share needed information for result-oriented stakeholder engagement.
- Principle 4: Regularly assess the process and outcomes of stakeholder engagement to learn, adjust and improve accordingly.
- Principle 5: Embed engagement processes in clear legal and policy frameworks, organisational structures/principles and responsible authorities.
- Principle 6: Customise the type and level of engagement to the needs and keep the process flexible to changing circumstances.

Source: OECD (2015a), *Stakeholder Engagement for Inclusive Water Governance*, https://doi.org/10.1787/9789264231122-en.

Policy recommendations

While the 2003 Federal Water Agreement recognises the role of water as a driver for sustainable development, the underpinning institutional, policy, regulatory and operational architecture is not necessarily set to support that intended outcome. There is room to strengthen the current water resources governance framework to better cope with water challenges in the face of climate change.

Rejuvenate the Federal Water Agreement to improve water resources governance

The 2003 Federal Water Agreement was a significant step towards strengthening water resources governance. It acknowledged the need for flexibility and context-specific solutions in a diverse federal country such as Argentina, and introduced topics that were until then often overlooked, such as basin management, the economic value of water, interdependence of water and the environment, or long-term planning.

Argentina should work towards a rejuvenated agreement or pact across national and provincial levels to enhance water resources governance. A rejuvenated agreement could help overcome the mistaken idea that Argentina is in a deadlock with respect to water resources governance due to its federal system and related complexity for multi-level governance. Federalism precisely is an opportunity and offers strong potential for multi-level partnerships to deal with water challenges at all appropriate levels of government in a shared responsibility.

There are three key priorities that provinces and the national government should aim to advance in a rejuvenated federal agreement:

1. Establishing a multi-level water planning framework that helps align national and provincial priorities, and provides a uniform unit of analysis and methodology for the development of plans. Planning can be a powerful co-ordinating vehicle across ministries and levels of government, but its potential has not been fully exploited in Argentina.
2. Strengthening existing basin governance arrangements to tackle water issues at the right scale. Water conflicts across provincial jurisdictions prevail even with the creation of 16 interjurisdictional basin committees and the explicit reference to interjurisdictional management of waters in the Federal Water Agreement.
3. Improving basin management practices. Argentina should support effective basin management practices, in particular on three fronts: 1) economic instruments; 2) data and information systems; and 3) stakeholder engagement.

Establish multi-level water planning framework for Argentina

Argentina should establish a comprehensive, effective and efficient long-term planning framework at all levels of government to address issues of federative management, and factor in both short-term considerations (economic, social and environmental performance) and long-term projected impacts (e.g. climate change, population growth). Plans should have a different focus depending on the level of government (national, interjurisdictional, provincial).

- National planning should link water policy and the country's broader development strategy and set clear targets on allocation regimes, water entitlements and infrastructure development. While the NWP takes stock of necessary actions in Argentina to promote economic development and close social gaps and acknowledges the need to preserve water resources, it does not relate sufficiently to the overall environmental and other water-related sectors' policy objectives.
- Interjurisdictional basin planning should set targets for allocation regimes and environmental flows and the level of the tariff of economic instruments, among others, to foster co-operation and alignment of provincial priorities across the river basin.
- Provincial planning should tailor national priorities to the territorial specificities, link water planning to the broader regional development strategy, and put in place policy tools to achieve the objectives set: deciding on allocation regimes (water uses), developing a project portfolio, setting the level of tariffs, etc.

Box 3.6. California's Water Plan, building a shared vision for the future

The California Water Plan is the state's strategic plan for sustainably managing and developing water resources for current and future generations. The water plan is much more than a document as it provides a forum for elected officials, agencies, California Native American tribes, resource managers, businesses, academia, stakeholders and the public to collaboratively develop findings and recommendations that inform decisions

about water policies, actions and investments. The California Water Plan is a key tool for strengthening these partnerships.

Perhaps most importantly, Update 2018 (the 12th in a series of such plans since 1957) prioritises supporting local and regional efforts to build water supply resilience across California. This approach recognises that different regions of the state face different challenges and opportunities, yet all benefit from co-ordinated state support. In April 2019, Governor Newsom signed an executive order calling for state agencies to work together to form a comprehensive strategy for building climate-resilient water systems through the 21st century. Update 2018 is timely as most of the content in the plan can inform this work.A shared vision for California's water future

Update 2018 presents a vision where all Californians benefit from such desirable conditions as reduced flood risk, more reliable water supplies, reduced groundwater depletion, and greater habitat and species resiliency – all for a more sustainable future. Planning and policy priorities will have a mutual understanding of resource limitations, management deficiencies and shared intent, with a focus on sustainability and actions that result in greater public health and safety; healthy economy; ecosystem vitality; and cultural, spiritual, recreational and aesthetic experiences.

In this vision, investments result in intended outcomes through the application of adaptive management by first focusing and agreeing on the end in mind, then recommending and implementing actions. Learning and adaptation cycles strengthen decision making, maximise return on investment and support proactive management.

Operational definition of sustainability

Update 2018 provides an operational definition of sustainability. Sustainability of California's water systems means meeting current needs – expressed by water stakeholders as public health and safety, a healthy economy, ecosystem vitality, and opportunities for enriching experiences – without compromising the needs of future generations. This definition is further carried into the *Sustainability Outlook*, which is a tool or method for tracking local, regional and state actions and investments to assist in guiding investment and policy changes.

Challenges to sustainability facing California

Update 2018 documents the critical challenges that significantly affect California's ability to manage water resources for sustainability. These include challenges from flood, access to safe clean water and sanitation, declining ecosystems, groundwater overdraft, forest health and wildfires, and the additional strain on all these challenges due to climate change.

Many of these critical challenges have been known for some time. It is more the systemic and institutional challenges that hamper the ability to address these critical challenges. Early investment in resolving the systemic and institutional challenges will pay the largest dividend for California. These systemic challenges fall into several categories:

- fragmented and non-coordinated initiatives and governance
- inconsistent and confliction regulations
- insufficient capacity for data-driven decision making
- insufficient and unstable funding

- inadequate performance tracking of state and local investment.

Recommended actions

This plan recommends significant additional investment in infrastructure and ecosystem improvements to overcome challenges to sustainability. It also recommends actions to resolve systemic and institutional issues that contribute to many of California's water challenges and the ability to resolve them. These actions are organised around the following six goals:

1. improve integrated river basin management
2. strengthen resiliency and operational flexibility of existing and future infrastructure
3. restore critical ecosystem functions
4. empower California's under-represented or vulnerable communities
5. improve inter-agency alignment and address persistent regulatory challenges
6. support real-time decision making, adaptive management and long-term planning.

These actions will require a USD 90.2 billion investment over 50 years. Of this, USD 77.8 billion is for financial and technical assistance to regional and local entities, USD 9.7 billion for state-managed water infrastructure, and USD 2.7 billion (less than 3%) to resolve systemic and institutional challenges.

Sustainable water management requires alignment and integration among water sectors

The *Sustainability Outlook* was developed as part of Update 2018 to provide a well-organised and consistent approach for tracking local, regional, and state actions and investments. It is an evolving method of informing the strategic planning and prioritisation of water management actions. This method, or tool, involves evaluating status and trends of conditions within a river basin or region, setting intended outcomes consistent with societal values, and determining whether actual outcomes are consistent with intended outcomes. Through progressive application of the *Sustainability Outlook*, decision makers should be able to identify needed analytical tools and data gaps, build capacity to take decisions and set priorities, and describe how individual and collective actions have affected the management of water resources for sustainability. The *Sustainability Outlook* was informed by stakeholder input and initial pilot projects, as described in *The Sustainability Outlook: A Summary*.

Building on the success of integrated regional water management

California has for many years invested in integrated regional water management (same as the more common integrated water resource management with an emphasis on regional level engagement) and has witnessed many successes as a result. As recommended, most of the work must continue to happen at regional and local scales. Regional agencies and organisations have extensive knowledge of their river basins and communities. To advance regional sustainability, the state government commits to supporting regional water agencies and organisations, and augmenting state investment in regional infrastructure and ecosystems. Approximately 86% of the recommended state funding (approximately USD 78 billion) is to assist and empower local and regional managers to plan, fund, implement and report on their accomplishments.

Over the long term, implementing Update 2018 will strengthen adaptive planning and management through increasingly robust data, knowledge and guidance for effective state policy, priority investments and financing options.

Sources: Contribution by Lewis Moeller, peer-reviewer, California Department of Water Resources (United States).

Plans should foresee short and long-term actions to support their implementation, including practical steps, indicators to monitor progress, and clearly mapping who does what. These roadmaps can be a tool to hold public authorities accountable for the implementation of the programme of measures included in the plans.

Plans should be consistent and co-ordinated with planning in water-related areas, such as environment, agriculture, energy, land use, spatial planning, and infrastructure. Synergies and trade-offs among those sectoral policies should be explicitly assessed, especially between water, land-use and environmental policies. For instance, urban dwellers take decisions that have strong impacts on water management today and in the future and do not always bear the related costs and liabilities. This is especially relevant in a context where the interface between water resources at the river basin scale and land-use management is fragmented because of split competences across provincial and municipal levels in these domains.

Plans should be developed in a bottom-up fashion and engage relevant stakeholders (subnational authorities, service providers, water users, property developers, academics, non-governmental organisations, etc.) to secure the buy-in needed for their implementation:

- National plans should be co-designed together with provinces to account for territorial differences and to create ownership on the goals set; relevant stakeholders at the national level should also be consulted.
- Provincial plans should account for territorial differences within the provinces, and engage relevant stakeholders at provincial and local levels.
- Interjurisdictional plans should engage provinces that are part of the interjurisdictional river basin to reconcile priorities and objectives across provinces.

Plans should promote a shift from the old paradigm of water resources development planning – where the focus was on infrastructure solutions – to strategic basin planning (Table 3.4) that considers the entire water cycle and the basin or river basin as unit of analysis and planning. Strategic basin planning strives to address all types of pressures in the basin (socio-economic, urbanisation, etc.) rather than only in water resources. Water should be integrated in the economy by translating priorities in the plans to sectoral policies and specific investment planning. The core objective of the planning exercise must be sustainable development of the province, with peculiar attention to environmental conservation. Plans should not focus on infrastructure for water resources management, but on the economic, social and environmental performance of the system. They should be realistic and translate into budgetary priorities (i.e. public investment decisions), and enhance clear linkages between water, regional development and land use, particularly in Argentina where these competencies are scattered across national, provincial and municipal levels.

Table 3.4. Attributes distinguishing technical from strategic basin planning

	Water resources development planning	Strategic basin planning
Extent of basin development	Basins with "spare" water available for development and not facing significant environmental pressures	Complex or water-stressed basins requiring difficult trade-offs between economic, social and ecological objectives
Issues of concern	Responding to identified water resources pressures	Responding to broader basin stress and socio-economic pressures
Purpose of basin planning	Reconciliation of water availability or quality with existing development goals: "water for the economy"	Water planning as an integral part of development planning: "water in the economy"
Objective	Development	Protection and management
Focus of attention	Water focused: water resources infrastructure systems	Society focused: economic, social and environmental systems supported by the river
Environmental requirement	Threshold levels, in particular water quality	Maintenance of ecosystem goods and services
Key skills in the planning process	Water planner led, with a focus on engineering skills	Co-operation between development, water and environment planners
Analysis techniques	Technical optimisation: – water resources infrastructure systems analysis – economic cost-benefit analysis – water quality assessment – future water use projections	Economic and environmental scenario: – integrated water resources systems analysis – social/economic analysis of water – strategic environmental assessment – scenario planning

Source: Adapted from Pegram, G. et al. (2013), *River Basin Planning: Principles, Procedures and Approaches for Strategic Basin Planning*, https://www.gwp.org/globalassets/global/toolbox/references/river-basin-planning.pdf.

Strengthen basin governance arrangements at all levels of government

Interjurisdictional river basin committees should gradually shift from conflict resolution, with often a single-issue focus, to effective basin planning. Three committees (COIRCO, COREBE, AIC) currently perform key water management responsibilities in their respective basins. Although these committees still lack an integrated planning approach, they appear to be good examples that have gone beyond the purpose of conflict resolution. Other less developed committees should aim to effectively facilitate the implementation of hard or soft measures of mutual benefit for different jurisdictions. The national government could work together with the committees and provinces to further broaden their functions, as appropriate, to promote an integral approach to river basin management.

Interjurisdictional committees could in the medium and long-term become stable and independent institutions promoting an integral vision of water resources management. When possible, interjurisdictional committees should be financially autonomous, collect their own revenues and ensure that their activities cut across political cycles. Financial autonomy will also contribute to investing in governance functions and implementation of the designed plans. There is also room to improve the technical capacity of the committees to perform their functions in an effective and efficient way, in particular to produce, collect and use data and to perform all the necessary technical and administrative duties.

At the provincial level, strengthening the capacity of provincial governments to manage resources at the right scale is critical since most responsibilities to deal with water challenges in Argentina are held at the subnational level. Training and capacity development tailored to the needs of each province could help to link basin plans and budgets, monitor and enforce environmental regulations. A place-based approach is very relevant for Argentina, where the diversity of situations in terms of legal, institutional and policy frameworks are noticeable (see Chapter 2).

Provinces should work with local authorities to strengthen urban river basin governance. Appraising the metropolitan and hydrological logics is key to addressing some of Argentina's urban water challenges. For instance, the metropolitan area of Córdoba is home to about 1.8 million people, with a radius of approximately 50 kilometres and encompasses 46 individual cities and towns, including the city of Córdoba. These municipalities have responsibilities over land-use planning, providing sanitation services and waste management – all at the core of water pollution problems. Solving pollution issues will require pooling resources from the different municipalities and co-ordinating efforts with the provincial government. A watershed approach could help establish financial schemes to fund measures that tackle the water pollution problematic.

Argentina should support effective basin management practices by sharing and upscaling practices and strengthening the capacities of provinces, thus indirectly also proposing improvements in interjurisdictional river basin committees. In particular, Argentina holds many opportunities to improve basin management by focusing on three fronts: 1) economic instruments; 2) data and information; and 3) stakeholder engagement. Leading research institutes and universities in these fields could also be of great support to help advance provincial practices in these matters.

Design and implement economic instruments as a key policy tool to increase efficiency in water use

The provinces should co-produce together a methodological guidance to design and implement economic instruments that are fit to places, adapted to local needs and promote efficient use of water resources. This could be very beneficial to the actual implementation of the polluter-pays and beneficiary-pays principles to ensure that those who generate future liabilities or benefit from resources also bear the related costs. Such guidance should focus on:

- Increasing awareness of different sectors about climate and water risks and documenting the willingness-to-pay for adaptation measures. Sectors such as industry, tourism and agriculture should be sensitised about the impact of water scarcity on their respective activities and the cost of inaction. There is a range of options for incremental approaches to the use of economic instruments, but often users' willingness to pay goes with awareness on water risks in the short and medium term.
- Producing reliable and updated information: Affordability studies and economic analyses should be carried out to assess users' capacity to pay based on tangible data and projections, and different methodologies.
- Providing different options for tariff design: Different options to compute tariffs related to polluter-pays and beneficiary-pays principles should be included.

However, it should also be noted that not all provinces may have the potential to collect water charges. In provinces where the legal framework is not in place, a legal reform should be a pre-requisite. In provinces where the legal framework exists but water charges have not yet been implemented, political buy-in would first be needed.

Develop an integrated water resources information system

A significant step forward to effectively guide water-related decision making in Argentina would be to stablish a platform to collect data from the provinces in a harmonised manner

and to debate and decide upon a common pool of indicators that can serve to set up the water resources information system. The *National Hydrological Network* (RHN) would be a good starting point since it already gathers hydrological-related data, and counts the participation of some provinces. A way forward could be to complement the scope of the RHN for it to become an integrated water resources information system. First, the RHN could produce more socio-economic data and information related to economic instruments, the price of water according to water uses, agricultural production and water use, economic analysis on the impact of water-related decisions, investments on water infrastructure, etc. Second, it could disaggregate data and information at different scales and levels of government (interjurisdictional basins, provinces, provincial basins and municipalities). Third, it could provide real-time data and information that can guide the activities of water stakeholders.

Other existing databases in Argentina could then be integrated into the newly set up information system, such as the Digital Cartography and Georeferenced Systems project initiated by the SIPH, or the Climate Change Risk Map System (SIMARCC) initiated by the SAyDS, which helps identify territories and population that are most vulnerable to the threats of climate change. To achieve this, the SIPH would have to work closely with other line ministries with water-related competences as well as with other federal councils.

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Annex 3.A. Case study: Province of Mendoza

Key facts and features

Box 3.A.1. Key data for the province of Mendoza, Argentina

- The province of Mendoza is located in the western part of Argentina, neighbouring Chile. The capital is the city of Mendoza. The province counts six important river basins (Mendoza, Tunuyán, Diamante, Atuel, Malargüe, and Grande and Colorado).
- Population: 1 774 737 (2010), of which 80.87% in urban areas and 19.13% in rural areas.
- The province of Mendoza is an arid and semi-arid region with three oasis (North, Centre and South) that occupy 3.5% of the province and concentrate around 90% of socio-economic activity.
- The province has an average annual rainfall of about 220 mm, with strong variability between the northeast (100 mm per year) and the southeast (400 mm per year).

The province is famous worldwide for its viticulture production, accounting for 70% of national production. Other important activities with implications for water management include mining (14% of national petroleum reserves), industry (wine-related industry, petroleum refinery, etc.) and tourism (700 000 visitors per year).

The semi-desertic province of Mendoza suffers pronounced water deficit and conflicts over water use with social and economic consequences. The province is the fifth largest contributor to national GDP. Its economy is highly dependent on agricultural activity (560 000 irrigated hectares, 25% of total national irrigated land) that accounts for 94% of water use (DGI, 2016). Mining, another water-intensive sector, is also very important for provincial economic performance (around 20% of provincial GDP) and holds implications on water quality. High water demands and natural factors (i.e. aridity, large irrigated surface, low precipitations and flow rates, high evapotranspiration rate, pronounced water deficit) result in a severe structural water deficit. Moreover, climate change is expected to put more pressure on existing resources. The average temperature of the province is expected to increase, resulting in reductions in water flows of 10-13% in the Mendoza, Tunuyán, Diamante and Atuel river basins by 2050 (SAyDS, 2015).

Legal framework

The province of Mendoza is a pioneer in the national landscape in terms of water institutional and legal frameworks. It passed the country's first water law in 1884. This law created a dedicated water agency, the General Department of Irrigation (DGI), with full responsibilities for water management. The provincial Constitution acknowledged in 1894 the decentralised nature of the DGI, which was ratified in the provincial Constitution of 1916, currently in force.

An overview of Mendoza's legal framework:

- General Water Law (1884): It is the main water norm of the province. It outlines priorities in water use, regulates operation of channels, establishes control mechanisms and taxation, provides instruments for water quality preservation, and defines the internal structure of the DGI.
- General Management of Surface Water Law 322 (1904): Delineates the administrative structure of the DGI, creating its internal bodies and special administrative procedures. It also defines rules to control the accounts of water users associations (WUAs).
- Provincial Constitution (1916): Devotes a full chapter to water rights and water resources management. In particular, the provincial Constitution sets forth responsibilities of water users in water resources management.
- Groundwater Laws 4.035 and 4.036 (1974): Establish the general framework conditions for the use of groundwater, including defining groundwater sources and the scope of application for the laws, establishing requirements for groundwater users rights registration, and regulating concessions.
- Regime for Elections in Water Users Organisation Law 5.302 (1988): Regulates the processes for electing representatives in the WUAs.
- Environmental Law 5.961 (1992): Provides policy tools and instruments to promote the preservation, conservation and improvement of the environment, including aquatic ecosystems.
- Institutional Rearrangement of the Drinking Water Supply and Sanitation Services and Water Quality Protection Law 6.044 (1993): In the framework of this law, Resolution 778/96 establishes water quality control.
- Water Users Organisations Law 6.405 (1996): Sets the internal organisation and processes that must be followed by the WUAs, including the electoral process, budgeting, auditing, etc.
- Regulation for Special Restricted Crops Areas (ACRE) Resolution 400 of the Honourable Administrative Tribunal (2003): Regulates the creation of special areas where wastewater can be reused for irrigation.
- Law Territorial and Land-Use Planning 8.051 (2009) and Provincial Territorial and Land-Use Plan 8.999 (2017): Provide a common understanding of land-use objectives, concepts and tools, and, with respect to water, aims to protect aquatic ecosystems from uncontrolled land-use practices.

The long-standing legal framework in Mendoza has resulted in a well-established water resources management system, with distinct features, characteristics and instruments, which make it unique in the Argentinian context (Box 3.A.2). A unique feature of Mendoza's water management system is the engagement of non-state actors in the management of water infrastructure. The WUAs are responsible for the operation and maintenance of secondary and tertiary channel systems.

Annex Box 3.A.2. Overview of Mendoza's water management features

Normative:

- Water is public and its use requires a permit or concession.
- "Inherence principle": water rights based on ownership of the land.
- The system has priorities in water use following this order: domestic supply, agriculture, energy, industrial, environment, recreational.
- The assignment of new rights is without prejudice to third parties.
- Public and open registry of water users.
- Government can define water reserves and restrict water use to implement measures against pollution.
- Water rights are not transferable among individuals.
- It is mandatory to obtain permission for the use of water and the discharge of effluents.

Administrative:

- Unique and decentralised administration by the General Department of Irrigation (DGI; see Box 3.A.3).
- Administrative procedures to process permits and rights.
- Management mechanisms to control possible abuse of the law.
- Co-ordination of water policy between the public sector and users organisations.
- Basin management through water subdelegations that depend on the DGI.

Economic:

- Water charge differentiated by water source and use.
- Self-financing of users organisations.
- Budget autonomy of the DGI.

Participation:

- Users are organised in water users associations (WUAs), which are integrated by users of the same irrigation channel.
- Users have the faculty to choose their representatives and manage their own resources.
- Public hearings for information-sharing and collecting opinions or concerns about projects of large public interest. It is a mechanism widely used for environmental impact projects, as well as to set restrictions of water withdrawal in aquifers.
- Basin councils co-ordinate decision making and manage conflicts across water uses.

Source: Adapted from Reta, J. (2003), "Argentina (provincia de Mendoza)", www.fao.org/3/y5062s/y5062s0j.htm.

Institutional framework

The province of Mendoza has a well-established institutional framework for water management. The provincial institutional landscape is composed of the DGI, as an executive and management body of the primary irrigation network (rivers, springs, dikes, dams and main channels), and the WUAs, as operational bodies of the secondary and tertiary irrigation network (distribute water from the main channels to the users' intake).

The DGI is the key actor in water management in the province of Mendoza. Its core function is to supply water for domestic and productive use, while ensuring sustainable, efficient, transparent and inclusive management. To achieve this, it has full competence over water resources management, including preservation, distribution and regulation of water in the natural environment as well as in channels. The DGI is financially autonomous from the provincial government. It has autonomy to approve its own budget, define and collect revenues, and is ultimately responsible to ensure its own economic and financial sustainability. The DGI has a well-defined internal structure that also leaves space for water users to participate (Box 3.A.3).

The provincial Secretary of Environment and Territorial Development has the mandate to ensure environmental quality in the province, including of natural resources. In 2017, in co-ordination with other ministries, it designed the provincial Territorial and Land-use Plan that, among others, establishes basic guidelines to ensure co-ordination among the different public actors whose portfolio has a direct or indirect impact on water resources.

Water users associations (WUAs) hold a crucial role for water management in Mendoza. As foreseen in the Water Law, management of irrigation channels is under the responsibility of users associations. WUAs are non-governmental public associations constituted by all holders of water rights that irrigate through the same channel. WUAs are regulated by Laws 5.302 (1988) and 6.405 (1996). The inspector manages the WUAs, which entails managing operation and maintenance of the channel system, controlling delivery of water to users and managing funds that users pay for water charges. S/he also is a first-line judge for water conflicts that may arise among users within his/her association. The Users Assembly is responsible for determining the water charge users should pay for operation, maintenance, etc.; authorising and budgeting minor works; and controlling the inspector's activities to prevent irregularities. More recently, WUAs have established second-level organisations. These are voluntary associations of WUAs sharing common interests and objectives. Lastly, the DGI supervises that WUAs comply with the obligations defined in Law 6.405. For instance, elections to appoint a new inspector are organised by the outgoing inspector under the supervision of the Honorable Administrative Tribunal of the DGI. There are 143 WUAs and 17 second-level WUAs in Mendoza.

Box 3.A.3. Internal organisation of the General Department of Irrigation

- The General Irrigation Superintendent is the highest executive and technical authority of the General Department of Irrigation (DGI). S/he is appointed by the provincial government for a five-year term. To relieve the DGI from political pressure, this term purposefully differs from the four-year term of the government. The Superintendent is responsible for the management of natural rivers and streams and controls the administration of manmade (irrigation and drainage) channel

systems. All requests for public water use concessions have to be submitted to the Superintendent.

- The Honorary Appeal Council (HAC) was established through the provincial Constitution and is regulated by Law 322 of 1905. The council has five members, each of them representing the water users in one of the five major river basins. The council is the second-line court for matters pertaining to public water distribution and use. It handles appeals on rulings by the Superintendent and by inspectors of the WUAs. If its rulings are not considered acceptable, an appeal can be filed before the Supreme Court of Justice of Mendoza, which is the only and last legal resort in this matter.
- The Honorary Administrative Tribunal (HAT) was established through Law 322 (Article 26). It is entrusted with the following responsibilities: draft the DGI's internal bylaws and other bylaws imposing rights or obligations on water users, appoint and remove all employees of the DGI, approve the annual budget, set the level of water charges, approve the election of authorities managing WUAs, and grant groundwater use concessions.
- The DGI has water subdelegations in each of the most important rivers of the province (Mendoza, Tunuyán Inferior, Tunuyán Superior, Diamante and Atuel) and in the Malargüe irrigation zone. Subdelegates are officials hierarchically dependent of the Superintendent, who exercise the administration of each particular river holding similar to those of the Superintendent.

Checks and balances are in place since the Superintendent, HAC and HAT control each others' activities: every year the Superintendent presents the general accounts to the HAT; the HAC controls the executive decisions of the Superintendent through appeals; and the HAT, since it is formed by the Superintendent and the HAC, is an accountability body for both.

Sources: De Llanos, M.E.A. and M.G. Bos (1997), "The legal and administrative setting for the use of water resources in Mendoza, Argentina", http://dx.doi.org/10.1023/A:1005852025664; Pinto M., M. Andino and G. Rogero (2019), Ley General de Aguas comentada y concordada. https://www.academia.edu/18443321/Ley_de_Aguas_de_1884._Comentada_y_Concordada

Basin councils are consultative bodies that do not take any binding decisions. The six councils (one for each river basin) were created by the DGI (Resolution 681 in 2012) and their main objective is to promote consensus among different actors involved in water resources management. Members of the councils are representatives of relevant public bodies, provincial legislators, municipalities, channel inspections, business chambers, among others. Councils must meet at least twice a year (DGI, 2016).

Key water resources governance challenges

Planning

The 2020 provincial Water Plan, which was developed in 2012, had a strong focus on agriculture (a specific water use) and thus does not respond to long-term environmental, economic and social objectives. The Plan was developed in co-operation with a Scientific and Technical Advisory Board composed of representatives from 7 universities, 13 research institutes, 5 provincial ministries, and more than 100 experts and 50 irrigation

professionals. Although the design of the plan followed a multi-stakeholder process, there was no direct enforcement in the consequent years.

Uncontrolled urban development has an impact on water management in Mendoza. Uncontrolled urban development can be observed in the Metropolitan Area of Mendoza (MAM). The MAM, located in the North Oasis of the province, is the largest urban centre, with 1 086 633 inhabitants (representing 68% of total provincial population, in only 0.16% of its territory) (INDEC, 2019). In the MAM, although population growth was 18% between 1990 and 2011, the urbanised area increased over 40% in that same period. For instance, in 1976, the department of Guaymallén had 3 500 ha urbanised, while today it is close to 8 000 ha (118% increase) (Mesa and Guisso, 2014). The land-use change from irrigated land to urbanised land comes with a change of the price for water (the user starts paying drinking water instead of irrigation water). However, many of the urban developments are gated communities, where the main water use is the irrigation of gardens and users do not really bear related costs.

Mendoza is the first province in the country to have issued a provincial land-use plan, the Provincial Territorial and Land-use Plan (Law 8.999 in 2017), where water features prominently due to the large impacts that urbanisation has on the water system. Out of the plan's seven priority areas, two are closely related to water: 1) Objective 4: Mitigate the deterioration of the environment by managing risks associated with natural and anthropic threats while responding to the challenges of climate change adaptation; 2) Objective 7: Promote integrated management of water resources as a strategic element for territorial planning, ensuring water resources preservation, fostering use efficiency, and guaranteeing access for human consumption and productive activities.

Lastly, the approval of a Drought Management Plan is currently under debate in the legislative chamber. The plan aims to minimise the negative effects of droughts on urban water supply and economic activities. The core approach is to establish a system of indicators setting thresholds defining the intensity of droughts in each hydrographic and hydrogeological basin of the province. The plan then specifies concrete actions for each of the different water uses (Box 3.A.4.).

Box 3.A.4. Mendoza's Drought Management Plan

The Drought Management Plan aims to minimise social, environmental and economic impacts of droughts in the province. It seeks to foster a cultural change in two ways:

- Raise awareness among the population on the structural water stress faced by the province of Mendoza.
- Promote efficiency at all fronts on water resources management.

The plan includes the following items:

- Description of basins, sub-basins and territorial units, including a water resources inventory, water uses and vulnerabilities in the basin.
- Record of historical droughts and climate change forecast.
- System of baseline indicators that alerts and characterises droughts episodes (Normal, Alert, Critical scenario)
- Diagnosis of different drought scenarios

- Actions and measures to be applied according to the scenarios
- Protocols for disclosing public information.
- Criteria for preparing post-drought reports.
- Tools to monitor and review the plan.

The Drought Management Plan proposes policy tools to transition from crisis management to risk management in different drought scenarios. These include:

- Restricting water uses with lower rank of water rights.
- Use of water resources reallocation mechanisms.
- Minimising losses in water supply networks.
- Mandatory installation of metering devices in large and medium users supply networks.
- Promote more actions to increase efficiency in intra-plantation level
- Intensify water quality control measures.
- Volumetric delivery of water

Source: Province of Mendoza (2019), Proyecto de ley: Lineamientos para un Plan Provincial de Sequía, http://www.irrigacion.gov.ar/dgi/noticias/proyecto-de-ley-con-los-lineamientos-para-un-plan-de-sequ%C3%ADa-provincial , (accessed on September 2019)

Water rights

A first characteristic of Mendoza's water rights system lies in the legal distinction of permanent and eventual concessions. The General Water Law classifies concessions as "permanent" (those that already existed before the Water Law was passed in 1884) or "eventual" (those that were awarded after the Water Law was passed) (Box 3.A.5). Water quotas associated to permanent concessions have to be supplied at any time, whereas eventual concessions are provided once permanent concessions have been satisfied. Thus, if water availability does not allow the delivery of the full endowment associated with eventual concessions (in practice 1.5 litres/second/hectare due to the permanent state of water scarcity in Mendoza), surpluses are divided by the number of hectares and the resulting flow is assigned as appropriate. Concessions can be complemented with "summer backing", and its main purpose is to reallocate water surplus in rich hydrological years.

The second characteristic is the existence of water permits. These rights are only valid for a certain period of time, granted by administrative act of the Superintendent, and are revocable. The volume of allocation depends on availability after permanent and eventual concessions are supplied. A distinction can be made between "precarious" rights (granted for ten years) and temporary ones (one year). Similarly, groundwater permits are only granted if the DGI determines that the groundwater source has a "healthy status".

The water rights system in Mendoza often discourages long-term investments and, ultimately, limits efficiency gains. The above water rights scheme results in a system where 40% of all water rights are either limited by volume (eventual concessions) or are temporary and precarious. The latter results in difficulty to finance long-term investments in improving channels, irrigation systems, etc., due to uncertainty. In fact, it is estimated

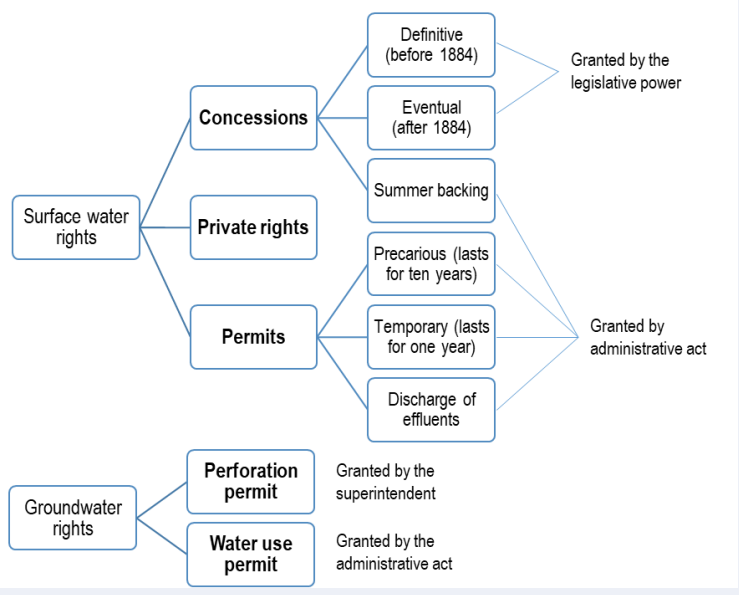
that the overall water system has a low efficiency (35% on average for consumptive use) (Reta, 2003).

Moreover, water concessions are not tradable between individuals, but are subject to re-appropriation and re-assignment through the DGI. Users can give up a water concession for a minimum period of 3 and up to 12 months. The concession can then be assigned to another user or another water use by the DGI. This transfer act should be publicly registered in the Water Registry. If new infrastructure is necessary to benefit from the concession, it is the responsibility of the new user to cover the costs (e.g. intakes, channels, etc.). The criteria or analysis for deciding which user benefits from the concession re-assignment is not clear.

Box 3.A.5. Water rights in the province of Mendoza

- Permanent concession: Existing rights prior to the General Water Law in 1884. The law compelled all irrigated landowners to register the number of irrigated hectares, and formalise the corresponding right. This right must be supplied at all times and has a perpetual character.
- Eventual concession: After pre-existing rights to the General Water Law were formalised, anyone willing to make use of public water has to apply for a concession, which is granted by the competent authority. No new concessions are granted to the detriment of pre-existing rights. "Eventual" concessions are served once "permanent" concessions have been supplied.
- Private right: Includes private waters whose flow starts and ends within the same property. The registration of this right is voluntary and is not subject to taxes.
- Permit: Only valid for a certain period of time ("precarious" are granted for ten years, "temporary" for one year), granted by administrative act of the Superintendent, and revocable. The volume of allocation depends on availability after permanent and eventual concessions are supplied.
- Groundwater permit: Granted with preference to users who already have some type of surface water concession. The General Department of Irrigation grants the permit for perforating the borehole, and the Honorary Administrative Tribunal grants the permit for using the water. It remains in force until a problem for its use arises (e.g. depletion of the source, deterioration of the quality, etc.).
- Discharge permit: The discharge permit of effluents of industrial and/or sewage origin is both provisional (valid while it complies with quality standards) and temporary (maximum validity is two years, with the option of renewal).

Figure 3.A.1. Water rights in the province of Mendoza



Lastly, outside official water rights, informal water uses distort the system. This occurs in two ways in the western region of Argentina (including in the provinces of Mendoza, Catamarca, Jujuy, La Rioja, Salta and San Juan). First, water abstraction with important economic significance but that does not hold an official water right. The lack of formalisation can lead to a complete absence of integrated water resources management, making it difficult for public authorities to determine the relation between supply and demand, and the social needs in order to prioritise public agendas. Second, reallocation of water, from one user to another, outside the formal mechanisms regulated by the law. These reallocations do not generally seek the development of crops on properties that lack water rights, but rather reinforce water availability through the temporary reallocation of water between users (Martin and Pinto, 2015).

Economic instruments

Water charges in Mendoza do not really help achieve efficiency and equity principles. In Mendoza, the economic value of water is not acknowledged, and water does not have a real and efficient price. This leads to two negative effects: on the one hand, the over-exploitation of the resource and, on the other, inequality in its use (greater consumption and management of water resources of a few users over the others) (Andino, 2015). Water charges are not promoting efficiency and equity for two main reasons:

1. Water charges recover costs of water resources management, but do not set any economic or environmental incentives. The DGI's financial autarchy requires that water users cover the cost of any service related to the management of the resource. Moreover, a "self-financing" criterion is prevalent in Mendoza, which implies that the level of the tariff should be just sufficient enough to ensure that the DGI and WUAs obtain sufficient resources to cover the expenses necessary for its operations. Thus, water charges are not based on the value of water as an economic good, but are defined according to the cost of the service of providing water for

irrigation and other uses. Charges have a purely fiscal nature without any incentive (Andino, 2015).

2. The actual (low) level of water charges does not provide incentives for promoting efficiency nor reducing pollution. For abstraction charges, the level of the tariff is calculated based on the surface area of the concession (Box 3.A.6). This does not promote efficiency for two reasons. First, it does not encourage reducing water use since the amount paid does not depend on real consumption. Second, it does not incorporate other factors such as technology (e.g. trickle irrigation), thus not encouraging water-savings. Similarly, charges for discharging effluents do not encourage pollution reduction. A fixed annual amount is paid depending on the type of activity (agriculture, manufacturing, oil and mining, etc.), being significantly higher for the oil and mining industry. Thus, the payment does not depend on the quality of the water discharged (i.e. type and concentration of pollutants) and there are no incentives to discharge less pollutants.

Box 3.A.6. Water abstraction charges in the province of Mendoza

The level of the water charge is set annually by the water authority. For the calculation of the charge, the only costs considered are those related to water provision and to controlling and collecting the revenues. For this, Mendoza uses the "zoning system", whereby each zone (which have been defined following a basin approach) must, or should, absorb the costs of management activities and infrastructure in that particular zone. The service in each zone is considered homogeneous; for example, in the case of agricultural use, each hectare registered in the same zone will pay the same amount for the service received. Thus, the costs of water management activities and infrastructure are divided by the total number of hectares with water rights. Then, there are two key criteria for defining the level of the charge:

1. Water source: For surface water, the price is fixed per hectare, while the fee for groundwater is taxed in relation to the diameter of the pipe in the borehole. For effluent discharge, the price is fixed by volume (m^3).
2. Water use: The DGI has established different coefficients that are multiplied by the charge defined by water source. Agricultural use has a coefficient of "1", domestic use "5.781" and industrial use "1.5". For hydroelectricity, a percentage of the value of the energy generated is charged and for mineral water or petroleum activities volumetric charges apply.

Sources: Padin Goodall, A.C. (2015), "El canon de agua en Argentina: Análisis comparativo de la región Patagónica y Cuyo", https://ri.itba.edu.ar/bitstream/handle/123456789/265/500886_Padin%20Goodall_M.pdf?sequence=1&isAllowed=y; Andino, M.M. (2015), "Régimen jurídico de la financiación del agua en argentina. Con especial referencia al caso de la provincia de mendoza", https://dialnet.unirioja.es/servlet/tesis?codigo=187042.

Lastly, the lack of metering and very low tariffs for drinking water supply are largely responsible for the irrational and high consumption by domestic households. Over 92% of customers in the Metropolitan Area of Mendoza pay a tariff calculated through a fixed system based on cadastral information rather than the actual volumes of drinking water they consume (i.e. a system known as "*canilla libre*") (Comellas, 2018). This type of tariff structure does not create any incentive for rational consumption since the tariff is dissociated from the volume actually consumed. In Mendoza, a semi-arid province with

structural scarcity issues, the domestic consumption is estimated around 400 litres per person per day (AySAM, 2019), way above the international recommendation of 250 litres per person per day. A persistent challenge is the lack of water consumption data in the Metropolitan Area of Mendoza. It is reported that currently only 8% of water services connections have micrometering. The "Strategic Plan of Water and Sanitation Mendoza 2016-2022" foresees an investment of USD 122 million to install micrometres in 800 000 connections. To date, this initiative is stalled.

Information

Water Registry is a key tool for managing water resources in Mendoza, since it provides updated and reliable information related to formal land tenure, water uses and rights, however remaining challenges relate to information on informal water uses. Any changes of status in water rights (modifications, renewals, revocations or withdrawals) should be instantly registered. Moreover, the province has been working since 2002 on a "Cadastral and Registry Information System" (SICAR), a georeferenced inventory based on a cadastral and alphanumeric plot, and data in the Water Registry. The purpose of the SICAR is to evaluate existing rights and simulate future hydrological and socio-economic scenarios. However, a grey area is the analysis and diagnosis of informal water rights, both for informal water intakes as well as reallocation mechanisms among users, which impedes public authorities from gaining a full picture of the water system.

There is a lack of data on economic and financial aspects to underpin the need to revisit tariffs. As in the rest of the country, tariff levels do not reflect operating and maintenance costs levels. The lack of metering level (both for production and distribution) in AySAM does not contribute to promote an efficient use of the resource.

Policy recommendations

The province of Mendoza has a very sophisticated water resources management system, but to be fit for the future some of the existing instruments need to be updated and new tools need to be implemented. Mendoza's legal framework, which dates back to 1884, has laid down clear rules of the game that cover all relevant aspects of water management. The province has well-established institutions with a long tradition in water resources management. The DGI has the technical knowledge to manage a complex network of channels, and also has the legitimacy achieved over the last 130 years. However, the province is now at a crossroad. Climate change impacts in the hydrological cycle are reducing the availability of water resources and changing flow regimes, which in an already semi-arid province will require strong adaptation measures. Not taking the necessary measures today can have dramatic consequences in the medium and long term.

Mendoza must adopt an integrated water policy that triggers efficiency on many fronts and in all water uses (agriculture, urban supply, industry, etc.). Water is a scarce resource in the province (just 1.620 m^3/inhabitants/year), but current incentives are misplaced to ensure it is used in the most efficient manner. Adjusting these incentives will require undertaking efforts to improve water planning, update the legal framework, improve data and information systems, and design economic instruments that promote behavioural change.

Planning should be a powerful tool to co-ordinate water-related sectors in Mendoza, and set long-term adaptation goals to climate change. Mendoza should promote a shift from sectoral planning to strategic basin planning. Strategic basin planning should strive to address all types of pressures in the six basins (socio-economic development, urbanisation,

pollution, etc.) rather than only focusing on water resources supply and demand. Plans should not focus on infrastructure for water resources management only, but on the economic, social and environmental performance of the system. The core objective of the planning exercise must be sustainable development of the province, with peculiar attention to environmental conservation. The basin plans should enhance clear linkages between water (both water resources management and water services provision), regional development and land use, even more so in Mendoza where uncontrolled urbanisation has generated a loss of agricultural land and put more pressure on the water system. The experience of the Territorial and Land-Use Plan could be used as the starting point to promote a Water Plan that includes all water-related sectors and sets the priorities to face water challenges now and in the future. Moreover, water reuse could be further explored alongside increased wastewater treatment in the province. Currently, Mendoza recycles 37% of the water supplied to domestic users (of the 10 000 litres per second that are treated in the province, 3 700 litres per second are recovered for irrigation in special restricted crops areas).

Updating some aspects of the legal framework could provide more flexibility and additional tools to face recurrent droughts in Mendoza. This should aim at creating a robust water allocation system that can make the most of economic development opportunities, protect the environment and promote the equitable use of water. This will require allocating water resources over the long term; having flexibility to make seasonal (or exceptional) adjustments to the amount of water available to different users; and promoting the sustainable management of both surface and groundwater sources. For this to happen, some flexibility is needed for permanent concessions, which are inherent to the land and granted for life. Mendoza could consider a legal figure of inherence to the water user to ease transfers of rights within the same basin. Similarly, the perpetuity of rights provides stability to many users today, but climatic trends threaten its relevance over time. Lastly, Mendoza could consider granting water the same legal status regardless of its source (surface, groundwater, reuse water, etc.). This would support the transition to a system where each user has a water quota in only one right (regardless of the source), and not a new right for each different source. The current system of accumulation of precarious rights in the same land could be one of the reasons for the low efficiency in water use.

Mendoza should redesign economic instruments to promote behavioural change of water users and foster water use efficiency. A well-designed water charge drives the behaviour of water users: abstraction charges promote water use efficiency and pollution charges make pollution costly and promote clean technologies and practices. Several steps could be taken in this direction. First, reinventing the concept of water charge in Mendoza, i.e. shifting from the cost-recovery to the behavioural change instrument. Second, reconsidering the zoning system by applying more targeted design criteria that make users understand the cost of water management related to their activities. Third, changing the criteria for defining the level of the tariff. For water abstraction charges, the province could shift design criteria from surface to volumetric criteria (also considering crop-specific criteria in agriculture). This would apply to both abstraction charges as well as household water services tariffs. Discharge of effluents charges should also focus on the contaminants of the water rather than be fixed by water use.

Lastly, there is a need to improve the production of data and information concerning who, where and how water is being used. Designing economic instruments requires a good understanding of how water is used and valued by users. Without a solid knowledge and information base, any assessment of needs, efficiency and effectiveness of economic instruments will remain subjective. Making sure the Water Registry and the "Cadastral and

Registry Information System" (SICAR) are up to date is an important task that should be further pursued. This information should also be made public to ensure the transparency of the system and hold decision makers and users accountable for water use. In addition, work remains to map, identify and quantify informal water uses in the province of Mendoza. It is claimed that informal intakes of water and reallocation mechanisms between users are of economic importance for the province; however, they remain outside the radar of public authorities. Similarly, triggering efficiency in domestic water consumption requires transitioning faster to the implementation of the micro-metering programme foreseen in the "Strategic Plan of Water and Sanitation Mendoza 2016-2022". It is imperative to start reporting water consumption levels by households and drive rational use. This is a key step no only in terms of water savings (which actually will be smaller than any savings that can be achieved in agricultural use), but to raise awareness among the society of the value of water, and the need to preserve it now and in the future.

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Annex 3.B. Case study: Interjurisdictional Authority of the Limay, Neuquen and Negro River Basin (AIC)

Key facts and features

Box 3.B.1. Key data for the Limay, Neuquén and Rio Negro Negro River Basin

- The Limay, Neuquén and Rio Negro River Basin is located in the northern part of the Patagonian Region. It extends over an area of 140 000 km² (5% of the national surface), covering the entire province of Neuquén and partially the provinces of Río Negro and Buenos Aires. The basin hosts a population of 874 000 inhabitants.
- The Neuquén and Limay Rivers, with an average flow of 280 m^3/s and 650 m^3/s, respectively, are tributaries of the Negro River (930 m^3/s) that flows into the Atlantic Ocean. The runoff regimes of the Limay and Neuquén Rivers are pluvio-snow. Most of the precipitation falls in the eastern foothills of the Andes.
- The basin is a key hub for energy production in Argentina. It has six hydroelectric plants with approximately 5 000 MW installed capacity, representing 15% of the national electricity supply. Moreover, the Neuquén hydrocarbon basin has the largest oil reserves in Argentina, currently contributing 55% of the country's production of oil and 42.5% of its natural gas. The area also holds 40% of the country's untapped natural gas.
- It also has more than 250 000 hectares of irrigated land, predominately producing fruits and vegetables.

The Interjurisdictional Authority of the Limay, Neuquén and Negro River Basins (AIC) is an interjurisdictional body in charge of co-ordinating the administration, control, use and preservation of the three river basins.

The AIC is one of the few successful cases of interjurisdictional basin co-operation across provinces for water resources management in Argentina. The development of large hydraulic projects (dams and reservoirs) and the consequent alteration of riverflows was the origin of the AIC creation back in 1985. Since then, the AIC has been promoting agreements on water resources allocation among the provinces of Buenos Aires, Neuquén and Rio Negro as well as monitoring and controlling the environmental performance of the basin. Following the 1990s, AIC's responsibilities expanded, as it became the enforcement authority of hydroelectric concession contracts granted in the basin.

Pressures on water resources, mainly due to climate change, as well as environmental degradation, require enhancing the role of the AIC in tackling these challenges and ensuring long-term sustainable development in the basin. The last decade (2008-18) registered an annual flow reduction of up to 30% with respect to the historical river flow series. Recently developed climatic scenarios point to increased water stress in the Comahue Region and a substantial change in the pluvio-snow regime (Forni et al., 2018). This reduction of water availability is likely to increase competition across water uses (hydroelectricity and agriculture). Another concern for the basin is dam safety, in particular related to the capacity of the spillway of the Cerros Colorados Dam on the Neuquén River. In 2006, a

flood resulted in water levels at the dam reaching 90% of the design flow for the spillway; exceeding that capacity would have had serious consequences. In addition, the basin is facing water quality issues in different areas, including due to untreated wastewater in the main cities of the basin.

Legal and institutional framework

The development of large infrastructure projects to promote the development of irrigation systems, manage floods and produce hydroelectricity triggered the creation of the AIC in 1985. The construction of the dams Alicurá, Piedra del Águila, Pichi Picún Leufú, El Chocón and Arroyito in the Limay River, and the Cerros Colorados Complex in the Neuquén River, changed the hydrological regime of the river basin, and several conflicts across users and jurisdictions started, particularly in seasons of high and low rainfall, which were not always satisfactorily managed (Pochat, 2005). As a result, in 1985, the governors of the provinces of Buenos Aires, Neuquén and Rio Negro and the national government signed a treaty that established a river basin organisation that could harmonise and co-ordinate water resources management with the core objective to foster regional development (Box 3.B.2). The creation of the AIC was ratified in three provincial laws in 1986 and in a national law in 1990.[1] The AIC has representation from the three provinces and the national government (Box 3.B.3).

Box 3.B.2. Competences delegated by the provinces and the national government to the AIC

- Conduct studies and research to evaluate water resources in the basin and promote rational use while satisfying provincial demands. There are two major objectives: 1) quantifying water availability in the basin; 2) analysing the potential for expanding water use while preserving the resource.
- Design and implement a programme for the use and distribution of water resources. The programme has to be ratified through additional treaties between provinces.
- Ensure provinces comply with the water resources programme. Provinces have the obligation to submit the required information to the AIC to prove compliance.
- Analyse hydraulic works developed in the basin, their operation and use to inform provinces of the impacts.
- Ensure the right to information prior to the authorisation of any hydropower development. Thus, the AIC has to be informed if any province is authorising these type of works in their jurisdiction. This implies that the AIC will make sure that the project does not have a negative impact on the other provinces.
- Conduct studies on natural ecosystems and margins of the river to evaluate the environmental impact of programmes developed in the provinces.
- Propose technical standards, execute projects, construct and maintain facilities, to detect and control water pollution. While each province preserved legislative power over the environment, it is important to highlight the willingness to harmonise environmental protection norms.
- Sanction provinces that do not adopt measures to stop pollution.

- Define the riparian limits of river basins. This delegation of power is a clear example of the willingness to reach consensus, since the definition of the riparian line has always been a source of conflict due to its definition in the Civil Code.
- Produce and share data and information (meteorological, hydrographic, hydrometric, hydrogeological, environmental, etc.).

Source: AIC (2019a), "Explained competences of the Interjurisdictional Authority of the Limay, Neuquen and Negro River Basins set in the statute", www.aic.gov.ar/sitio/estatico/atribucionescomentarios.pdf (accessed in July 2019).

AIC gained significant competences in the 1990s. In a broader wave of privatisation and liberalisation of the Argentinean economy, the national government divided Hidronor, the national company responsible for the exploitation of the hydroelectric plants in the basins, into several "business units". These units were tendered as concessions to private companies. This resulted in the provinces asking the national government for some control over the operations of the reservoirs (in Argentina, water resources management is the competence of each of the 23 provinces and the Autonomous City of Buenos Aires within its jurisdiction, even for interjurisdictional rivers). Through an administrative act (1993), the national government designated the AIC as the enforcement authority of concession contracts. At the time, the AIC was an established legal entity, but was not yet operating, and the assignment of this competence accelerated its implementation. This new function also came with funding – a percentage of revenues from energy generation (1.5%) by the concessionaires was transferred to the AIC. As specified in the act, 1% should be invested in the needed hydraulic works downstream of the dams while the remaining 0.5% should be used to finance the day-to-day activities of the AIC. Altogether, 91% of the AIC's budget comes from the 1.5% applied to revenues of energy generation; the remaining 9% comes from intellectual services provided to third parties (e.g. studies, research, etc.). As an enforcement authority, the AIC also took over new responsibilities:

- operate and maintain the hydro-meteorological network and issue hydro-meteorological reports to inform the concessionaires and the jurisdictions
- design the operational rules of the reservoirs, with the aim to optimise water use and flood protection
- control concessionaires' compliance with the clauses of concession contracts related to the execution of hydroelectric works, water management and environmental protection.

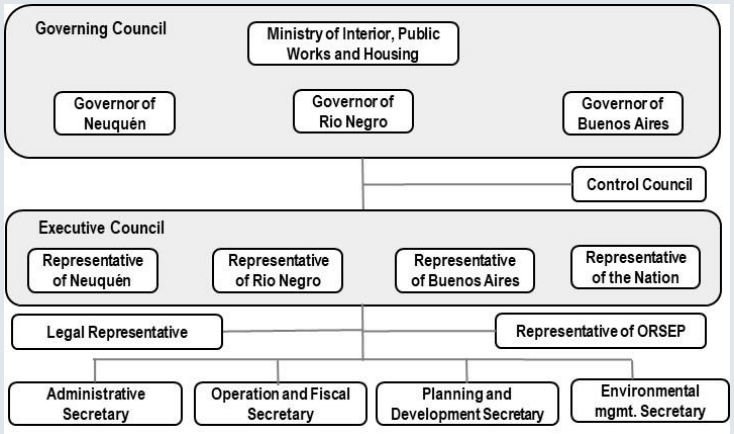
Box 3.B.3. The AIC's internal structure

The AIC's internal structure is formed by three bodies:

1. The Governing Council is comprised of the governors of the three provinces and the national Minister of Interior, Public Works and Housing. The council is presided by the minister. The council sets the AIC's policy priorities and approves water resources plans, actions and investments in the basin.
2. The Executive Committee is responsible for the administration of the AIC and is formed by representatives of the provinces and the national government. The members of the Executive Committee are appointed by the respective governments and the presidency rotates on an annual basis.
3. The Control Entity controls and supervises administrative acts, and is constituted by representatives of the signatory provinces and the national government. It is currently made up of representatives of the General Syndicature of the Nation and the Court of Audits of the provinces of Buenos Aires, Neuquén and Río Negro.

Decisions taken in the Executive Committee are then implemented by the three technical Secretariats of the AIC: Planning and Development, Operational and Inspection, and Environmental Management. Financial and accounting issues are the responsibility of an administrative area.

Annex Figure 3.B.1. AIC's internal structure



Source: AIC (2019b), "La AIC", www.aic.gob.ar/sitio/laaic (consulted in July 2019).

Water resources governance challenges

Planning

So far, the AIC has mainly focused its actions on co-ordinating water resources development across the three provinces in a context that was that of relative water abundance. During the last three decades, the Limay, Neuquén and Rio Negro River Basin has enjoyed relatively high levels of water availability to promote regional development, while not facing significant environmental pressures. The role of the AIC has been to provide a space for agreement among the three provinces to decide on expanding water use

for productive developments. Investments have been targeted to providing the necessary infrastructure to make use of the resource. However, until 2017, there are no references that the AIC or the provinces have developed what the 1985 Treaty required as the "programme for the use and distribution of water resources". As specified in the treaty, this programme should go beyond deciding on water allocation, to also include an integral study of the basin including environmental, social and economic aspects, as well as current and future water demands.

The lack of integrated long-term planning has resulted in environmental pressures on the ecological status of water bodies and ecosystems in the basin. The basin suffers episodes of water pollution due to untreated urban wastewater. However, the situation has been improving in the last years. A well-known example is the City of Bariloche, in front of the southern border of Lake Nahuel Huapi, where there were water quality point issues related to fast urban growth of the metropolitan area (composed of 12 municipalities) and the lack of capacity of the wastewater treatment plant. The expansion of the wastewater treatment plant of the city was initiated 10 years ago, and is completed to date, to account for this urban growth. Moreover, after ten years of litigation, the province of Rio Negro is also delivering additional measures to solve this challenge (Poder Judicial de la Nación, 2019). Amongst others, a new wastewater treatment plant is under construction.

A strategic shift of AIC towards more integrated planning could help address all of the different types of pressure that exist in the basin (economic and social development, urbanisation, water quality, etc.). Basin planning could help enhance linkages between water, agriculture, industrial and hydroelectric production, navigation, urban development and land use, which could help expanding water services and limiting pollution for untreated domestic wastewater discharges.

Economic instruments

There is a heterogeneous framework for the design and implementation of economic instruments in the basin. Besides the hydroelectric charge that is fixed by the Adminsitrative Act of the Nation and is collected and invested by the AIC, all other water charges are the responsibility of the three provinces forming the basin. Differences are notable among these provinces. For instance, in the province of Neuquén, the level of the abstraction charge depends on the origin of the water source and quality, while Rio Negro does not make any distinction among water source or quality. Similarly, in Neuquén the level of the charge varies across the Limay River; Rio Negro does not make any distinction across rivers or basins.

Water abstraction charges for agriculture do not promote irrigation efficiency. While volumetric measures are used for setting the level of the charge in the majority of uses (domestic water supply, industrial, mining, oil industry, bottled water, etc.), in the three provinces water for irrigation is charged by hectare. This practice does not provide incentives to foster rational water use by farmers. First, it does not encourage reducing water use, since the amount paid does not depend on real consumption. Second, it does not incorporate other factors such as irrigation technology (e.g. trickle irrigation).

Economic instruments are not being used to encourage pollution reduction in the provinces of Buenos Aires and Neuquén. In both provinces, users have to request a permit to discharge effluents into the rivers. However, in the province of Buenos Aires, there is no payment to discharge effluents. Similarly, in Neuquén, while Decree 790/99 foresees a fee for users to discharge effluents (based on a volumetric calculation and depending on the

nature of the contaminants), there is currently no regulation to enforce this decree (Padin Goodall, 2015).

Data and information

The AIC has one of the most advanced water-related information systems in Argentina. The AIC manages a network of over 170 meteorological stations, of which more than 100 provide real-time information. It also has a network of 66 gauging stations (i.e. to measure river flows) (AIC, 2018a). This network collects and gathers information related to rainfall, temperature, river flows, wind, etc. The data are used to release monthly reports on the "hydro-meteorological status of the basin", which are publicly published on the AIC's website (AIC, 2019c). The AIC also manages a network to monitor water quality in the basin and analyses environmental performance of the basin.

It is not clear whether the AIC collects and analyses socio-economic data to guide decision making. There is no integrated information for the basin with regards to economic instruments, water uses, agricultural production efficiency, economic analysis on the impact of water-related decisions, investments on water infrastructure, infrastructure maintenance data, etc. In particular, it is complicated to find an integral analysis of the agricultural sector: water demand, type of crops, future projections for water use, etc. Such an analysis is fundamental for any water management decision now or in the future, particularly in a context where decreasing water availability due to climate change is a concern for the basin.

Policy recommendations

The AIC has been successful at managing trade-offs across uses and jurisdictions in a context of abundant water and little pressure for environmental performance, but increasing impacts of climate change and social pressures to reduce point pollution in the basin require strengthening its role to improve integrated river basin management. There are three priority areas in this sense: 1) accelerating the development of an integrated basin management plan that aligns priorities across jurisdictions; 2) revamping the use of economic instruments as a key tool to reduce pollution; and 3) expanding the information system to incorporate other socio-economic datasets to guide decision-making.

The AIC should accelerate the development of its strategic water plan, and expand its scope for it to become a tool that reconciles priorities and objectives across the three provinces in the basin. The AIC has the technical capacity and knowledge to develop a water plan for the basin. It has a long-standing tradition of managing water issues in the basin, and a solid data and information system. In this sense, the AIC has started to work towards a water plan that will provide an integral view of current and future water availability and demands under different possible scenarios (Box 3.B.4). This plan should be ambitious and also promote a shift to strategic basin planning since the entire water cycle should strive to address all types of pressures in the basin (socio-economic, urbanisation, etc.) rather than only in water resources. The plan should set medium and long-term objectives to meet the crucial challenges the basin is facing concerning climate change impacts and environmental deterioration. It should also include a robust allocation regime that foresees future reductions in water availability and increases in water demand.

Box 3.B.4. Towards a Plan for Comprehensive Use of Water Resources in the River Basins of Limay, Neuquen and Negro

In May 2018, the AIC launched an 18-month project to develop a Plan for Comprehensive Use of Water Resources, whose main objective is to enhance the evidence base in the basin for better decision making. In particular, the plan has the following objectives:

- identify current and future water uses related to agriculture production, drinking water supply for urban and touristic initiatives, and hydroelectric initiatives
- carry out a diagnosis and evaluation of the current water availability situation, identifying the various actors with water resources needs
- propose a tool for water resources management allowing for the evaluation of different water allocation scenarios that combine different alternatives of uses and supply
- take into account considerations on groundwater and glaciers
- take into account considerations on water quality and environmental degradation areas
- develop an action plan
- establish georeferenced data
- strengthen the technical capacity of jurisdictions with representation in the AIC
- develop a system that would be permanently updated and that would allow future evaluations and consultations.

Source: AIC (2018b), *Planificación del Aprovechamiento Integral de los Recursos Hídricos de las Cuencas de los Ríos Limay, Neuquén, y Negro,* project proposal, May 2018.

The plan, currently under development, should focus on laying down ambitious actions to co-ordinate provincial efforts to:

- Conduct a socio-economic and environmental analysis (i.e. population trends, economic and social performance, and environmental performance) for the basin. The analysis would provide a clear picture of the current development status of the basin, and allow for defining future water availability and demand scenarios. Currently, there is no integrated database at the basin scale that allows for this type of analysis. The plan could help collect this type of data from the provinces.
- Propose guidelines for the use of economic instruments as a key policy tool for the provinces (respecting that the competence for economic instruments is under the responsibility of each of the provinces). These guidelines could suggest the shift from surface criteria to volumetric criteria to define the level of abstraction and pollution charges. It could even go further by proposing concrete methodologies for the design in the charge that could harmonise existing differing practices in the three provinces.

Notes

1. The treaty was ratified by Law 1.651 of the province of Neuquén (7 July 1986); Law 2.088 of the province of Río Negro (21 July 1986); Law 10.452 of the province of Buenos Aires (9 October 1986); and Law 23.896 of the national government (26 October 1990).

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Chapter 4. Water services governance in Argentina

This chapter provides an overview of the current development and performance of water and sanitation services in Argentina, and zooms in the legal, institutional and regulatory frameworks of the sector. It describes how regulatory functions and responsibilities are allocated across different levels of government. It identifies key governance and regulatory challenges that the sector faces. It then discusses how to improve water and sanitation services governance, as well as the delivery of regulatory functions, tools and incentives.

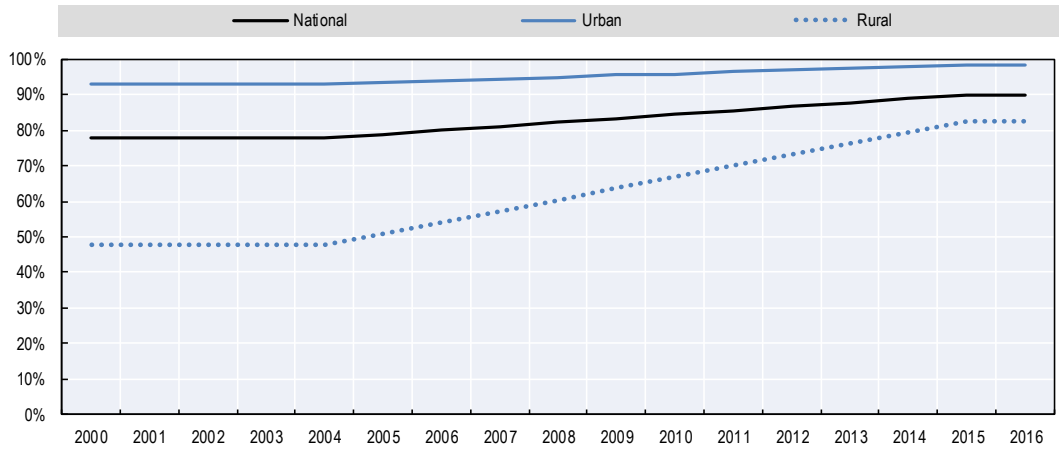
Access to water and sanitation services

In 2015, 84.4% of the 43 million inhabitants of Argentina had access to water through a public network and 58.4% to sewers. Although there are no reliable statistics regarding the level of wastewater treatment, it is estimated that 15-20% of collected wastewater is treated (SIPH, 2016). However, in the Wastewater Treatment Plants (Plantas de Tratamiento de Aguas Residuales, PTAR) survey carried out by the National Directorate for Drinking Water and Sanitation (Dirección Nacional de Agua Potable y Saneamiento, DNAPyS), it is estimated that by 2018, 36% of the wastewater collected received primary or secondary treatment.

Whereas sewer coverage has historically been lower than water coverage, over the last decade, the increase in sanitation coverage (6%) has been superior to the expansion of drinking water supply coverage (4%), thus helping to slightly reduce the gap. This has been the case in all provinces with the exception of Formosa, Misiones and Santiago del Estero, where access to drinking water supply growth has been more important.

According to the Joint Monitoring Program/ World Health Organization (JMP/WHO) data, despite strongly improving over the last decade, access to improved water in rural areas is still lagging behind, with only 83% of the rural population accessing improved water in 2016, while the rate reaches 98% in urban areas (Figure 4.1). Improved water source is defined by JMP/WHO as a source that, by nature of its construction, adequately protects the water from outside contamination, in particular from fecal matter.

Figure 4.1. Evolution of access to improved water in urban and rural areas, Argentina



Source: JMP/WHO (2016), Access to improved water, https://washdata.org/data/household#!/.

The water supply coverage for populations that present unsatisfied basic needs (Necesidades Básicas Insatisfechas, NBI) is 73%, while it reaches 85% for people without NBI. The same is true for sanitation, as coverage for vulnerable population is 31.2% and 56.3% for non-NBI inhabitants.

Taking stock of this situation, the National Water Supply and Sanitation Plan (Plan Nacional de Agua Potable y Saneamiento, NWSSP) set development targets for the sector, with the objective of reaching 100% coverage for drinking water and 75% coverage for sanitation in the country's urban areas by 2023. This represents an additional connection of 8.2 million people for water and 8.9 million for sanitation. The projected investment

required is approximately USD 21 613 million, comprising USD 8 220 million for drinking water and USD 13 393 million for sanitation. To achieve these expansion objectives, an annual average investment of USD 3 000 million is necessary, with a maximum of USD 5 420 million in 2019 (Table 4.1). These amounts of investment represent respectively 0.7% and 1.2% of 2016 gross domestic product (GDP). According to the latest data available from the DNAPyS, USD 2 495 million was spent on works during the period 2016-18 (USD 665 million in 2018, USD 913 million in 2017 and USD 917 million in 2016). The estimated investment for the year 2019 amounts to USD 505 million, for a total of USD 3 000 million from 2016 to 2019. Taking into account the investments made by the provinces, total investment for the past four years amounts to USD 4 290 million.

Table 4.1. Water services investment needs and funding

Million USD

	2016	2017	2018	2019	2020	2021	2022	Total	%
Investments	2 009	2 731	3 144	5 420	3 867	3 248	1 194	21 613	100%
Funding									
Current loans	1 013	506	169					1 688	8%
New loans		600	1 125	1 500	1 500	900	375	6 000	28%
Local funding	101	792	1 009	1 807	1 289	1 083	398	6 478	30%
National Treasury	895	833	841	2 113	1 078	1 265	421	7 447	34%
Indicators									
Investments compared to GDP 2016	0.40%	0.60%	0.70%	1.20%	0.90%	0.70%	0.30%		
Investments compared to total national expenditure 2016	1.30%	1.20%	1.20%	3%	1.50%	1.80%	0.60%		
Investments compared to total national capex 2016	7.70%	7.20%	7.30%	18.30%	9.30%	11%	3.60%		

Source: SIPH (2016), *Plan Nacional de Agua Potable y Saneamiento*, Ministry of the Interior, Public Works and Housing, Buenos Aires, https://www.argentina.gob.ar/sites/default/files/interior_agua_plan_agua_saneamiento.pdf

There are clear challenges for funding the levels of investment needed to achieve the universal coverage objectives in Argentina. One such challenge is effectively channeling and co-ordinating financial contributions to ensure the best use of fiscal resources and external financing. A further challenge is the fact that achievement of the NWSSP universal coverage objectives relies in a large part on the provinces' willingness to undertake investments that are aligned with those objectives. However, rather than aligning their priorities with those of the national government, it has been found that provinces generally design their own portfolio of projects in an independent manner that may not strictly correspond to the NWSSP objectives and associated deadlines (albeit they still seek national funding for delivery of those non-aligned projects). This is the case notwithstanding the fact that the central government provides up to two-thirds of the funding for projects.

This highlights the long-term risks which arise from the mismatch of large infrastructure investment policy priorities across levels of government. Misalignment can result in too much, too little or the wrong type of infrastructure and, in the worst case, can deliver a system which lacks the capacity for interconnection (physical, financial or social) and hence reduces the overall effectiveness of the country in its sourcing, delivery and use of essential services such as water and sanitation services (which are key drivers of economic activity and social welfare). This, in turn, also highlights the need for consistent,

collaborative and enforceable large infrastructure investment policy priorities across all levels of government, including a systematic economic, social and environmental assessment process underpinning policy development and investment delivery. Despite the existence of an overarching universal coverage policy strategy, the drinking water and sanitation sector remains characterised by a lack of legal capacity and instruments from responsible and regulatory bodies to enforce them and related policy resolutions and decisions. Moreover, there is a lack of clear accountability; ongoing independent performance assessment and reporting; and mechanisms for the review, assessment and update of the overall the universal coverage policy. In addition, although no formal mechanism is provided for the review, evaluation and update of the current NWSSP, the DNAPyS is expected to formulate a new plan for 2020-23 along with other regulations (including conditional funding mechanisms or performance-based projects).

Quality and management of water and sanitation services

In addition to the objective of increasing access and connection to water and wastewater services, the NWSSP also seeks to improve the quality and management of services. Despite the lack of data and information, an assessment of the water and sanitation services sector was carried out on the basis of data under development by the DNAPyS (through the National Water and Sanitation Information System and management plans and results) focusing on the situation of 20 providers in Argentina (serving about 27 million inhabitants, or around 65% of the country's urban population with drinking water). Table 4.2 summarises the results of this assessment, clearly showing a lack of efficiency and a low level of cost recovery.

Efficiency of water services providers

The efficiency of Argentinean water service providers shows a great diversity across the country, but the performance remains low on average when compared to a sample of water companies in Latin America. Staff costs represent a large share of operational expenditure. As a result, looking at staff efficiency is key to assess utilities' operational efficiency. Staff efficiency (measured as the ratio of staff per 1 000 connections for drinking water) is on average 3.33 employees per 1 000 connections, ranging from 1.00 to 7.10. For a sample of companies in Latin America, the ADERASA (Association of Regulators of Water and Sanitation of the Americas) benchmarking study estimates that the average staff efficiency is 2.94, with a variation of 1.04 to 6.48. The micro-metering levels are around 27%, ranging from 0% to 95% (Table 4.2). This latter statistic appears very low in comparison with levels recorded by ADERASA, where the average is 70% and ranges from 20% to 79%.

Cost recovery of water services providers

The actual tariff setting system does not incentivise efficient or rational use of water, nor promote demand management. Most users pay for services according to a "*canilla libre*" (free tap) system under which a fixed rate is charged regardless of the water volume consumed, thus providing no incentives for the efficient use of water. This "free tap" system is based on an old presumed consumption criterion taking into account the location, surface covered, quality and age of the property. These variables are supposed to reflect users' income level and therefore their ability to pay. However, the "*canilla libre*" system appears somehow outdated and would need to be actualised to ensure cross-subsidies between wealthy and vulnerable customers are still effective. This pricing system also distinguishes residential from non-residential users, thus providing cross-subsidies from

non-residential to residential users, as well as from metered to unmetered users. While cross-subsidies are not inherently wrong, they should be reviewed and tested from time to time to assess their effectiveness and efficiency and to determine whether or not the cross-subsidy is still required from an overall perspective. For the time being, current cross-subsidies appear diverse and scarcely focused.

Table 4.2. Indicators for a sub-set of 20 water services providers, Argentina

No.	Province	Main service provider	Population supplied with drinking water (%)	Population supplied with sewerage (%)	Micrometre coverage (%)	Total employees per 1 000 drinking water connections	Daily production of drinking water per account (L/inhab/day)	Consumption of drinking water per inhabitant per day (L/inhab/day)	Drinking water leakage (%)	Coverage of operating costs
1	Buenos Aires (General Pueyrredón-Mar del Plata	OSGMP	97	97	20	2.78	532	356	33	0.86
2	Buenos Aires (Principal provider)	ABSA	77	61	34	3.74	802	407	49	2.41
3	City of Buenos Aires + 26 districts of the province of Buenos Aires	AySA	74	59	17	3.51	573	338	41	0.81
4	Catamarca	Aguas de Catamarca SAPEM	87	66	25	3.51	984	397	60	0.55
5	Chaco	SAMEEP	87	42	23	7.10	504	260	48	0.64
6	Chubut	Coop. Trelev	99	93	0	N/A	472	253	46	0.93
7	Córdoba	Aguas Cordobesas	98	N/A	28	1.00	335	272	19	2.64
8	Corrientes	Aguas de Corrientes S.A.	96	78	92	2.31	339	148	56	1.18
9	Formosa	Aguas de Formosa S.A.	93	47	18	4.21	588	259	56	0.98
10	Jujuy	Agua Potable de Jujuy S.E.	75	71	59	3.17	474	211	56	1.03
11	La Rioja	Aguas Riojanas SAPEM	95	83	42	2.83	N/A	366	N/A	1.00
12	Mendoza	AYSAM	90	85	8	1.80	749	367	50	0.80
13	Misiones	SAMSA	97	51	95	2.88	N/A	185	N/A	1.65

14	Neuquen	EPAS	97	82	7	6.56	703	422	40	0.28
15	Salta	Aguas del Norte	81	64	25	3.06	630	378	40	0.85
16	San Juan	OSSE	76	46	2	3.20	N/A	N/A	N/A	0.91
17	Santa Fe	ASSA	98	76	35	2.31	513	257	50	1.12
18	Santiago del Estero	Aguas de Santiago S.A.	98	47	4	2.64	301	153	49	1.31
19	Tierra del Fuego	DPOSS	94	88	1	N/A	433	303	30	1.22
20	Tucumán	SAT	86	70	11	N/A	794	380	52	1.06

Note: The average water consumption per inhabitant per day is 300 litres, with a minimum of 148 and a maximum of 422. These values are well above the registered values in ADERASA for Latin America, where the average is 173 with dispersion from 49 to 366.
Source: Internal data of the National Directorate for Water Supply and Sanitation.

With the tariff structure and level being disconnected from the cost to serve, the service operator is dependent on other funding sources (government grants, etc.) to make the business model viable, especially in a context of high inflation. This situation presents significant challenges for the economic regulator.

First, while it may be the case that, subject to data availability, the regulator may be able to establish the prudent and efficient costs of service delivery, it does not have the ability to set revenues or prices at a level which allows the operator to cover those costs. At best, the regulator can help provide transparency on the true costs of service, and on the amounts of revenue received under the "*canilla libre*", thus identifying the "funding gap" which the operator needs to cover.

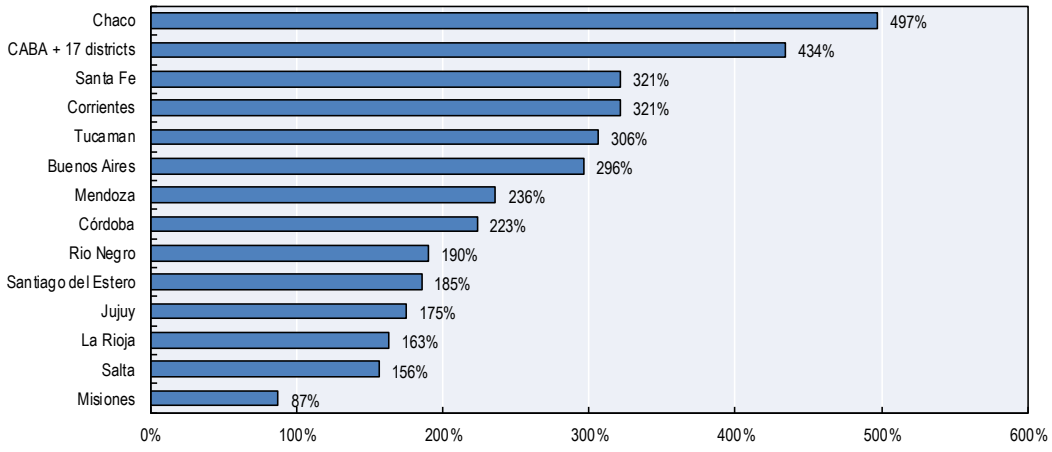
Second, in such a system, neither the operator nor the regulator can set revenues or prices which might drive better use of the services (from a social, economic or environmental perspective). For example, subject to government policy directives, tariff structure could be set to discourage excessive water use (an environmental as well as an economic consideration). Alternatively, they could be set to recognise industries which are heavily water-dependent for production (economic and social considerations). Further, they could be used to cross-subsidise water and sanitation services to provide the least well-off with better capacity to access those services (social considerations).

Such a tariff system also deprives the regulator from a vital tool to evaluate the efficiency of the service provision and set tariffs accordingly. Moreover, it deprives the provider from implementing any incentive tariff policy.

According to AFERAS' report (2011), since 2006, major tariff increases have been implemented in order to improve the level of cost recovery from tariffs, with a great diversity among provinces. A similar evolution occurred between 2011 and 2015 (AFERAS, 2018). In some cases, collection arrears dating back 2010 were compensated. Figures 4.2 and 4.3 show the cumulative tariff increases during the period 2011-15, and the average monthly invoice per jurisdiction for 2015.

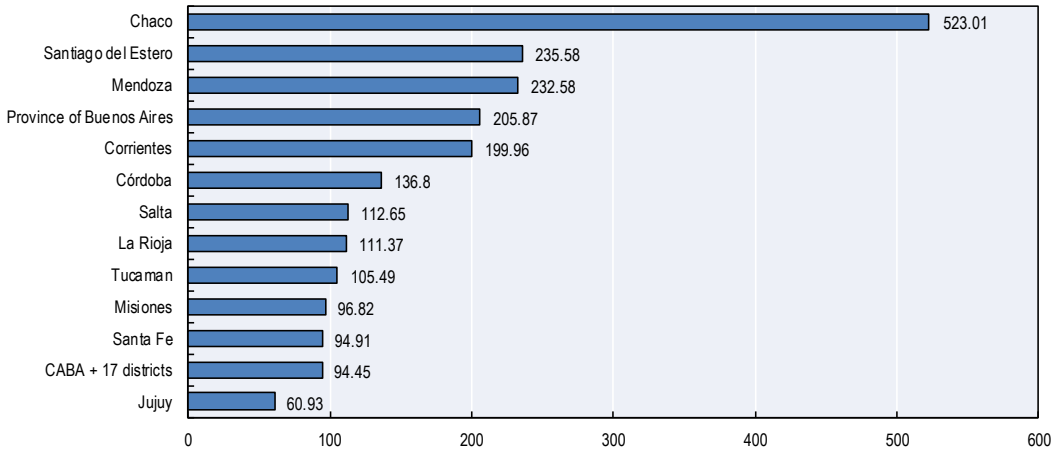
Nevertheless, despite tariff increases cumulated between 2006 and 2015 in more than half of the main providers of the country with available information, revenues collected are still not sufficient to cover operating and maintenance costs. This is due to a combination of low economic efficiency, increasing opex and insufficient tariff levels. On average, the operating cost coverage reached 0.91 when excluding Aguas Cordobesas and ABSA, which have extreme values with 0.28 and 1.31. This situation of increased operating costs and frozen or delayed tariff revenues results in the necessity for external contributions in order to maintain the financial viability of the service. In some cases, these have come from the reallocation of funds destined to expansion plans and service improvement, while in other cases they have been provided through government subsidies. Even so, these external contributions are often themselves insufficient and the ongoing underfunding/under-recovery means that there are resultant reductions in the levels and/or quality of assets, especially for the restoration and renewal of networks. This has resulted in poor network health, with poor service quality and high levels of network leakage. There is currently no evidence that actions have been taken to improve efficiency and thus reduce the average cost of services.

Figure 4.2. Cumulative water and sanitation tariff increases, Argentina, 2011-15



Notes: CABA: Autonomous City of Buenos Aires. The increase of CABA + 17 districts (AySA) corresponds to the nominal increase of the K coefficient, as the subsidies to a significant portion of the users were maintained, the average increase in rates was much lower.
Source: AFERAS (2018), *Sistemas Tarifarios y Tarifas en Argentina*. http://www.aderasa.org/v1/wp-content/uploads/2017/10/AFERAS_libro_Sistemas_Tarifarios_Tarifas_Argentina.pdf

Figure 4.3. Average monthly water and sanitation invoice per jurisdiction in pesos, Argentina, 2015



Note: CABA:Autonomous City of Buenos Aires. + 17 districts = AySA, 2015
Source: AFERAS (2018), *Sistemas Tarifarios y Tarifas en Argentina*. http://www.aderasa.org/v1/wp-content/uploads/2017/10/AFERAS_libro_Sistemas_Tarifarios_Tarifas_Argentina.pdf

Data performance of water and sanitation service providers

On top of efficiency improvement challenges, the NWSSP identified the need for reliable and systematised information. Indeed, the lack of comprehensive information is hampering the definition and development of strategic policy and decision making both at the national and local levels. As a result, the Secretariat of Infrastructure and Water Policy (Secretaría de Infraestructura y Política Hídrica, SIPH) developed in 2017 a *Guide to Performance Indicators and Indices for Water and Sanitation Providers*, and implemented in 2019 the National Water and Sanitation Information System (which also includes the guide). Bridging this information gap implies an intensive interrelationship and co-ordination

between the DNAPyS and the main sectoral actors of the provinces, such that the information system will become a fundamental instrument for the planning, monitoring and enforcement of the NWSSP goals. In 2018, the SIPH launched a consultancy for an interactive information system to collect and process data on water and sanitation infrastructure and services at the national level (Box 4.1). This system, once implemented, is expected to improve the definition of policies, plans and programmes at the national and provincial levels; guide the prioritisation of investments; establish management goals; and assist in the evaluation of operators' performance based on benchmarking. In addition, the SIPH is carrying out discussions, together with the Under-secretariat of Public Innovation and Open Government, so that, together with civil society, an agreement can be reached on the proposed publication of a set of performance indicators of key providers for the 4th Open Government Action Plan 2019-2021 of the Open Government Partnership[1] (Chief of Cabinet Office, 2019).

Box 4.1. A set of synthetic performance indicators to assess and monitor the performance of utilities

As an initial step in the development of a data system for the water supply and sanitation sector, a set of nine "synthetic indicators" are being considered in the NWSSP in order to assess and monitor the performance and achievements of operators:

1. Drinking water and sanitation coverage (as a percentage of the population or active connections).
2. Percentage of sewage with treatment.
3. Water not invoiced during the period, technical losses being distinguished from commercial.
4. Global indicator for staff productivity (full-time equivalent employees/active water and sewer connections).
5. Overall indicator of water and wastewater quality.
6. Global indicator of service quality perception based on customer surveys. This indicator is linked to commercial practices, communication, customer relationship and the image of the provider.
7. Operating margin or cost coverage.
8. Share of personnel expenses of total expenses. This indicator can be used to set targets in relation to cost projections and can be linked with productivity and connection increase over time.
9. Financial structure of the company (debt/equity).

These indicators appear to be a good first step to assess and monitor the performance of water supply and sanitation providers and provision. The DNAPyS plans to complete this list of indicators with indicators regarding operational efficiency (technical losses, pipe breaks, sewer blockages), service quality (service continuity) or commercial efficiency (collection ratio, collection period, commercial losses).

Source: SIPH (2016), "Plan Nacional de Agua Potable y Saneamiento", Ministry of the Interior, Public Works and Housing, Buenos Aires, https://www.argentina.gob.ar/sites/default/files/interior_agua_plan_agua_saneamiento.pdf .

Legal and institutional framework for water and sanitation services in Argentina

The legacy of the privatisation era

The regulatory framework for water supply and sanitation in Argentina stems from the legacy of a decade of privatisations in the 1990s when, many regulatory agencies were created, with limited capacity to discharge their duties over time. In the 1990s, Argentina privatised the management of drinking water supply and sanitation services in several provinces, and in metropolitan areas, including Buenos Aires, Córdoba, Mendoza and Santa Fe. In 1993, for instance, Aguas Argentinas S.A. (AASA) (SUEZ), was granted a 30-year concession in the Metropolitan Area of Buenos Aires (AMBA), becoming at that time the largest private water concession covering a population of around 9 million. In parallel to the the execution of public-private partnerships (PPPs) in most parts of the country, dedicated regulatory authorities were set up in provinces. In practice, the newly created regulators controlled the proper execution and delivery of obligations under the concession contracts (e.g. control of operators' contractual commitments, and interpretation of contractual clauses) rather than regulating water and sanitation services per se (e.g. setting incentives for efficient water use, promoting demand management, information and data gathering, customer engagement). In addition, several researchers concluded that many regulatory authorities suffered from political and economic capture, which was found to highlight the shortcomings of the institutional architecture put in place through the privatisation process (Azpiazu, Bonofiglio and Nahón, 2008): lack of neutrality at the time of renegotiations, lack of clearly stated principles regarding the allocation of regulatory functions, lack of transparency in decision making, co-optation in the appointment of directors or councilors. The risk of capture was also reinforced by the asymmetry of information and technical skills between the private operator and the newly created regulator.

With the termination of the various concessions in the second half of the 2000s, service provision was transferred back to the national, provincial and/or municipal authorities under public concessions. However, the regulatory framework remained largely unchanged. As a result, regulatory authorities still tend to be control agencies, and can find themselves hampered by economic and political interference (Box 4.2). For instance, tariffs continue to be firstly reviewed and approved by political authorities. In recent years, the emphasis was put on the improvement of cost recovery through tariff increases to reduce the financial dependency towards subsidies. This situation occurred particularly in the AMBA, where the operator AySA had seen its tariff rate quasi frozen from its creation in 2006 until 2016. It was then granted an accumulated tariff increase through the adjustment of the K coefficient of 629% from 2016 to 2019. In addition, this financial sustainability policy allowed the company to increase its operating costs from 42% in 2015 to 81% in 2018.

Nevertheless, the role of certain regulators tends to be limited to formal approvals of proposed tariffs, albeit some regulators have an advisory role to political authorities in the tariff-setting process. Regulators are funded through a fee perceived on the water supply and sanitation invoice. In the case of the Metropolitan Area of Buenos Aires and the city of Buenos Aires, due to important increases of the coefficient K and consequently of the tariff since 2016, the regulatory agencies' financial resources increased significantly as their situation went from deficit covered by the National Treasury to surplus. This evolution led the Ministry of the Interior, Public Works and Housing to approve a resolution reducing the rate perceived on the water invoice by the regulatory agencies (ERAS and APLA) from 2.6% to 1.79%, as of 1 July 2019.

Box 4.2. Preventing undue influence and maintaining trust: The case of electricity and gas regulators in Argentina

National electricity regulator

The legal powers that Law 24.065 of the Electric Power Regime grants to the National Electricity Regulatory Entity (ENRE) as a self-governed organisation with institutional boundaries can provide the foundations to build trust as an independent regulator.

Defining serving terms for members of the governing body of regulators as fixed and in staggered periods can reduce the risk of regulatory capture and appointments should last beyond presidential periods. In the case of ENRE, governing bodies are designated for five years and the president is elected for a four-year term. The members of the board cannot have direct or indirect interests or relations with the electricity firms. There is also a three-year "cooling off" period, during which an individual is prohibited from working in the industry before or after holding a public position in ENRE.

Direct intervention of ministries in the policy space of regulators can undermine trust in the regulator. Decree 134/2015 issued in 2015 declared the energy sector in a state of emergency. This decree provided instructions to the Ministry of Energy and Mining to implement actions to improve quality and ensure the supply of public services in technical and economic conditions. The intervention of the ministry included the generation, transport and distribution of electricity. A decree of this nature granted the executive power faculties to intervene in ENRE, narrowing its capacity as a regulatory authority.

National gas regulator

Law 24.076 of Natural Gas grants ENARGAS an institutional design similar to that of ENRE, including the status of a self-governed body, the arrangements for the board of the institution, and the system for the appointment of board members, among others. These legal instruments seem to be consistent with OECD principles on the governance of regulators, but any potential risk in the institutional design that threatens independence should be identified and avoided, or limited.

In the case of ENARGAS, through Decree 571/2007 issued in May 2007, the president of Argentina intervened, taking control of the regulator's functions and responsibilities. The arguments put forth included defective administrative reporting, serious faults and other misconduct. The decree made explicit that the intervention was planned for 180 days, with the possibility of extension. The short-term intervention lasted ten years, however, until the publication of Decree 594/2017 issued in 2017, which declared the end of the intervention and appointed the vice president of ENARGAS and other senior officials.

In order to prevent undue influence and maintain trust, regulators need to have, among other things, clear objectives, a solid regulatory and institutional framework to dispatch their function effectively and efficiently,

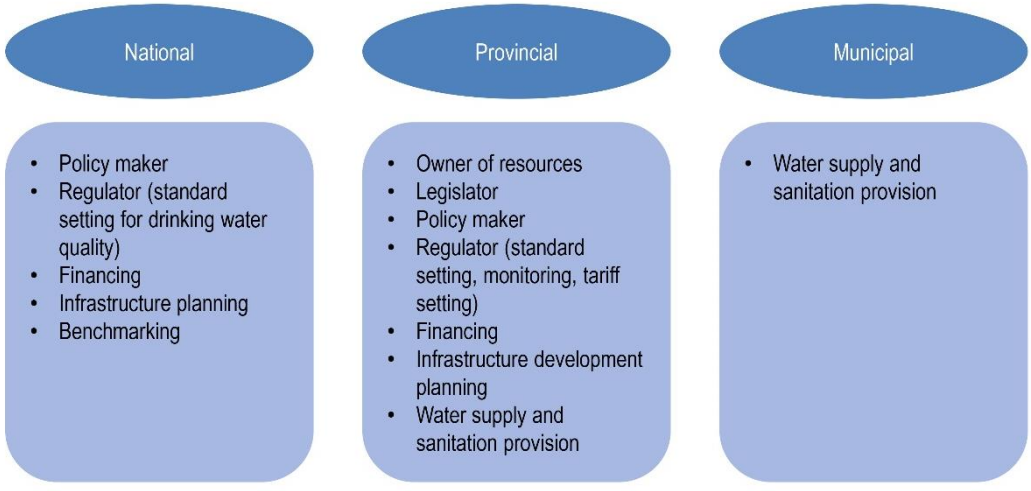
and an institutional and regulatory landscape to resolve disputes and misconduct under the rule of law. Interventions of a nature similar to the one described above may have largely negative effects over the performance of the institutions, as well as in stakeholders' perception.

Source: OECD (2019), *Regulatory Policy in Argentina: Tools and Practices for Regulatory Improvement*, https://doi.org/10.1787/d835e540-en.

The present legal and institutional setting

The multi-level institutional setting for water services provision in Argentina is rooted in policy choices and reforms dating back to the 1980s and 1990s. In 1980, the provision of drinking water and sanitation services was transferred to the 23 provinces, with the decentralisation of the state-owned Obras Sanitarias de la Nacion (ONS). In 1994, Argentina underwent a constitutional reform that introduced an environmental provision (Article 124) acknowledging the historical right, whereby the 23 provinces and the Autonomous City of Buenos Aires own the water and have jurisdiction over them. They are therefore responsible for the provision of water services within their own boundaries. Article 41 states that the National state may dictate minimum standards of quality and protection, which can be supplemented by the provinces. This means that the national government can establish a national water policy, strategy, programme or plan, but needs the support of the provinces to implement it (Figure 4.4). In practice, there is no national water law nor framework, and each of the 23 provinces and the city of Buenos Aires have their own water legislation, both in terms of resource management and water and sanitation services. Their powers include policy making, policy implementation, operational management, financing and regulation. A full fledge institutional mapping for water supply and sanitation is available in Figure 2.2 under chapter 2.

Figure 4.4. Allocation of responsibilities regarding water and sanitation services, Argentina



At national level

The Ministry of the Interior, Public Works and Housing has the sectoral competence for water and sanitation services policy at the national level. Within the line ministry, the SIPH

establishes the national policy and planning for water and sanitation services and decides the financial national resource allocations to and within the sector.

In particular, the SIPH is the enforcement authority of the regulatory framework for water and sewer services provided by Agua y Saneamientos Argentinos SA (AySA). This water and sanitation services provider is a public limited company owned by the state (90%) and by its employees through their union (10%). Currently AySA provides services to the capital of Buenos Aires and 26 municipalities of Greater Buenos Aires.

The National Entity for Sanitation Water Works (Ente Nacional de Obras Hídricas de Saneamiento, ENOHSA) sits within the SIPH as a decentralised body with legal status and administrative autonomy. Historically it has acted as a financial agency channeling national and external resources to the provinces and service providers. In 2004, it became authorised to contract for and execute works, projects and acquisitions for the construction, maintenance and replacement of sanitation infrastructure.

Two further self-governing bodies, the Water and Sanitation Regulatory Entity (Ente Regulador de Agua y Saneamiento, ERAS) and the Planning Agency (Agencia de Planificación, APLA) have the respective functions of policy planning and regulation in the context of AySA's service provision. ERAS exercises control over the provision of drinking water and sewerage services, including control of water pollution in AySA discharge. APLA reviews and validates investment planning by liaising with the municipalities and the concessionaire, and monitors the execution of works.

Although the SIPH is in charge of managing and co-ordinating the water and sanitation sector policy at the national level, an initial diagnosis revealed the absence, until recently, of a specialised working group or department under the SIPH dedicated to those functions. In reality, it had not existed for more than two decades, except with a small team to fulfill the functions of the Application Authority of the Metropolitan Area of Buenos Aires' (AMBA) services contract (AASA and AySA). The current management of the national government considered it necessary to constitute a dependency within the scope of the then Undersecretariat of Water Resources (now the SIPH) as the governing body at the national level. As a result, the DNAPyS was created in 2016. Its tasks include, among others, the formulation of sectoral policies for water and sanitation services, as well as the medium and long-term planning of investments and the quality of services. It is also in charge of developing a national data system to bridge the information gap on water and sanitation services, of carrying out specialised studies, promoting good practices for the maintenance of infrastructure and operator management, transferring knowledge, and strengthening provincial and municipal services.

Horizontal co-ordination among these various national institutions is a challenge because of an allocation of responsibilities that is overlapping, unclear or rivalrous. Moreover, there are difficulties linked with the design, implementation and monitoring of water and sanitation services policies, deriving from the lack of co-ordination between these national entities. Taking stock of these horizontal co-ordination challenges at the national level, a Water Cabinet has been created (Box 4.3).

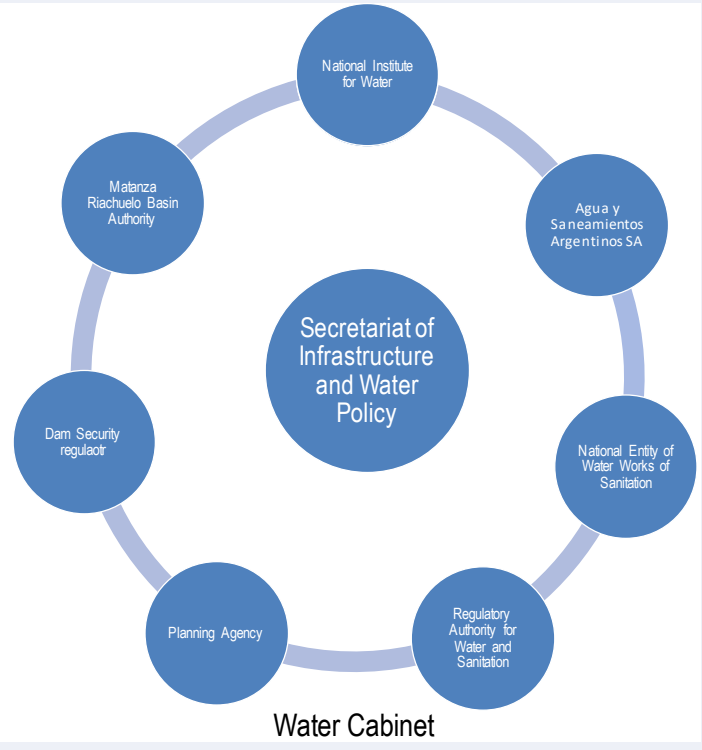
As discussed above, in 2016, the DNAPyS established the NWSSP, targeting universal coverage for urban drinking water supply throughout the country, and a 75% coverage for sewage by 2023. The plan identifies water services access gaps as well as key efficiency issues in service delivery, and proposes an investment plan and policy actions to improve the overall performance of the sector. In theory, the DNAPyS should drive the implementation of the NWSSP throughout the country; but from a legal standpoint, its

enforcement power is limited to the Metropolitan Area of Buenos Aires where AySA operates. Besides the exception of the AMBA, drinking water and sanitation is usually under the responsibility of the provinces, within a co-existence of provincial and municipal ownership of services (see the following section). Hence, the SIPH does not have the legal capacity to make the provinces accountable for the implementation of the NWSSP, and faces difficulties to align national, provincial and local priorities. Provinces voluntarily implement infrastructure or policy measures included in the plan. In such cases, nevertheless, ENOHSA can act as a financial agency to channel monetary resources to the provinces and service providers. ENOHSA can also, with the agreement of the provinces, contract and execute projects related to the construction, maintenance and replacement of water services infrastructure in co-ordination with the responsible provincial authorities.

Box 4.3. The creation of a Water Cabinet, Argentina

In December 2015, in order to articulate the management and governance of water policies between the various stakeholders involved at the national level, the Ministry of the Interior, Public Works and Housing created the Water Cabinet (Gabinete del Agua, GEA) as an instance for policy co-ordination, planning and budgeting. The GEA meets regularly upon invitation from the Secretariat of Infrastructure and Water Policy with a view to report progress, exchange and receive instructions, and integrate commissions and technical work groups. The main goals of the GEA are to generate favourable conditions to promote and implement integrated water resources management, and to develop water resources management based on the definition of specific goals and objectives from the National Plan for Water Supply and Sanitation.

Figure 4.5. Composition of the Water Cabinet



At subnational level

The legal and institutional organisation of the provision of water and sanitation services at the provincial level replicates the organisation of AySA and the AMBA, with the provincial governments having powers over their territory (with the exception of AySA mentioned above).

The most frequent institutional organisation at the provincial level consists of a body responsible for sector-based planning and collection of revenues (provincial ministry, secretariat or undersecretary) and a regulatory body for water supply and sanitation. When there is no economic regulator, as is the case in eight of the provinces (Table 4.3), the regulatory functions are exercised by provincial water administrations.

Table 4.3. Existence of provincial regulatory authorities, Argentina

Existence of a regulatory authority for water supply and sanitation	Yes (Name)	No
Public water supply and sanitation operators	C.A.B.A. y 26 Partidos de la Provincia de Buenos Aires (ERAS-APLA) Buenos Aires (ADA) Catamarca (ENRE) Chaco[4] (APA) Formosa (EROSP) Jujuy (SUSEPU) La Rioja (EUCOP) Mendoza (EPAS) Rio Negro[4] (DPA) Salta (ERSP) Santa Fe (ENRESS) Tucuman (ERSPT)	Entre Rios[1] La Pampa[1] Neuquén San Juan San Luis Santa Cruz Tierra del Fuego
Private water supply and sanitation operators	Córdoba[2] (ERSEP) Corrientes (AOSC) Misiones (EPRAC) Santiago del Estero (ERSAC)	Chubut[3]

Note 1: Predominantly municipal.
Note 2: Only the drinking water service of the city of Córdoba; other water services and sanitation services are operated by municipalities and/or co-operatives.
Note 3: Predominantly co-operatives with one regulator for the city of Trelew.
Note 4: Regulatory functions are exercised by the water directorates.
Source: SIPH (2016), "Plan Nacional de Agua Potable y Saneamiento", Ministry of the Interior, Public Works and Housing, Buenos Aires, https://www.argentina.gob.ar/sites/default/files/interior_agua_plan_agua_saneamiento.pdf

Water and sanitation services are generally provided by provincial companies organised as commercial companies, with their share capital owned by the provinces, municipalities and unions. They cover the main cities within the provinces (with the exception of the provinces of Chubut, Entre Ríos and La Pampa, where services in the main cities are provided by municipal entities and co-operatives). In many small localities and local communities, services are provided by the municipal administration, user co-operatives or community entities.

It is estimated that there are 1 828 water and sanitation service providers in urban areas in Argentina. Of those, 23 are provincial and regional (the regional one referring exclusively

to AySA, which covers two provincial jurisdictions, the city of Buenos Aires and 26 municipalities of the province of Buenos Aires). Of those 23 provincial and regional providers, 15 are public companies, 4 are state entities and 4 are private concessionaires (Corrientes, Córdoba, Misiones and Santiago del Estero). The 15 provincial and regional public operators serve around 60% of the country's population. Provincial private companies serve close to 10% of the population. Municipal operators (including cooperatives) represent more than 98% of the total number of operators, but they comprise the smallest localities, and serve approximately 30% of the population (Table 4.4).

The problem of access to and operation of water and sanitation services of disfavoured neighbourhoods and of the rural population presents specific challenges that differentiate them from the expansion of services in areas with formal and planned urbanisation conditions. The policies and regulations issued by the national government have resulted in the creation of the National Registry of Disfavoured Neighbourhoods (Registro Nacional de Barrios Populares, RENABAP), which aims to create a favourable framework for the urban regularisation of these neighbourhoods. It also seeks to design a national plan to expand access to water and sanitation services in those neighbourhoods, with the participation of the provinces and promoting horizontal co-ordination. The DNAPyS, with the technical support of the IDB, is currently conducting studies to formulate a "National Program of Access to Water and Sewers for Popular Neighborhoods" focused on the provinces of the interior of the country to complement the actions undertaken by AySA in these type of neighbourhoods.

Table 4.4. Scale and number of water supply and sanitation services providers, Argentina

Water supply and sanitation providers	Geographical scope of the service provider		Total
Legal type of water supply and sanitation provider	Provincial/regional	Municipal	
Public operator	15	13	28
Private operator	4	8	12
Municipal centralised operator	4	377	381
Co-operatives		1 407	1 407
Total	23	1 805	1 828
Population served (as a share of total population connected)	70%	30%	

Source: SIPH (2016), "Plan Nacional de Agua Potable y Saneamiento", Ministry of the Interior, Public Works and Housing, Buenos Aires, https://www.argentina.gob.ar/sites/default/files/interior_agua_plan_agua_saneamiento.pdf.

Economic regulators are generally responsible for regulating all water and sanitation operators within a province or territory, including municipal operators and co-operatives, and generally apply the same regulatory framework across all of those operators (a one-size-fits-all approach). However, the regulatory frameworks provide limited economic efficiency incentives to the operators: the regulatory system generally only promotes financial operating cost recovery through tariff increases, not through efficiency gains. Further, other financial and institutional incentives generally focus on short-term investment and solutions which can close gaps in access to services – there is no longer term focus. This limits investments in other areas (IT, leak management, demand-side measures, for example) that could help improve the operator's technical or financial

efficiency, which would (in the medium to longer term) improve the level of resources available to invest in closing service gaps. Thus, it may be argued that there is a focus on short-term gain but long-term pain in the sector – facilitated by the regulatory model in place.

An illustration of this missed opportunity can be seen in the levels of water losses, which are high (40-45% leakage rate on average). Moreover, there is a lack of technical capacity to develop projects on the part of service providers at the provincial and municipal levels, in particular to carry out socio-economic assessments of projects as well as to monitor their implementation. At the same time, there is a lack of training of the operational personnel and a lack of infrastructure maintenance. In general, bidding documentation is of low quality and there are excessive delays in the administrative bidding steps, leading to extensions of time and/or additional work being required.

The decentralisation and fragmentation of water and sanitation services also makes it difficult to co-ordinate the sector and for the national government's decisions to be implemented at provincial and local levels. In order to overcome these co-ordination challenges, the Secretariat of Infrastructure and Water Policy has set up various local mechanisms, namely the creation of the Metropolitan Water Board in the AMBA (Box 4.4), the Plan Belgrano Executing Unit[2] in the northern provinces of the country, and the management and result plans (*Planes de Gestión y Resultados*, PGRs). The PGRs are designed as a planning and control tool for water and sanitation providers, which analyse the demand over a five-year period and the main indicators of performance and efficiency. They also include financial projections to assess funding needs and sustainability. They comprise a diagnosis of the provider's management, with proposals for improving its activities. Objectives are set jointly by sector authorities, providers and regulating bodies through consensus and on a technical basis. The first PGRs for provincial providers started at the end of 2016, and were financed by the World Bank and the Inter-American Development Bank (Saltiel et al., forthcoming). Each PGR entails a working period of four to five months and includes:

- programming horizon of five years
- investment plan, with works priorities
- management diagnosis and improvement plan
- demand prospects, coverage goals and levels of efficiency
- financial projections and financing structures.

Actions aimed at improving transparency and providers' accountability are also planned. The objective is that users gain access to administrative, financial, operational and technical information through the publication of financial statements, annual reports, management indicators and master plans. Moreover, the PGRs could be used to prioritise investments.

Box 4.4. The Metropolitan Water Board of Buenos Aires, Argentina

The Metropolitan Water Board (*Metropolitana Mesa del Agua,* MMA) was created in January 2016 and operated until 2018 within the Under-secretariat of Water Resources, the actual Secretariat of Infrastructure and Water Policy (SIPH) within the Ministry of the Interior, Public Works and Housing. It was formed by representatives of the SIPH, the Water and Sanitation Regulatory Entity (ERAS), the Planning Agency (APLA), and the

company Agua y Saneamientos Argentinos S.A. (AySA), the Ministry of Infrastructure and Public Services of the province of Buenos Aires, the Buenos Aires Water Control Agency, the Provincial Directorate of Waters and Sewers of the province of Buenos Aires, the company Aguas Bonaerenses S.A. (ABSA), the National Entity for Sanitation Water Works (ENOHSA), and the Matanza Riachuelo Basin Authority (ACUMAR).

The MMA's objective was to articulate common policies on water and sanitation between the government of the province of Buenos Aires and the national government with emphasis on the Autonomous City of Buenos Aires and the parties that make up the Buenos Aires Metropolitan Area. The goal was to overcome the lack of urban planning that characterises the Metropolitan Area of Greater Buenos Aires (AMBA) and that is one of the most important challenges for water and sanitation management in the area.

This initiative was part of the Water and Sanitation Axis included in the National Water Plan announced by the Argentinean president. It allowed accelerating the deadlines and increasing the magnitude of the investment planned in the AMBA.

Stakeholders held working meetings to exchange information for evaluation and decision making to reach a common understanding on policies. One of the MMA's main objectives was to co-ordinate initial works and legal and institutional arrangements between stakeholders in order to expand and improve services and to reach the global goals set for 2023, i.e. 100% access to drinking water and 75% access to sewage for the population in the area.

As a result of the MMA's actions, from the end of 2016 onwards, nine municipalities were incorporated into AySA's service provision area. Prior to 2016, these municipalities were served either by the provincial company, ABSA, or to a lesser extent by municipal services.

Source: OECD Questionnaire

Regulatory functions and processes for water and sanitation services in Argentina

Regulatory functions in water and sanitation services encompass economic, environmental and social aspects. They can be shared among several institutions. However, they need to be clearly defined and allocated to avoid overlaps and incoherence. Table 4.5 provides a list of regulatory functions for water and sanitation services and the level and institution to which they are allocated in Argentina. These functions are part of a broader analytical framework produced by the OECD on the governance of regulators. This section reviews how these functions are discharged in the case of Argentina and some of the gaps identified.

Table 4.5. Allocation of regulatory functions for water and sanitation, Argentina

Regulatory function	Level in charge of exercising the function	Type of institution in charge of exercising the function
Tariff regulation	Subnational*	Regulator or provincial/municipal administration
Quality standards for drinking water	National and subnational	National Food Commission and regulator or provincial administration
Quality standards for wastewater treatment	Subnational	Regulator or provincial administration
Defining public service obligations	Subnational	Provincial administration
Defining technical/industry and service standards	Subnational	Regulator
Setting incentives for efficient use of water resources	Subnational*	Regulator or provincial administration

Setting incentives for efficient investment	Subnational*	Regulator or provincial administration
Information and data gathering	Subnational	Regulator
Monitoring of service delivery performance	Subnational	Regulator
Customer engagement	Subnational	Regulator or provincial administration
Consumer protection and dispute resolution	Subnational	Regulator or provincial administration
Licensing of water operators	Subnational	Provincial/municipal administration
Supervision of contracts with utilities/private actors	Subnational*	Regulator or provincial/municipal administration
Analysing water utilities' investment/business plans	Subnational	Regulator or provincial/municipal administration

Note: For the Metropolitan Area of Buenos Aires, these functions are jointly exercised by a national entity, namely the Secretariat of Infrastructure and Water Policy, and a subnational entity.
Source: OECD (2015c), *The Governance of Water Regulators*, https://doi.org/10.1787/9789264231092-en.

Quality and reliability standards

Whereas provincial regulatory authorities are in charge of drinking water and wastewater quality control, compliance bacteriological and chemical parameters and thresholds are defined at national level (Food Code and regulatory standards). When there is no regulator, provincial or municipal authorities are in charge of this control. While there have been no serious and widespread breaches, many operators face specific compliance problems. Some are resolved within reasonable time frames, but this is often not the case due to ineffective management or lack of resources. With regard to service continuity, some unscheduled service cuts or low-pressure issues can occur in the summer due to peak consumption. In order to mitigate these problems, storage tanks are common, but can generate drinking water quality issues. Likewise, in the outskirts of large cities, there are risks of poor water quality and pollution due to the poor maintenance of networks and the precarious state of septic tanks. In addition, it is difficult to set a clear and sound diagnosis of the quality levels of water provided throughout the country, due to the very limited information available. Large operators have quality monitoring programmes, which sometimes involve the use of contracted specialised laboratory services, which can guarantee the quality of the testing. However, many operators do not meet the mandated quality standards as they do not have sufficient human or financial resources. While regulators are entitled to carry out additional verification inspections if needed, they often only check the water quality information provided by operators.

Tariff regulation

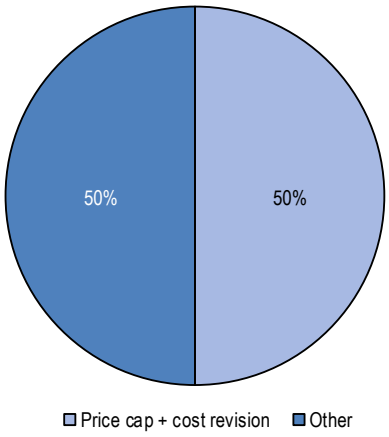
Tariffs are proposed by operators to provincial or municipal authorities for approval, before they are reviewed and cleared by subnational regulatory authorities. In the case of AySA, the company proposes tariff increases to the SIPH, the authority responsible for tariff setting. ERAS, the Users' Ombudsman of the ERAS and APLA are consulted and, although not mandated by law, since 2017, a public hearing has been convened for all tariff increase requests. In Argentina the actual tariffs set are commonly at a level lower than that required for cost recovery for a large number of utilities. This reflects the trade-off made by public operators and local political authorities between economic and affordability objectives. This said, it has been observed that, for some private operators (Córdoba, Corrientes, Misiones, Santiago del Estero), higher tariffs and/or operating cost coverage ratios have been established as compared to public operators.

When there is no provincial regulator, prices are directly approved by provincial or municipal authorities. The "*canilla libre*" system completely disconnects tariff setting from production costs and local conditions of service delivery, which prevents regulators from

assessing efficiency and setting tariffs accordingly. This, in turn, fails to drive behavioural change towards a lower water consumption and a reduction of operational costs.

According to the Association of Argentinian Regulators of Water and Sanitation Services (AFERAS), the most common price setting methodology across the country is a price cap (Figure 4.6). However, in practice, hybrid methods do exist since, in all jurisdictions, periodic reviews are carried out following different methodologies, mainly addressing cost increases. Currently, periodic or ordinary tariff reviews are rare, especially in state-owned companies. In general, rates are increased on an annual or semester basis due to cost increases or extraordinary modifications.

Figure 4.6. Most commonly used tariff setting methodology among a sample of 16 regulatory authorities, Argentina



Source: AFERAS (2018), "Sistemas Tarifarios y Tarifas en Argentina", Serie de Publicaciones sobre Tarifas Nº3. http://www.aderasa.org/v1/wp-content/uploads/2017/10/AFERAS_libro_Sistemas_Tarifarios_Tarifas_Argentina.pdf

Incentives for an efficient use of resources and spending

Water services providers are subject to the provisions of the General Environment Law No. 25.675 regarding environmental impact assessment, as well as the requirements of Law 25.688 regarding water use permits for abstraction and wastewater discharges. Nevertheless, there are currently neither systematic nor standardised *ex ante* economic and social assessment processes for proposed infrastructure development, with the exception of investment projects funded by donors, which usually include a cost-benefit analysis. As a result, most projects funded by the provinces are neither routinely appraised nor selected according to a cost-effectiveness, cost-benefit or multi-criteria analysis. Moreover, the concept of efficiency does not generally prevail in the political decisions regarding works to be undertaken.

It is worth mentioning that, for national projects financed by the national government, the Public Investment Project Bank (BAPIN) verifies that investment projects to be incorporated into the BAPIN comply with certain standardisation criteria, in order to allow comparability and prioritisation for their eventual inclusion in the national budget.

Nevertheless, due to the federal structure of the country and depending on the province, the limited scrutiny of resource use and spending is done either by a regulatory authority, the provincial administrative authority or a dedicated agency. For example, in the AMBA,

APLA is responsible for analysis, assessment and scrutiny of AySA's investment and business planning. For instance, on 9 October 2019 APLA issued a resolution to express its conformity with AySA's 2019 – 2023 Plan for Improvement, Operation, Expansion and Maintenance of Services (Plan de Mejoras, Operación, Expansión y Mantenimiento de los Servicios, PMOEM). Of note, in 2018, APLA established a multi-criteria methodology to select investment projects that will be ready for implementation by November 2019.

Social obligations

Given the multiplicity of subsidy systems in the different provincial and municipal jurisdictions – including direct, crossed and social schemes – it is difficult and complex to compare situations and plans among providers. Nevertheless, the information regarding social obligations is only available at operator level. For instance Box 4.5 shows the description of the social tariff system in AySA's concession.

Box 4.5. AySA's social tariffs, Argentina

In 2018, 304 943 users were benefiting from one of AySA's three social schemes, which represented subsidies equal to 478.7 million of Argentinian Pesos. The Water and Sanitation Regulatory Entity (ERAS) is responsible for authorising and implementing these three social schemes described below.

Table 4.6. AySA's social schemes

Social scheme	Number of beneficiaries
Social rate	302 857
Social case	802
Community rate	1 284

Social rate for households

This social scheme is based on income (subject to verification by ERAS), and encompasses three different types of social support. First, it supports connection to the water or sewer service by providing a 50% discount of the connection fee for households that are not yet connected to the water or sewer service. Second, it allows variable discounts for households that cannot afford to pay their water bills due to low incomes. Third, it provides debt cancellation when households are unable to pay back their arrears due to low incomes.

Social case

This social support is targeted towards households that are in a critical social situation and cannot pay the social rate payment described above. For these households, the connection charge to the service is free, water and wastewater services are provided for free, and all past debts are entirely cancelled.

Community rate

This social scheme is targeted towards non-residential customers such as civil or non-profit associations or organisations, universities, public schools, public hospitals, community sports clubs, theatres, food charities, and any other institution upon agreement by ERAS. These institutions benefit from a 50% discount on the connection fee for their first connection to the water or sewer service. They also get a 30% discount on the tariff for metered customers and a 25% discount on the general daily rate of the variable charge when they are non-metered. They are entitled to 50% debt cancellation when they are unable to pay their arrears due to economic issues.

Source: AySA (2019), "Tarifa Social", https://www.aysa.com.ar/usuarios/Tarifa-Social., (accessed on June 2019)

Participation of users and consumers

At the national level, there are legal guarantees for consumer access to information. Decree 1.172/2003 of Access to Public Information was promulgated in 2003. This decree contains five bylaws dealing with public participation in the drafting of regulations and access to public information. Also in 2003, the Law on Free Access to Environmental Public Information (Law 25.831) was passed. This law, which is applicable at national, provincial and municipal levels, guarantees the right to access to environmental public

information provided by the national government. In 2016, a Law on the Right to Access Public Information (Law 27.275) was passed establishing "the possibility to search, access, request, receive, copy, analyze, reprocess, reuse and redistribute freely information in custody" (Article 2). Article 42 of the National Constitution establishes that consumers and users of goods and services have the right to the protection of their health, security and economic interests; to adequate and truthful information; to freedom of choice; and to conditions of fair and dignified treatment. The protection of economic interests and the right to adequate and truthful information can be demanded by users against the service provider and before the regulatory authority.

In addition to these national, generic and overarching legal provisions, a few regulators and operators disclose information and data to the public through annual reports freely accessible on their website. Furthermore, in the AMBA, with a view to strengthening citizens' consultation and participation, public hearings are held since 2016 for tariff revisions requested by AySA. The Ombudsman of the different jurisdictions (Nation, CABA and province of Buenos Aires) attends those hearings. The use of public hearings for the tariff adjustment process exists in several provinces (for example Buenos Aires, Córdoba, Salta, Santa Fe, among others).

In the case of the AMBA and according to Article 54 of its regulatory framework, a Users' Syndicate of ERAS is formed within the scope of the regulatory entity. This Users' Syndicate is made up of representatives of the water users' associations duly registered in the Sub-secretariat of Consumer Defense of the Ministry of Economy and Production. Its members attend the Users' Syndicate meetings *ad honorem*. The Users' Syndicate establishes its own internal operating rules, which must be approved by ERAS' Board of Directors within 30 days. These meetings are held on ERAS' premises at least once a month. Members review the issues considered to be of concern and relevant to the activity carried out by providers of the regulated area. The Users' Syndicate issues opinions which must be considered by the Board of Directors. The administrative costs of the Users' Syndicate are borne by the regulatory entity that sets its annual budget.

Nevertheless, the participation and consultation of water and sanitation services users remains limited in all provinces. In Argentina, there are other regulators on electricity, gas and telecom whose engagement practices can provide inspiration (Box 4.6).

Box 4.6. Engagement: Practices of the electricity, gas and telecom regulators in Argentina

In Argentina, the participation of civil society in the drafting of regulations was ruled and mandated in 2001, when Law 25.432 of Binding and Non-Binding Popular Consultation was issued by the National Congress. It is only in the last few years, however, that this practice effectively began being adopted by ministries and national government agencies. Public hearings constitute a channel for society to participate in the decision-making process. Public hearings are public participation procedures in which the authority provides formal spaces of communication in which stakeholders may express opinions about particular interests.

Decree 1.172/2003 includes the regulation of public hearings, which defines actors, roles, timing, budget responsibilities, stages, protocols, formats and procedures. The decree also publishes the regulation of the public participation of norms, as an institutional mechanism to express opinions regarding drafted administrative norms and laws that the executive will present before congress. In this regulation, any person can formally request the authority

to launch a public participation procedure of norms – implying that not all regulation proposals may be subject to a consultation process.

The decree also defined the regulation to publish the interests and opinions of any person within the public hearing, with the aim to influence functions and decisions of public entities, as economic regulators. The basic principle of this regulation is that all information recorded is public and must be free to access, updated daily and published on web portals.

In addition to public hearings, the National Electricity Regulatory Entity, the National Gas Regulatory Entity and the National Communications Entity hold meetings with different stakeholders. For instance, the National Communications Entity has monthly consultations with consumer commissions, but there is no evidence of systematic meetings beyond public hearings with regulated firms with protocols to ensure transparency. In the National Electricity Regulatory Entity, the National Gas Regulatory Entity, apart from public hearings which follow transparency practices, there is no evidence of formal meetings within a planned agenda with regulated entities or other stakeholders.

Source: OECD (2019), *Regulatory Policy in Argentina: Tools and Practices for Regulatory Improvement*, https://doi.org/10.1787/d835e540-en.

Handling consumer complaints and disputes

Each provincial regulatory framework stipulates specific mechanisms for consumer complaints and handling disputes. For instance, Law 11.220 on the Regulatory Framework of the province of Santa Fe establishes that users may lodge a complaint with the regulatory authority if the operator does not give a timely and satisfactory response to their claim. Likewise, users may refer to the regulator cases of irregular conduct or omission of the operator or its agents affecting their rights; or harming the service, natural resources and the environment. Article 30 of the aforementioned law establishes an obligation on the regulatory authority that "*all matters submitted to its knowledge be handled as quickly as possible, guaranteeing the right to defence of individuals, users and providers, and respecting in all cases the due administrative process*". In the AMBA, the regulatory framework that applies to AySA stipulates (in Article 9) that the operator shall handle users' queries and complaints "*within a reasonably short delay and in a substantial and satisfactory manner*". Article 59 refers to the application of consumer protection and defence norms as defined by the National Consumer Defense Law 24.240. Article 60 certifies the right of users to refer to the regulatory authority when the level of service provided by the operator does not match legal requirements, or when the operator has not responded in due time to the customer's claim. Article 54 stipulates the creation, the missions and the functions of the "Users' Ombudsman" as well as the "Users' Syndicate" established within the regulatory authority.

Collection of information

Despite the DNAPyS recent efforts to set up a national and standardised data and indicators system, there is currently no unified collection or monitoring system regarding the performance of water and sanitation services in Argentina. In each province, operators report information to their regulatory or administrative authority, and the nature and content of reporting varies between operators and provinces.

Regarding affordability information, the National Institute of Statistics and Censuses (INDEC) is currently the main source of information at the national level, as it is in charge

of preparing the National Household Expenditure Survey (ENGhO). Nevertheless, it does not have updated information to measure the share of water and sanitation services expenditure in household incomes, as the most recent available and approved data date back to 2004. In the first quarter of 2020, the results of this ENGhO (2017/18) will be published. Meanwhile, some preliminary results have been published.[3]

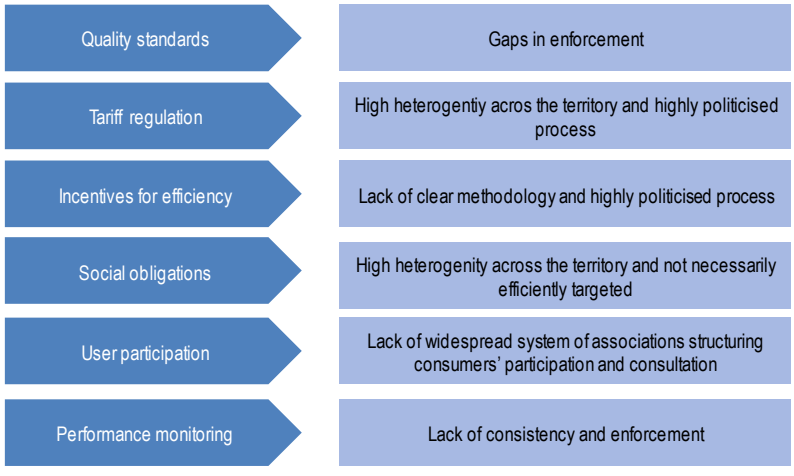
Regarding infrastructure maintenance data, there is no national nor provincial information available. Two surveys are presently being carried out by the DNAPyS to know the status of the drinking water treatment plants and the wastewater treatment plants.

Performance monitoring of service provision

There is currently no comprehensive performance monitoring of service provision at the national level due to the lack of standardised data and indicator collection system (see above). Nevertheless, as already mentioned, and as part of the NWSSP, the DNAPyS is implementing a performance monitoring system using synthetic performance indicators encompassing technical and economic efficiency.

In the provinces, regulatory authorities publish reports of regulated providers' performance indicators. However, these reports remain largely descriptive and include neither regulatory recommendations nor targets. While only a few regulators publish reports regarding their yearly operation (including information such as financial execution, administrative compliance, activities undertaken, etc.), the publication of performance indicators measuring progress in achieving the policy objectives of the regulator is not a common practice.

Figure 4.7. Synthesis of regulatory functions and gaps in water and sanitation services, Argentina



Policy recommendations

Provide a national overarching legal framework to support regulation consistency and set common water supply and sanitation policy criteria across the country

The development of a clear policy framework and underpinning legal and regulatory system that defines roles, allocates functions, powers and duties would help to get rid of

overlaps, unclear responsibility allocation and competition between national institutions in the water and sanitation services sector.

To overcome the heterogeneity of regulatory practices for water and sanitation services, a national law for drinking water and sanitation could provide an overarching legal framework to support consistency of regulation across the country and foster good regulatory principles in the water sector. Such a national law could provide "*national guidelines for water and sanitation services as a general framework from which each federated state defines its implementation and accepts as important principles the universality of access to services, efficiency and economic sustainability, transparency and social control; […] it [could set] the guidelines regarding the minimum requirements of the service quality; and provide the guidelines on institutional and regulatory aspects of the regulation and control of the provider entities*" (Saltiel et al., forthcoming). For instance, this national overarching framework could mention the human right to water and sanitation as approved by Resolution 12/8 of October 2009 by the United Nations Human Rights Council. Other examples from OECD federal countries, such as Australia, could be of inspiration to Argentina (Box 4.7).

Box 4.7. Australia's National Water Initiative pricing principles

The NWI pricing principles were developed in 2010 jointly by the Australian Government and state and territory governments to provide a set of guidelines or road map for rural and urban pricing practices and to assist jurisdictions to implement the NWI water pricing commitments in a consistent way.

In Australia, state and territory governments are primarily responsible for the policy, planning, management, and regulation of water resources. Usually more than one state or territory department is involved in the urban water sector in each jurisdiction, such as: health departments, which usually play a role in drinking water and recycled water regulation; environmental protection authorities, which are involved in environmental regulation related to wastewater discharge; treasury departments, which are involved in budgets, community service obligations, borrowing controls and dividend policy; and in some cases, government ministers who are responsible for setting water prices and other key decisions. Within that framework, the urban water sector's regulatory arrangements vary by jurisdiction, with independent economic regulators determining prices in some jurisdictions, while state and local government take on that role in others. Corporatised utilities rarely determine the prices of their services. The independent economic regulators set prices through a transparent process, involving community consultation and draft and final price determinations, with the aim of balanced service standards with cost recovery and a return on capital. While allowing the opportunity for review, price paths are generally set for a period of three to four years. Where there are small populations or widely dispersed communities, urban water and wastewater services provision have been the responsibility of vertically integrated government owned monopolies. This remains the case in South Australia, Western Australia, the Northern Territory and the ACT. Significant structural and ownership reform has taken place in recent years in some jurisdictions, which has changed the urban water supply structure. Since the 1990s, most metropolitan utilities have been corporatised, as have utilities in regional urban areas of Victoria and Tasmania. In the metropolitan areas of Sydney and Melbourne, structural reform has led to vertical separation of the bulk supply and retail–distribution functions of the supply chain. The

private sector is becoming increasingly involved in urban water supply and wastewater treatment.

Sources: OECD (2013), *Making Water Reform Happen in Mexico*, https://doi.org/10.1787/9789264187894-en.; Australian Department of Sustainability, Environment, Water, Population and Communities (2012), "National Water Initiative Pricing Principles" Water for the Future Policy and Programmes website, www.environment.gov.au/water/policyprograms/urban-reform/nwi-pricing-principles.html

A national law on water and sanitation could also help fill existing gaps – such as the information gap, as national legal provisions have proven useful in other countries to frame the collection of information on water services performance. In France, for instance, the Water Law of 2006 requested the establishment of an observatory (Observatoire des services publics d'eau et d'assainissement) to support the country's municipalities to: monitor water services; provide transparent information to consumers and citizens on tariffs and quality of services; and develop a database of service provision performance indicators. In Australia, the *Commonwealth* Water Act 2007 expanded the Bureau of Meteorology's water information functions that were allocated under the Meteorology Act 1955.

Align national and provincial water and sanitation services policy objectives through financial incentive mechanisms

To ensure the efficient implementation of the NWSSP, sound and standardised investment assessment should routinely be conducted, both for provincial and national investment projects. The functions of the BAPIN could be reviewed and strengthened to fulfil this task for national projects. This would help prioritise projects according to their cost-effectiveness and cost-beneficial contribution to the economy and society. It would also allow the effective channelling of national funds to ensure the best use of fiscal resources and external funding. The allocation of national funds based on *ex ante* assessment can be a fundamental governance tool to help align local investment projects with the NWSSP's objectives, thus increasing the enforcement capacity of the DNAPyS, and its subordinated institutions Plan Belgrano Agua, as well as of ENOHSA. The allocation of funds should be based on objective criteria, thus increasing legitimacy and predictability for public decision makers and investors, and reducing political discretion and interference. As such, this mechanism can be a powerful tool not only to foster efficient investment, but also to help utilities to get out of a low-level equilibrium (Box 4.8).

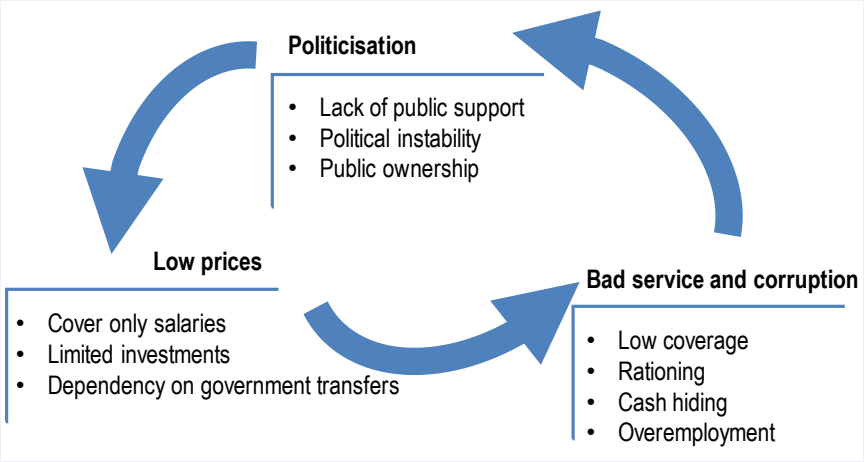
Moreover, the preparation of the PGRs by provincial operators should be made compulsory to obtain national funding. As the PGRs include planning and financial projections over a five-year period, they are essential tools to prioritise investment requiring national and provincial budget resources as well as to establish control and conditional mechanisms for granting the aforementioned transfers (Box 4.9) considering the compliance with performance and efficiency indicators (Saltiel et al., forthcoming). This conditional obligation should also cover the provision of performance data to feed the DNAPyS' Sectoral Information System. In this sense, recently the SIPH issued Resolution No. 44 (2 September 2019) to advance the implementation of PGRs and its information system throughout the country. The resolution delegates to the DNAPyS the design of the regulations to set the conditionality to access national funds as well as the monitoring of goals in PGRs.

Box 4.8. Low-level equilibrium concept and the big push

As described by Savedoff and Spiller (1999), the water and sanitation services sector in many developing countries is stuck in a so-called low-level equilibrium. In such situations, low tariffs are associated with low quality, low service expansion and general operational inefficiency. The term equilibrium indicates that without a reform of the sector's set up, there is no movement toward improved water services.

This phenomenon originates in incentives for governments to behave opportunistically. By lowering tariffs or resisting tariff increases, they can reap short-term political benefits such as electoral gains, so they will support the status quo over costly political actions that might involve increased water rates in the short run and yield diffuse benefits in the longer term. Moreover, consumers are relatively dispersed and too disorganised to assume an active role in holding the water authority accountable. They also are unwilling to spend more on poor quality services that are seen as wastefully managed. In turn, this creates incentives for water companies to operate inefficiently regardless of whether the services are provided by a public or a private company.

Figure 4.8. Low-Level Equilibrium Concept and the Big Push



In order to get out of the low-level equilibrium, various strategies can be implemented, such as improving the regulatory environment or limiting government opportunism. Following the low-level equilibrium trap theory developed by Nelson (1956), large investment programmes can act as a "big push" that enables underdeveloped sectors to get out of the low-level equilibrium trap and embark on a development path.

Source: World Bank (2017), *Joining Forces for Better Services? When, Why, and How Water and Sanitation Utilities Can Benefit from Working Together*, https://openknowledge.worldbank.org/handle/10986/28095?locale-attribute=es.

Box 4.9. EU conditionalities to align investment in water infrastructure with water policy compliance

Making federal funding of water infrastructure investments contingent on compliance with key legislative requirements can foster compliance with national policies. With the funding programme concerning the period 2014-20, the European Union supports the implementation of policies and legislation by providing financial incentives to member countries, applying *ex ante* conditionalities that member countries must fulfil in order to qualify for the provision of such financial support. This ensures that investments are coherent and consistent with EU legislation and policies. In fact, if *ex ante* conditionalities are not met, the European Commission can suspend any payments in their support.

Water-related investment under funds intended for water-related programmes and projects to support regional development are subject to an *ex ante* conditionality and a number of criteria related specifically to whether member countries satisfy the most essential requirements of EU water legislation. Requirements applicable to all water-related programmes include the existence of:

- compliant river basin management plans
- compliant water pricing policies
- a relevant monitoring network
- compliant environmental objectives and use of exemptions
- a summary of the programmes of measures that will deliver the objectives set.

Similarly, funds intended to support rural development are subject to an *ex ante* conditionality for payment of support for investments in irrigation systems, concerning the implementation of:

- a water pricing policy recovering environmental and resource costs
- the existence of a river basin management plan for the basin concerned
- the use of water metering
- a minimum requirement for water savings.

To be fair and effective, conditionalities should be attached to outcomes that are under the control of the parties, and cannot be affected by third-party failure. For instance, farmers should probably be able to receive funding to increase production or to meet environmental requirements, provided they comply with obligations incumbent on themselves, independently of whether their local public sector bodies comply with their obligations.

In Argentina, conditionalities could be used to better align investment planning at national level and investment projects implemented at provincial level. For example, it would be advisable that national funding for water and sanitation infrastructure is made available only for projects complying with the NWSSP objectives. Such compliance would have to be documented through thorough technical and economic analysis.

Source: OECD (2015d), *Water Resources Governance in Brazil*, https://doi.org/10.1787/9789264238121-en.; Peter Gammeltoft, former Head of Unit for Water at European Commission, Directorate General for the Environment.

Implement continuous and uniform information collection and performance monitoring

The continuous, consistent and standardised collection of information and data on the performance and efficiency of water and sanitation services across the country is a key asset for the development and improvement of the sector (Box 4.10). It can be used both to support the definition of public policies and business strategies and to evaluate the service actually provided to society to convey a reliable and regularly updated overview of the sector. Such an information system would be useful for the DNAPyS to design relevant water and sanitation services policy targets, produce mid-term reviews, and monitor achievements. It can also be used to implement result-based funding allocation for investment projects and be a central element for incentive mechanisms.

Box 4.10. Strategy monitoring, reporting and updating

Monitoring plays a key role in assessing and reporting the progress implementing a strategy. It provides stakeholders, at all levels, with key information regarding implementation progress and backlogs, allowing them to set up corrective actions whenever necessary. The monitoring process must be continuous, consistent, focused and disciplined.

Table 4.7. Characteristics of a monitoring process

Monitoring process characteristics	Operational translation
Continuous	Carried out on a yearly basis
Consistent	Use the same set and sources of data over time
Focused	Compare achievements with forecasted targets
Disciplined	Follow a specific and clear monitoring mechanism

Continuous process

In order to monitor the implementation and progress of a water and sanitation services national strategy plan, responsible institutions should provide an annual report detailing their achievements with regard to their assigned objectives.

Consistent process

Responsible institutions should use the same set and source of data to monitor and report the improvements and achievements on the ground with regard to their assigned strategic objectives. Indeed, clear standards for data reporting are critical for an effective monitoring.

Focused process

In the reporting, the progress achieved for each strategic objective shall be clearly detailed, compared and assessed against the forecasted targets for short, medium and long terms.

Disciplined process

Responsible institutions must follow a specific monitoring mechanism to report yearly to the line ministry.

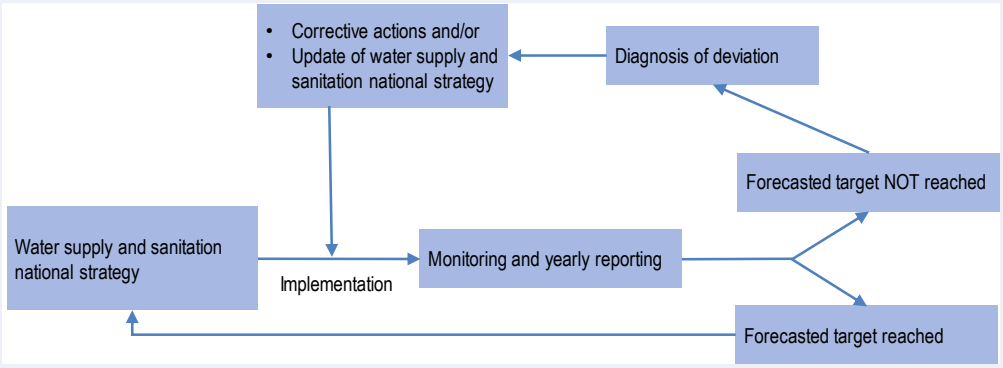
From monitoring to updating

The ultimate goal of the monitoring and reporting process of a water and sanitation services national strategy plan is to ensure that implementation of the plan and improvement on the ground are carried out and effectively happening as planned.

When the reporting prepared by the responsible institution shows a deviation between forecasted targets and the progress made on the ground, a diagnosis should be made clearly stating the magnitude and the reasons for the observed deviation. This diagnosis should also include and describe appropriate corrective actions to be undertaken to respond to eventual problems and issues that were evidenced and still ensure forecasted targets are reached. When necessary, targets may be adjusted, thus leading to an update of the strategy plan. It is important to distinguish corrective actions from strategy plan updating. Corrective actions are not intended to modify the strategic objectives of the water and sanitation services national strategy plan, but rather to modify the action to be undertaken to ensure the strategic goals are achieved. The strategy plan is to be updated only when corrective actions are thought to be insufficient to allow the responsible institutions to achieve the targets in due time and at forecasted costs.

At the end of each year, the line ministry shall consolidate the reporting of the various responsible institutions to produce an operational follow-up document highlighting the progress made to achieve all forecasted targets, and identifying the remaining gaps and the corrective actions to be implemented. This follow-up document also helps assess how effective the actions on the ground are to achieve the forecasted targets, and can be used to annually produce an updated version of the national strategy plan. Figure 4.9 illustrates the full updating process.

Figure 4.9. Updating process of the strategy plan



An information system on the performance of water and sanitation services can also be used at utility level to routinely report key performance indicators to the provincial regulatory entity in a uniform manner sufficiently complete and easy to interpret. For such a purpose, performance evaluation should be done according to the underlying policy objectives targeted by the regulator. Finally, these key performance indicators can also be used as steering tools by utilities themselves to monitor and gradually improve their performance (Box 4.11).

The set of indicators defined by the DNAySA could be supplemented with additional indicators to better reflect overall quality and performance of utilities. For instance, the following indicators should be and are planned to be added: continuity of service, collection

period, collection ratio, metering level, sewer blockages, pipe breaks, average revenue per cubic metre produced and sold. For further guidance on additional relevant indicators, useful examples can be found in the OECD report on *The Governance of Water Regulators* (2015c). In addition, a synthetic performance index could be built to give a quick and clear outlook of the performance of a utility compared to the rest of the sector. The National Drinking Water and Sanitation Information System contains data on 91 variables that allow calculating the main indicators considered in the main international and regional benchmarking systems (IBNET-World Bank, International Water Association (IWA), ADERASA, etc.).

Box 4.11. Examples of water performance indicators

In **Bulgaria**, the regulator collects performance information on the following 15 indicators which are listed in the Law on Regulation of the Water Supply and Sewerage Services (Chapter 3, Article 9):

1. penetration of water supply services
2. drinking water quality
3. non-interruption of water supply (uninterrupted water delivery and duration of disruptions)
4. total water losses in the water supply systems and time limits for the reduction thereof
5. breakdowns of the water supply system
6. pressure in the water supply system
7. penetration of sewerage services
8. quality of raw wastewater and of treated wastewater
9. breakdowns of the sewerage system
10. floods in properties of third persons caused by sewerage
11. operational indicators of efficiency
12. financial indicators of efficiency
13. time limit for reaction to written complaints by consumers
14. time limit for connecting new consumers with the water supply and sewer systems
15. staff size in proportion to the number of consumers serviced.

These 15 key indicators are further elaborated into 49 sub-indicators (*cf.* Annex No. 1 of the Ordinance of Long-term Rates, Terms and Conditions for the Formation of the Annual Target Levels of Quality Water and Wastewater Services) which are themselves further developed into 72 performance indicators (*cf.* guidelines to the implementation of the above

ordinance, Annex 2). The key indicators and their sub-indicators are part of the business plans of water and sanitation services operators in Bulgaria.

In **Peru**, 35 performance indicators are grouped into two high-level areas: provision of services and business management. Every high level has three sub-levels and two sub-levels, respectively. These are shown in Tables 4.8 and 4.9.

Table 4.8. Provision of services

Quality of service delivery	Billing	Affordability
Presence of residual chlorine	Average rate	Potable water coverage
Presence of thermotolerant coliform	Average billing	Sewerage coverage
Turbidity	Unit consumption measured	
Continuity	Unit volume billed	
Pressure		
Total density claims		
Wastewater treatment		

Table 4.9. Business management

Sustainability of services	Business efficiency
Working relationship	Non-revenue water
Replacement of fixed assets	Micrometering
Maintenance costs of infrastructure	Active connections billed by metering
Current liquidity	Default ratio
Indebtedness	Operating cost per unit volume produced
Interest coverage	Operating cost per unit volume billed
Operating margin	Produced water obtained from underground sources
Return on assets	Produced volume per unit
Return on equity	Staff costs per unit volume billed
	Sales and service costs per unit volume billed
	Density of breaks in the distribution networks of potable water
	Density of sewer blockages

Some of these performance indicators are used to set the management goals of the water companies. The main management goals are related to increasing coverage and improvement of the service quality, such as:

- household potable water connections
- household sewer connections
- annual increase in new water metres
- water unbilled
- pressure
- continuity
- wastewater treatment
- update of technical and commercial cadastre

- density of breaks in the distribution networks of potable water
- density of sewer blockages
- the tariff increases authorised by the regulator are subject to compliance of these management goals.

The Water Utility Performance Index (WUPI)

The WUPI is a simple index measuring how closely a utility company operates to accepted good practices. The index is based on ten dimensions generally accepted as key performance indicators in the industry and available from the IBNET dataset. These dimensions fall into three categories: coverage (water, sewer and wastewater treatment); quality (service continuity and sewer blockage); and management (metering, non-revenue water, staff productivity, collection rate and operating cost recovery). For each dimension, a score of 1-10 is computed measuring how close a given utility is to regional good practices. The sum of all scores gives the WUPI, with 100 (best practice on each dimension) being the best score.

Sources: OECD (2015c), *The Governance of Water Regulators*, https://doi.org/10.1787/9789264231092-en; Michaud, D. et al. (2015), *Water and Wastewater Services in the Danube Region: A State of the Sector*, http://documents.worldbank.org/curated/en/327761467999140967/Water-and-wastewater-services-in-the-Danube-region-a-state-of-the-sector.

Strengthen the independence of subnational regulators to lower the risk of political interference

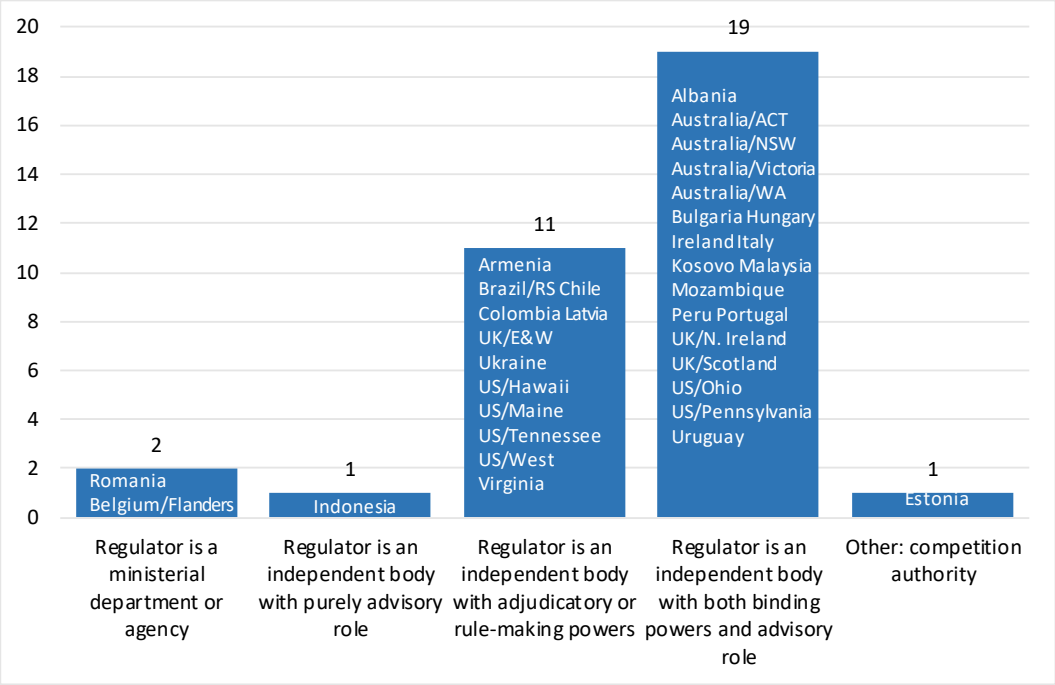
In a fragmented, decentralised and politicised sector such as water and sanitation services, a certain degree of independence (or distance from political appointees) helps to overcome political interference in key decisions such as tariff regulation, for instance. However, it is not clear to what extent a subnational body would manage to achieve the necessary level of independence. *De jure* independence is achieved through explicit reference in the law. *De facto* independence of regulators is ensured through a mix of governance features and operational modalities. These involve independent decision making, i.e. decisions that are taken without being subject to government assessment; staffing based on technical grounds rather than political criteria; protection of the board and top management from political interferences; and a budget which does not depend primarily on the government (Boxes 4.12 and 4.13).

Box 4.12. Level of autonomy of water regulators

A majority of water regulators surveyed can be defined as independent regulatory body. Exceptions include Romania, where the regulator is an authority subordinated to a minister. In Belgium/Flanders the regulator is a sub-entity of a Governmental agency and has mainly an advisory role. In the case of Indonesia the regulatory body is independent but has a pure advisory capacity. In Estonia, the regulatory duties for WWS have been vested to the competition authority.

Figure 4.10. Status of the regulatory agency

(Number of regulators/34)



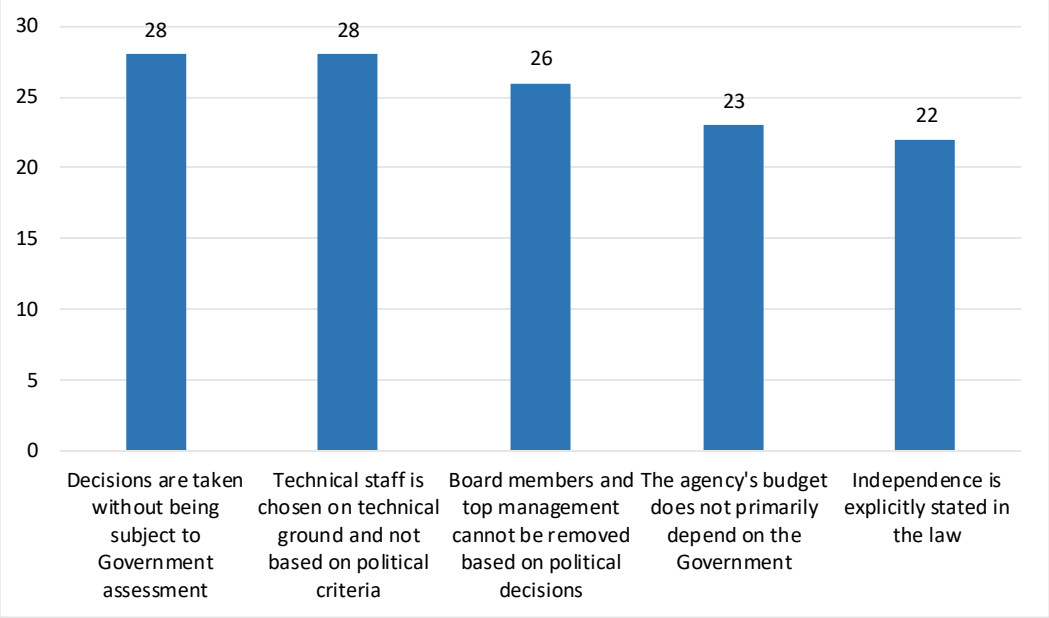
Source: OECD (2015c), The Governance of Water Regulators, https://doi.org/10.1787/9789264231092-en.

De jure independence through explicit reference in the law is achieved for 22 regulators. De facto independence of regulators is ensured through a mix of governance features and operational modalities. These involve independent decision making, i.e. decisions that are taken without being subject to government assessment (28 regulators); staffing based on technical grounds rather than political criteria (28 regulators); protection of the board and top management from political interferences (26 regulators); and a budget which does not depend primarily on the government (23 regulators). In 13 cases, the regulator

combines both de jure and all de facto conditions, achieving, at least on paper, the organisation most likely to ensure independence.

Figure 4.11. Ensuring independence from political influence

(Number of regulators/33)



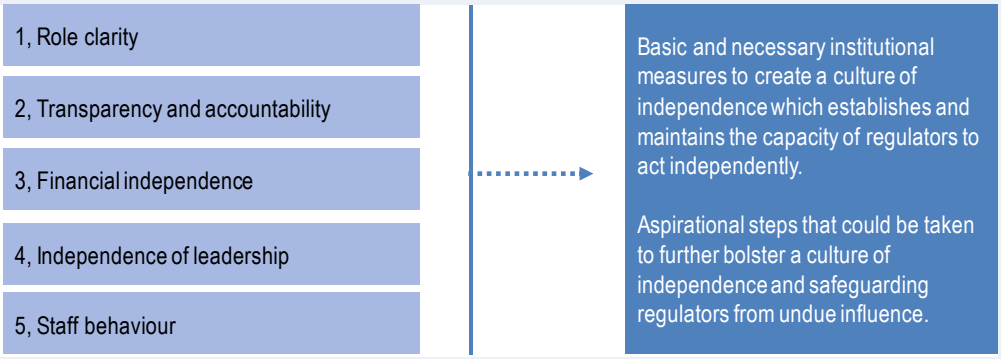
Source: OECD (2015c), *The Governance of Water Regulators*, https://doi.org/10.1787/9789264231092-en.

Box 4.13. Creating a culture of independence

Independence comes in two forms: *de jure* independence refers to the formal independence granted by law, whereas *de facto* independence promotes practical independence as shown by actions, decisions and behaviours. The OECD has produced guidance on how to establish and implement independence with regulators (OECD, 2017).

The guidance identifies five dimensions of independence (Figure 4.12).

Figure 4.12. The five dimensions of independence of regulators



Each of the five dimensions includes practical guidelines that can be considered as the basic and necessary institutional measures to create a culture of independence which establishes and maintains the capacity of regulators to act independently, based on an analysis of regulators' institutional processes and practices within the OECD Network of Economic Regulators. The guidelines also include a set of aspirational steps that could be taken to bolster a culture of independence and safeguarding regulators from undue influence.

Source: OECD (2017), *Creating a Culture of Independence: Practical Guidance against Undue Influence, The Governance of Regulators*, https://doi.org/10.1787/9789264274198-en.

Strengthen and promote vertical and horizontal co-ordination

Co-ordination is one of the building blocks for the attainment of regulatory goals. Also, co-ordination can provide a platform to share experiences and innovate regarding good regulatory practices at the subnational level and help increase expertise and deal with common problems. The *2012 Recommendation of the OECD Council on Regulatory Policy and Governance* states that countries should "*promote regulatory coherence through co-ordination mechanisms between the supranational, national and subnational levels of government. As an important component of co-ordination, better communication between levels of governments may help to prevent conflicts and duplication of regulation*" (OECD, 2012).

Vertical co-ordination between national and provincial levels

Repeated reference has been made to co-ordination problems between national and provincial levels in Argentina, especially in a context of high decentralisation. In order to overcome these vertical co-ordination issues, the DNAPyS, within the framework of a technical cooperation with the IDB, has recently completed guides to assist provincial and municipal providers to design tariff regimes and set tariffs as well as to implement regulatory accounting. Nevertheless, it seems necessary to strengthen these efforts and go beyond this initiative. The creation of an entity that brings together regularly the DNAPyS and provincial departments in charge of water and sanitation services policies could help overcome vertical co-ordination issues. Such an entity, similar to the Federal Water Resources Council, would offer a place for the definition and co-elaboration of policy priorities for water and sanitation services, thus fostering consensus and diffusing potential conflicts. This entity would also be the place to jointly address critical issues affecting the

sector and to build shared financial instruments and policies. In order to avoid any overlapping, the entity's functions would be strictly limited to drinking water and sanitation services. Another option could be to restructure the Federal Water Resources Council to include water and sanitation services within the scope of its competence (Saltiel et al., forthcoming). This formal co-operation mechanism would secure inter-governmental agreements and nation-wide policy arrangement.

Horizontal co-ordination at provincial level

Further efforts should be made to enhance horizontal co-ordination at provincial level to address capacity gaps. The role and activities offered by the Association of Argentinian Regulators of Water and Sanitation Services (AFERAS) to its members should be enlarged and reinforced. The same could be applied to the Federal Council of Sanitary Services Entities (Consejo Federal de Entidades de Servicios Sanitarios, COFES), which brings together the water operators from the whole country. Such associations are key stakeholders that can remedy capacity challenges by providing knowledge exchange activities through conferences or workshops. In particular, they can help foster evaluation, bench-learning processes, training and capacity-building activities for their members. Sometimes, they can also do some lobbying and advocacy work, or provide input for technical standards and setting guidelines (Table 4.10). Local, national and international fora where water officials can exchange practices and lessons learnt are also crucial. The participation in international networks, closer co-ordination with academia to develop tools and instruments, and further co-operation with universities are also options. International donors can provide financial support for the development and actions of these professional associations. Capacity can also be reinforced through collaboration with local universities, which can offer specific trainings to improve the skills of professionals and practitioners. They can also provide tailored research work using operators' data and focusing on issues of key interest and importance for operators.

The regulation of the water and sanitation sector emerged in Argentina at the beginning of the 1990s, simultaneously with the privatisation of services. When the concessions were terminated, the National state hired international consulting services to design the new regulatory bodies and train its managers and officials. A generational change is presently taking place in the country, as those officials reach retirement age, and young professionals are being incorporated. It is important that the experience accumulated over the past decades can be transferred to the new generation through appropriate knowledge management processes and tools. Therefore, regulatory bodies must devote and sustain resources to develop skills through career plans for young professionals to promote greater professionalisation and enhance the effectiveness of regulation.

Table 4.10. Overview of water associations and the services they offer to their members in the Danube region

Country	Name	Scope	Year of creation	Full-time staff	Services offered					
					Training	Technical assistance	Knowledge exchange	Lobbying and advocacy	Public relations	Standards setting
Albania	SHUKALB	Water and wastewater	2005	5	✓		✓	✓	✓	
Austria	OVGW	Water	1881	15	✓	✓	✓	✓	✓	✓
	OWAV	Wastewater	1909	8	✓	✓	✓	✓	✓	✓
Bosnia and Herzegovina	VRS	Republika Srpska	2001	3	✓	✓	✓	✓	✓	
	UPKP	FBiH/utility services	1999	1	✓	✓	✓	✓	✓	
Bulgaria	BWA	Water and wastewater	2001	5			✓	✓	✓	
Croatia	GVIK	Water and wastewater	1972	-	✓	✓	✓	✓		
Czech Republic	SOVAK	Water and wastewater	1989	5	✓	✓	✓	✓	✓	
Hungary	MAVIZ	Water and wastewater	1990	10	✓		✓	✓	✓	
Kosovo	SHUKOS	Water and wastewater	2001	3	✓		✓	✓		
North Macedonia	ADKOM	Municipal services	2004	2	✓		✓	✓	✓	
Moldova	AMAC	Water and wastewater	2000	10	✓	✓	✓	✓	✓	✓
Montenegro	UVCG	Water and wastewater	1999	1	✓	✓	✓	✓	✓	✓
Romania	ARA	Water and wastewater	1995	25	✓	✓	✓	✓	✓	✓
Serbia	WSAS	Water and wastewater	2011	-	✓	✓	✓		✓	✓
	UTVSI	Water professionals	1960	5	✓	✓	✓	✓	✓	✓
Slovak Republic	AVS	Water and wastewater	2004	2	✓	✓	✓	✓	✓	
Slovenia	CCIS	Chamber of commerce	1851	2			✓	✓	✓	
Ukraine	UWA	Water and wastewater	1995	9	✓	✓	✓	✓	✓	✓

Source: Michaud, D. et al. (2015), *Water and Wastewater Services in the Danube Region: A State of the Sector*, http://documents.worldbank.org/curated/en/327761467999140967/Water-and-wastewater-services-in-the-Danube-region-a-state-of-the-sector

Support autonomous, efficient and financially sustainable water and sanitation services operators

Decentralisation shifts control rights of water and sanitation services over service distribution to local government. With limited political contestability of local elections, political interference may serve to slacken efforts to improve public services. In that case, accountability, efficiency and equity in service delivery may worsen. Overcoming political interference requires pursuing and strengthening the trend to make water utilities more efficient, self-sustained and performance-oriented. Box 4.14 describes some of the key

responsibilities of service providers, as developed in the Lisbon Charter. The section below suggests steps that could be taken to strengthen operators, focusing on: corporatisation, organisation and management; accountability and stakeholder engagement; and financial sustainability.

Box 4.14. The Lisbon Charter, Guiding the public policy and regulation of drinking water supply, sanitation, wastewater management services

Responsibilities of the service providers

As key stakeholders of this sector, service providers, whether public or private, should effectively and efficiently ensure equitable, universal supply of the services, as a fundamental contribution to the wellbeing of society.

Regardless of their organisational structure and management model, service providers should:

[…]

Article 5.2
Improve operational efficiency, adopting an optimal type of organisation for the local context, particularly in relation to staff management, the gathering and sharing of information, administrative routines, financial resources, planning, accounts, budget and quality insurance; […]

Article 5.5
Contribute to human resources capacity development and innovation in service delivery through cooperation with other bodies, as essential factors to ensure overall quality of service provision;

Article 5.6
Verify the integrity of their processes by appropriate monitoring, reporting and auditing, keeping track of information and conducting suitable and auditable accounting, in accordance with the requirements of the regulatory authority in particular. This includes providing reliable information to support the design of appropriate public policies and business strategies, as well as to evaluate the service that is provided to society.

Source: IWA (2015), *The Lisbon Charter, Guiding the public policy and regulation of drinking water supply, sanitation, wastewater management services*, https://iwa-network.org/publications/the-lisbon-charter/

Corporatisation, organisation and management

Corporate governance of utilities should ensure a clear separation of functions and responsibilities between utilities and local governments. This would help promote transparency and accountability, and avoid political interference. *"State-owned enterprises should observe high standards of transparency and be subject to the same high quality accounting, disclosure, compliance and auditing standards as listed companies. […] The boards of SOEs should have the necessary authority, competencies and objectivity to carry out their functions of strategic guidance and monitoring of management. They should act with integrity and be held accountable for their actions."* (OECD (2015a), *OECD Guidelines on Corporate Governance of State-Owned Enterprises*).

Moreover, in the case of state-owned utilities, as in Argentina, the state should act as an informed and active owner, ensuring that the governance of state-owned enterprises is carried out in a transparent and accountable manner, with a high degree of professionalism and effectiveness (Box 4.15).

In this regard, it is worth mentioning the Administrative Decision 85/2018 of the Office of the Cabinet of Ministers of the National Government that approved the "Guidelines for Good Governance of Companies with Majority State Participation in Argentina", and the Decree PEN 202/17 stating the procedure to be carried out in case of conflict of interest of any person in charge of public procurement or license, permit, authorization granting over a public or private domain. Both regulations follow the guidelines established by the Inter-American Convention against Corruption and the United Nations Convention against Corruption, as well as the standards set by the OECD.

Box 4.15. The state's role as an owner

Governments should simplify and standardise the legal forms under which state-owned enterprises (SOEs) operate. Their operational practices should follow commonly accepted corporate norms.

The government should allow SOEs full operational autonomy to achieve their defined objectives and refrain from intervening in SOE management. The government as a shareholder should avoid redefining SOE objectives in a non-transparent manner.

The state should let SOE boards exercise their responsibilities and should respect their independence.

The exercise of ownership rights should be clearly identified within the state administration. The exercise of ownership rights should be centralised in a single ownership entity, or, if this is not possible, carried out by a co-ordinating body. This "ownership entity" should have the capacity and competencies to effectively carry out its duties.

The ownership entity should be held accountable to the relevant representative bodies and have clearly defined relationships with relevant public bodies, including the state supreme audit institutions.

The state should act as an informed and active owner and should exercise its ownership rights according to the legal structure of each enterprise. Its prime responsibilities include:

1. Being represented at the general shareholders meetings and effectively exercising voting rights.
2. Establishing well-structured, merit-based and transparent board nomination processes in fully- or majority-owned SOEs, actively participating in the nomination of all SOEs' boards and contributing to board diversity.
3. Setting and monitoring the implementation of broad mandates and objectives for SOEs, including financial targets, capital structure objectives and risk tolerance levels.
4. Setting up reporting systems that allow the ownership entity to regularly monitor, audit and assess SOE performance, and oversee and monitor their compliance with applicable corporate governance standards.

5. Developing a disclosure policy for SOEs that identifies what information should be publicly disclosed, the appropriate channels for disclosure and mechanisms for ensuring quality of information.
6. When appropriate and permitted by the legal system and the state's level of ownership, maintaining continuous dialogue with external auditors and specific state control organs.
7. Establishing a clear remuneration policy for SOE boards that fosters the long and medium-term interest of the enterprise and can attract and motivate qualified professionals.

Source: OECD (2015a), *OECD Guidelines on Corporate Governance of State-Owned Enterprises*, https://www.oecd.org/corporate/guidelines-corporate-governance-soes.htm.

Accountability and stakeholder engagement

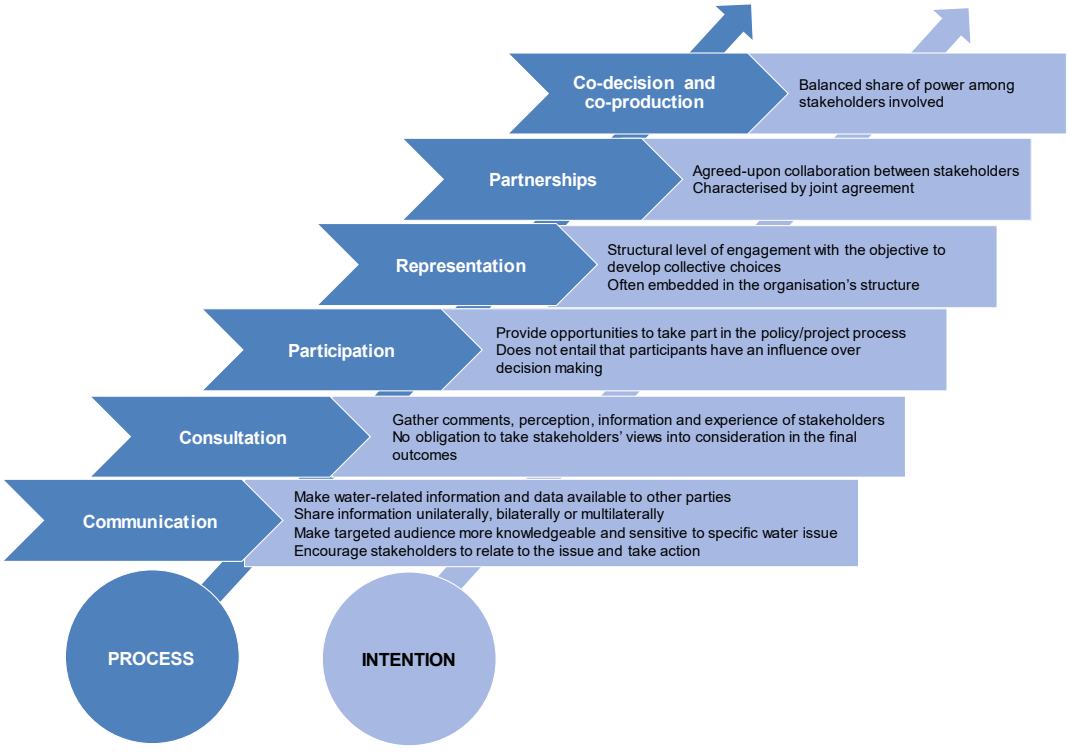
Accountability and transparency are the foundations of trust for economic regulators, but also a mechanism to align expectations between regulators and stakeholders. The main message is that compulsory or self-imposed practices in accountability and transparency promote the decision-making process and provide elements to lower the risk of regulatory capture.

Workers, administrative and managerial personnel of the operators are an important and strong stakeholder that should not be overlooked. They are grouped into unions in their respective provinces and are gathered in turn into the powerful National Federation of Sanitation Workers (Federación de Trabajadores de Obras Sanitarias, FENTOS). As mentioned previously, unions are shareholders of utilities and are represented in the boards of directors. The unions have a strong leadership capacity over the utilities personnel so that the managers of the operators shall accompany with a strong commitment the implementation of institutional reforms and new regulations designed by the national and provincial governments to face the sector's future challenges. This is particularly true for the implementation of procedures and instruments required to strengthen corporate governance, improve operational efficiency as well as transparency and competitiveness of public purchase.

Accountability is presently low in the water and sanitation sector in Argentina. To address this issue, it is possible to strengthen the short route of accountability between customers and service providers by enhancing customer engagement mechanisms. To do so, utilities may internalise accountability mechanisms in their routine processes. These internalised mechanisms are helpful for depoliticising the provision of services, as they can create a "counterweight to the power of the owner" and help prevent political interference (Van Ginneken and Kingdom, 2008).

Despite the existence of several national laws on access to information in Argentina, there is low/insufficient engagement between water and sanitation services users and operators. Strengthening users' participation in water utility consultative bodies and in water decision making is a necessary step and an essential accountability mechanism to ensure effective and efficient public services. There are various possibilities of engagement processes between customers and service providers, ranging from communication to co-decision and co-production (Figure 4.13). International experience provides interesting examples of how other countries have engaged customers in decisions on water issues (Boxes 4.16, 4.17 and 4.18).

Figure 4.13. Level of stakeholder engagement



Source: OECD (2015b), *Stakeholder Engagement for Inclusive Water Governance*, https://doi.org/10.1787/9789264231122-en.

Box 4.16. Stakeholder engagement in the Portuguese water sector

Currently, the institutional framework in Portugal includes the regulatory authority (ERSAR), the environmental and water resources authority (Portuguese Environment Agency), the public health authority (Directorate General for Health), the consumer protection authority (Directorate General for the Consumer), the competition authority (Competition Authority) and the financial support management authority.

The success of the Portuguese public policy owes much to the good articulation between the aforementioned state-level bodies and the municipalities, but also to the participation of other stakeholders. The Portuguese National Water Council is the consultation body, independent from the government, where public administration bodies, municipalities, operators, consumers, non-governmental organisations, experts, research centres, universities and representatives from business associations engage to discuss the Portuguese public policies for water. This forum contributes to the coherence between the sector and regional interests and is a relevant platform to promote discussion over the public policy and the national water plans. In the case of water services, two other consultative bodies are in place – the Consultative Council and the Tariff Council – both within the regulatory framework. The inclusion of all relevant stakeholders in policy making is part of a co-operative environment, which highlights and explains the existence of a broad

consensus in the Portuguese water sector and in the Portuguese society about the fundamentals of the public policy for water.

Source: ERSAR (2017), *The Portuguese Public Policy for Water Services (1993-2016)*.

Box 4.17. South Australia: Water and sewerage revenue regulatory determination process

In South Australia, the economic regulator, the Essential Services Commission, has introduced a high level of engagement by consumers, consumer experts and other regulators in the process for setting the revenues for the water and sewerage service provider, SA Water (a state-owned monopoly service provider). It undertakes this process every four years, with the determination fixing service standards and revenue caps for SA Water of a forward-looking basis.

The overall objective of the regulatory determination process is to ensure that SA Water provides the water and sewerage retail services valued by its customers at the lowest sustainable cost.

The regulatory determination review process has a strong focus on transparency, raising publicly issues for consideration very early in the process and involving a significant amount of direct customer testing and negotiation in the preparation of SA Water's draft business plan. That plan is ultimately submitted to the commission for review (and can be approved, approved with modification or substituted with the commission's own independent determination, based on the commission's assessment after a further public review process).

While the commission remains responsible for making the final regulatory determination, the review process will involve multiple opportunities for stakeholders to be involved prior to that final determination. Input from a diverse range of stakeholders is important, as it helps the commission to take better-informed and more inclusive decisions.

Guidance notes

To assist all participants in the process (SA Water, consumer groups, the media, the government, etc.), at the commencement of the regulatory process the commission publishes a series of guidance notes.

Those notes are publicly available and explain the process, methodological issues, past and expected future service performance and outcome, and also identify likely key issues. The papers provide any early opportunity for education and engagement by all stakeholders in the process.

Consumer Experts Panel

The Consumer Experts Panel draws on the collective knowledge, skills, expertise and experience of the commission's Consumer Advisory Committee and SA Water's customer advisory groups, sitting jointly as a Consumer Experts Panel.

The commission acknowledges and recognises the value that members of those committees bring to the regulatory system in South Australia, developed through some 20 years of utility regulatory experience. Through the panel the commission is looking to capture and

support that value, and to provide a meaningful and ongoing role for consumer representatives and advocates in South Australian regulatory processes.

The key purpose of the Consumer Experts Panel is to allow members to identify and raise the issues that are important to the customers they represent – particularly through a public priorities report. The commission provides members with the resources and opportunity to have their views heard through a more efficient, effective and inclusive regulatory consultation process, including the capacity to commission research (through the commission), on relevant areas of inquiry which would benefit the regulatory determination review process and the outcomes for SA Water's customers and the community.

The evidence, and other outputs, from these joint issue identification and prioritisation exercises will be provided to SA Water's Board and to the Negotiation Forum (see below) and will be a critical input to the process. The Consumer Experts Panel will help to ensure that the proposed business plan that SA Water submits to the commission has been prepared with a sound understanding of the key issues raised by members.

Negotiation Forum

The Negotiation Forum will ensure that the draft business plan submitted by SA Water to the commission has been thoroughly tested by a wide range of stakeholders. The Negotiation Forum is comprised of a Customer Negotiation Committee, a team from SA Water (the chief executive and two other senior executives) and an independent probity advisor (appointed by the commission).

The Customer Negotiation Committee comprises an independent chairperson, a member of the Consumer Experts Panel and a member of SA Water's ongoing Customer Working Group. Its task is to elicit and represent the perspectives, preferences and priorities of SA Water's diverse customer base in the Negotiation Forum to test SA Water as it prepares its proposed business plan for the next regulatory period.

Through the Negotiation Forum, the Customer Negotiation Committee and the SA Water team are expected to discuss, deliberate and, where possible, reach a common position of draft regulatory positions put forward by SA Water. The process is one of transparency and challenge. While the positions reached are not binding on the commission or SA Water, they are persuasive and informative in the regulatory process – where it can be seen that there has been thorough transparency, testing and agreement, the positions reached are more likely to be accepted by the commission.

The Customer Negotiation Committee is expected to:

- understand and operate within the regulatory and legislative framework that applies to the decisions the commission will take in SAW RD20 about SA Water's retail services and provide its advice consistent with these requirements
- understand SA Water's strategic direction and priorities, the broader regulatory and legislative requirements around the retail services it provides, past performance outcomes, future service delivery challenges, opportunities, and investment needs
- understand current customer and regulatory priorities, as evidenced through the Consumer Experts Panel priorities report and representations made by or available from other regulators, including but not limited to the members of the Regulators Working Group

- elicit, understand and represent the perspectives, preferences and priorities of SA Water's diverse customer base on the matters subject to the negotiations
- constructively test and negotiate with the SA Water Negotiation Team with a view to agreeing on the matters to be included in SA Water's proposed business plan that will provide water and sewerage services at the lowest sustainable price for the quality and reliability levels valued by customers.

The Customer Negotiation Committee is responsible for negotiating SA Water's proposed business plan. There will be some aspects of SA Water's plan that are non-negotiable, such as whether or not it should undertake activities to comply with the requirements of its regulators. It may, however, test SA Water on whether or not it has proposed the lowest sustainable cost of delivering the activities to meet regulatory requirements.

Regulators Working Group

Some of the requirements for SA Water's drinking water and sewerage retail services are set by other regulators. This includes requirements around economic, environmental, public health, social and technical regulation outcomes that SA Water must achieve. Meeting all of these requirements constitutes the "basic" or "minimum" service SA Water must provide.

The commission has convened a Regulators Working Group to provide a forum for the various regulators to co-ordinate in achieving positive outcomes for the South Australian community through their combined regulation of SA Water.

The Regulators Working Group will continue to work together in the lead up to and throughout the 2020-24 regulatory period to jointly monitor and evaluate SA Water's performance in meeting its overall regulatory requirements.

The members of the Regulators Working Group commit to:

- working together to promote the best long-term outcomes for SA Water's customers and the community
- communicating openly to ensure a shared understanding of the overall regulatory system that applies to SA Water, the impact of regulation on each other's priorities and the combined effect of regulation on SA Water and its customers.

Public consultation

In addition to the able processes, the commission undertakes its own consultation once it has received a draft business plan from SA Water. This has two stages: 1) seeking comments on the draft plan generally and, once submissions have been received and analysed, 2) seeking comments on a draft regulatory determination. Both stages are open and transparent, and the commission explains in its decision documents how it has responded to any submissions received.

Sources: OECD (2015b), *Stakeholder Engagement for Inclusive Water Governance*, https://doi.org/10.1787/9789264231122-en; ESCOSA (2019), *Essential Services Commission of South Australia*, https://www.escosa.sa.gov.au/industry/water/retail-pricing/sa-water-regulatory-determination-2020, (accessed on June 2019)

Box 4.18. Collaborative and consumer-centric tariff-setting process in Scotland

In Scotland, the framework for setting water charges has gradually moved from a traditional, and at times adversarial, price-setting process between regulator and regulated entity, to an innovative approach that is highly participatory and involves customers in decision-making. This shift reflects the changing role of regulators in an increasingly complex environment where citizens' and consumers' demands, risks and uncertainty around long-term societal, economic and environmental impacts highlight the growing importance of mediation and collaboration.

Following three regulatory cycles (2002-2006, 2006-2010 and 2010-2015) aimed at improving the efficiency of Scottish Water, the sole water and wastewater provider, and complying with national and international standards, the focus of the Water Industry Commission for Scotland (WICS), the independent economic regulator overseeing the sector, has progressively shifted towards ensuring that overall performance and levels of service were consistent with consumer views and priorities.

For the Strategic Review of Charges (SRC) for the six-year period 2015-2021, further innovation was introduced to ensure that customer's views were at the heart of the regulatory process. This took the form of the creation of a 'Customer Forum', which was tasked with negotiating directly with Scottish Water on the outcome of its business plan, within acceptable ranges set by WICS. Outcomes of this process included: agreeing on a price cap in constant nominal prices; the use of the consumer price index more easily understood by customers as a measure of inflation than the retail price index; higher level of capital efficiency with Scottish Water, and; three new performance indicators that would take into account the customers' experience of the service provided.

The on-going Strategic Review of Charges for the period 2021-2027 has widened stakeholder participation to monthly meetings in which the regulators, the Scottish government, the water company and customer representatives discuss the emerging building blocks of the SRC. The current review has seen further innovation in the form of more targeted customer research, such as using behaviourally-informed experiments to better gauge the true preferences of consumers and the determination of investment and maintenance needs based on an improved understanding of asset conditions.

Sources: OECD own analysis and based on Water Industry Commission for Scotland (2017a) Innovation and Collaboration: future proofing the water industry for customers, Methodology for the Strategic Review of Changes 2021-2027, April 2017; Customer Forum (2015), The Customer Forum for Water in Scotland – Legacy Report – Lessons Learned from customer involvement in the 2015-21 Strategic Review of Charges; Heims. E. and Lodge, M. (2016) "Innovation through customer engagement and negotiated settlements in water regulation. Towards a transformed regulatory state?" carr discussion paper 83. London: London School of Economics and Political Science; Hendry, S. (2016) The Customer Forum – Putting customers at the centre of regulating water services. Water Policy. doi:10.2166/wp.2016.199 Littlechild, S. (2014) The Customer Forum: customer engagement in the Scottish water sector, Util. Policy, 31 (2014), pp. 206-218.

Addressing financial sustainability

The revenues from water tariffs do not cover the costs of the water sector in Argentina. This is partly a consequence of the real costs not being reflected in the price of water and the fact that there is a large amount of non-revenue water (NRW) and in some cases a low staff efficiency. Nevertheless, financial sustainability of water and sanitation services crucially depend on revenues raised through tariffs (in addition to subsidies) to cover

operation and maintenance costs (Box 4.19). The politicisation of tariff setting is an important barrier to a more effective use of tariffs to promote financial sustainability. For instance, making tariff regulation transparent and disclosing information and technical reports on the use of revenues would help to build a more consensual understanding on the link between tariffs and sustainability of service provision. In addition, operators should not only approach cost recovery through increases in tariff levels, but they should also in priority seek efficiency gains, as there are many areas for improvement (staff efficiency, NRW, metering level, energy costs, etc.). Moreover, a sound accounting system should be put in place to enable an optimal accounting management and a documented tariff calculation (as mentioned throughout this Chapter, DNAPyS has started to implement some actions in this direction). Changes in the tariff structure (towards more progressive schemes) could also be explored in areas where the metering level is high. As the metering level increases, the "*canilla libre*" system should progressively be abandoned, as it prevents tariff from reflecting the real costs of service provision and does not incentivise operators to be more efficient In addition, the improvement of providers' financial sustainability should go along with a fine-tuning of the subsidy systems to target efficiently vulnerable and disfavoured populations. This subsidy system should be designed carefully to avoid or at least minimize errors of exclusion and inclusion.

Box 4.19. Setting tariffs

Setting the right tariffs for domestic water use is a challenging task. In many cases, utilities do not know the cost of the service and operate inefficiently, which adds costs to the provision of services. In addition, from a political standpoint, charging below cost can be seen as paying off. However, it is in general counterproductive. When tariffs are set below cost recovery, the provider must either rely on government subsidies or cut back on service, maintenance and investment. Generally, tariffs that are below the costs (at least of operation and maintenance) result in poor service, asset deterioration and an inability to invest to meet growing demand. The role of regulation in tariff setting is to bring tariffs up to a sustainable cost recovery level in which a variety of objectives, e.g. economic efficiency and affordability of services for lower income households, is reconciled (OECD, 2009). There are four main objectives embedded in the design of water and sanitation tariffs: 1) environmental conservation; 2) financial sustainability; 3) economic efficiency; and 4) social fairness (OECD, 2010). In order to accommodate these objectives, three dimensions of tariffs policy are relevant: tariff levels, tariff structure, and the tariff setting and revision process.

- Financial sustainability: Water tariffs are a key element of long-term financial sustainability of water operators and of systems. Low levels of tariffs, coupled with inadequate compensation from other sources of revenue – typically taxes (and international transfers in developing countries) – over the long run lead to a vicious circle of bad maintenance and deterioration of services that affect users' willingness to pay and might, in turn, induce a decrease in bill collection rate and further reduction of revenue for the sector.
- Economic efficiency: Prices provide important signals to providers and users that drive economic efficiency, i.e. that allow allocating water with priority to uses with the highest value to society and service provision at the cheapest costs.
- Environmental conservation: Appropriate pricing of water supply and sanitation services contributes to environmental conservation when it is used to manage

demand and discourage "excessive" uses of water. To this effect, increasing block tariffs are typically used.

- Social fairness: Social fairness generally implies that the water tariff treats similar customers equally, and that customers in different situations are not treated the same. Social fairness accommodates affordability concerns, i.e. poor households are able to obtain adequate supplies of clean water. In practice, however, the debate on whether tariffs are the appropriate tool to address affordability concerns is lively. Increasing block tariffs, the traditional policy tool used to achieve social objectives, have raised many criticisms as they may not be appropriate if poor households consume more water than richer ones and if the poor are not connected to the water systems. Cross-subsidies have shown limitations over time when shifts in the balance between subsidised and subsidisers were not anticipated. Targeted subsidies for water consumption have also been criticised on the ground, pointing out that precise targeting requires good administrative capacity. Subsidies supporting connections to water networks have proved more helpful for the poor than subsidies to water consumption.

Source: OECD (2013), *Making Water Reform Happen in Mexico*, https://doi.org/10.1787/9789264187894-en.

Notes

[1] https://www.argentina.gob.ar/modernizacion/gobiernoabierto/cuartoplan

[2]. This unit is in charge of water supply and sanitation works supervision and prioritisation, and sector strengthening in the northern provinces of the country (Catamarca, Chaco, Corrientes, Formosa, Jujuy, La Rioja, Misiones, Salta, Santiago del Estero and Tucumán).

[3]. https://www.indec.gob.ar/ftp/cuadros/sociedad/engho_2017_2018_resultados_preliminares.pdf.

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Annex 4.A. Case study: Metropolitan Area of Buenos Aires

Key facts and features

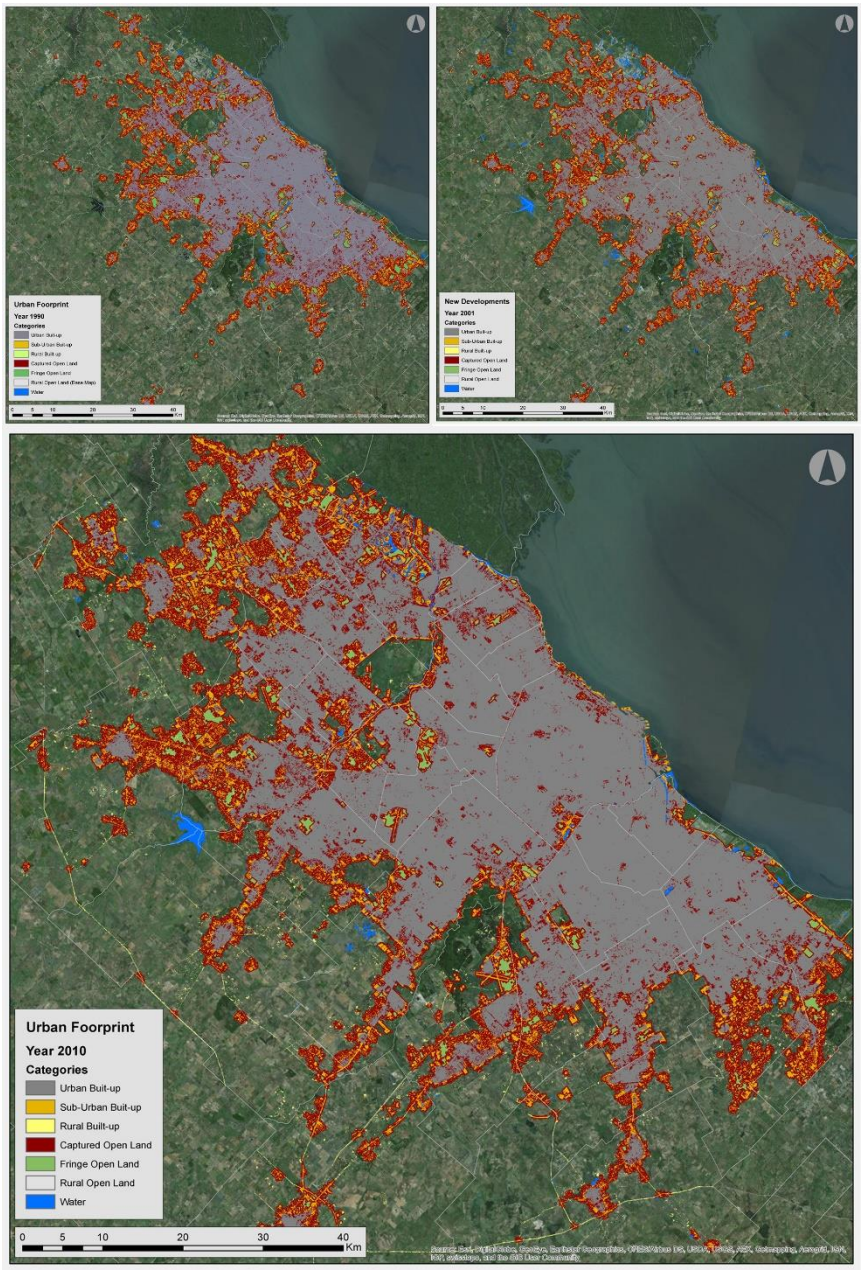
Box 4.A.1. Key data for the province of Buenos Aires

- The Metropolitan Area of Buenos Aires (Área Metropolitana de Buenos Aires, AMBA) is an urban area encompassing the Autonomous City of Buenos Aires (Ciudad Autónoma de Buenos Aires, CABA) and the following 40 municipalities of the province of Buenos Aires: Almirante Brown, Avellaneda, Berazategui, Berisso, Brandsen, Campana, Cañuelas, Ensenada, Escobar, Esteban Echeverría, Exaltación de la Cruz, Ezeiza, Florencio Varela, General Las Heras, General Rodríguez, General San Martín, Hurlingham, Ituzaingó, José C. Paz, La Matanza, La Plata, Lanús, Lomas de Zamora, Luján, Malvinas Argentinas, Marcos Paz, Merlo, Moreno, Morón, Pilar, Presidente Perón, Quilmes, San Fernando, San Isidro, San Miguel, San Vicente, Tigre, Tres de Febrero, Vicente López and Zárate.
- Population: 12 806 866 (2010), which represents 82% of the population of the province of Buenos Aires (15 625 084). The population of the province of Buenos Aires represents 39% of the total population of Argentina.
- The weather of the area is influenced by the ocean, with hot summers and temperate winters. Precipitations are abundant and distributed throughout the year, ranging from 750 to 1 100 mm.

This megacity covers 13 285 km^2 and extends from Campana to La Plata, with a physical western limit of the Río de la Plata. The territory is an undulating plain crossed by numerous water courses that flow into the Río de la Plata. The population of the AMBA grew from 10 918 027 inhabitants in 1991 to 12 806 866 inhabitants in 2010 (Census 2010) (Figure 4.A.1), representing 37% of the inhabitants of Argentina. The territorial expansion of the AMBA has followed the lines of railway communication and roads, inland and along the coast of the river. As a megalopolis, it is still constantly growing, so that its limits are increasingly blurred.

This urbanisation in the AMBA has acted as a major contributor to continuing gaps in access to quality water and wastewater services. Lack of decent housing for low-income households has resulted in illegal occupation of non-serviced land without basic services in the peripheries, particularly low-lying and flood-prone land (Figure 4.A.2).

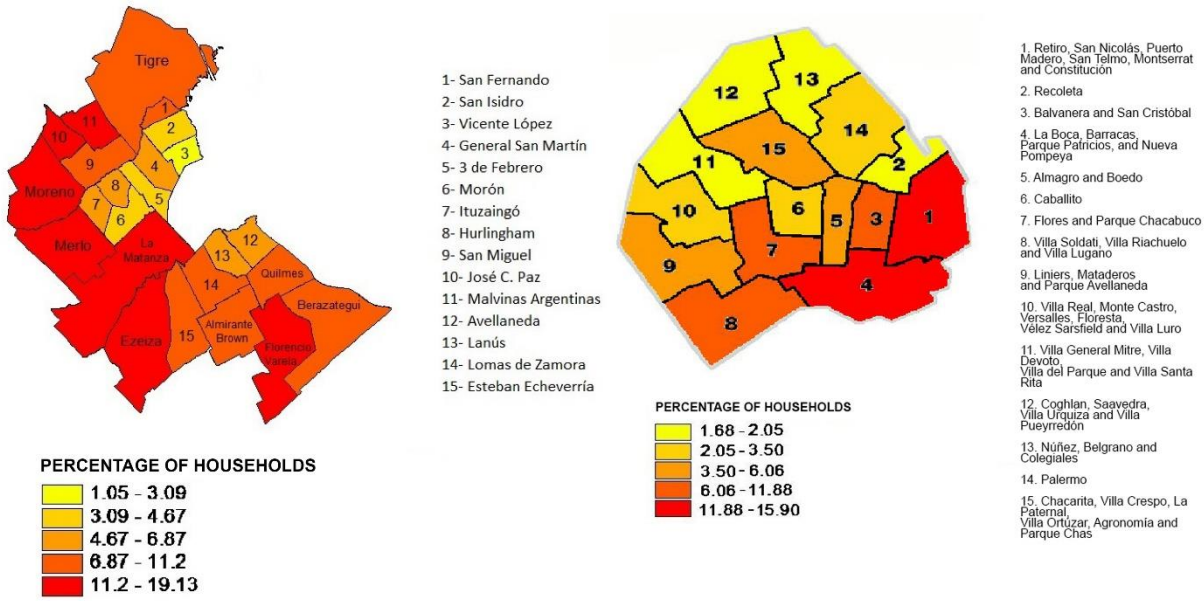
Figure 4.A.1. Urban population growth in the Metropolitan Area of Buenos Aires, 1990, 2001-10



Source: Observatorio del Conurbano Bonaerense (2019), "Dinámica", www.observatorioconurbano.ungs.edu.ar , (accessed in May 2019)

Figure 4.A.2. Share of households that present unsatisfied basic needs in the Autonomous City of Buenos Aires and the Greater Buenos Aires, 2010

Left image corresponds to Greater Buenos Aires and right image corresponds to the Autonomous City of Buenos Aires



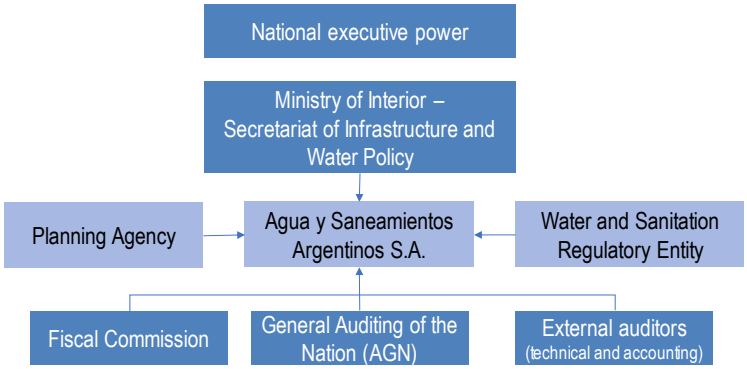
Source: DINREP (2014), "Necesidades Básicas Insatisfechas (NBI): Información censal del año 2010", Dirección Nacional de Relaciones Económicas con las Provincias (DINREP), http://www2.mecon.gov.ar/hacienda/dinrep/Informes/archivos/NBIAmpliado.pdf

Legal and institutional framework

Rationale

The legal and institutional setting regarding the provision of water and wastewater services of AySA, the concession area of the city of Buenos Aires and municipalities of the metropolitan area of Buenos Aires dates back to 1993 when the 30-year concession contract was granted to the private operator Aguas Argentinas (AASA) led by the SUEZ. This contract was terminated by the government through Decrees of Necessity and Urgency 303/2006 and 304/2006 in March 2006 to create a state-owned company Aguas y Saneamientos Argentinos (AySA) to take responsibility for the provision of water and sanitation services. In March 2007, new legislation created a new regulatory body, the Water and Sanitation Regulatory Entity (Ente Regulador de Agua y Saneamiento, ERAS), that took over the former responsibilities of the Tripartite Entity for Sanitary Services (Ente Tripartito de Obras y Servicios Sanitarios, ETOSS) created during the privatisation process. The law also established the Planning Agency (Agencia de Planificación, APLA) (Figure 4.A.3).

Figure 4.A.3. Regulatory framework of AySA



Regulatory functions in water and sanitation services encompass economic, environmental and social aspects and can be shared among several institutions. However, they need to be clearly spelt out and allocated to avoid overlaps and incoherence. Table 4.A.1 provides a list of regulatory functions for water and sanitation services and specifies the institution to which they are allocated in the AMBA.

Table 4.A.1. Allocation of regulatory functions for water and sanitation services in the Metropolitan Area of Buenos Aires

Regulatory function	Institution(s) in charge of exercising the function
Tariff regulation	ERAS – SIPH
Quality standards for drinking water	ERAS – SIPH
Quality standards for wastewater treatment	ERAS – SIPH
Defining public service obligations	SIPH
Defining technical/industry and service standards	APLA – ERAS
Setting incentives for efficient use of water resources	ERAS – SIPH
Setting incentives for efficient investment	APLA – SIPH
Information and data gathering	ERAS – APLA
Monitoring of service delivery performance	ERAS
Customer engagement	ERAS
Consumer protection and dispute resolution	ERAS
Licensing of water operators	National government
Supervision of contracts with utilities/private actors	ERAS – SIPH
Analysing water utilities' investment/business plans	APLA (investment plans) – ERAS (business plans)
Carrying out management audits	AGN – Technical Auditor – Accounting Auditor

Notes: ERAS: Water and Sanitation Regulatory Entity; SIPH: Secretariat of Infrastructure and Water Policy; APLA: Planning Agency; AGN: General Auditing of the Nation.

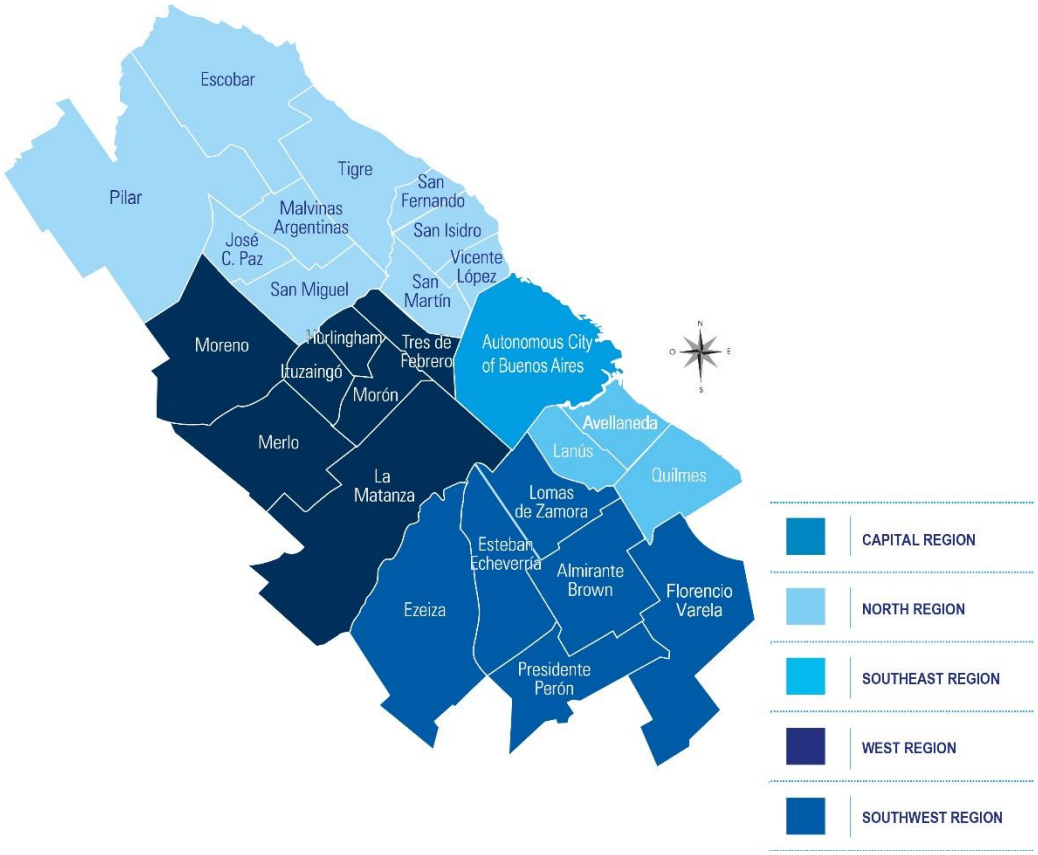
Main players and instruments

Until 2016, the AySA concession comprised the CABA and 17 municipalities of the province of Buenos Aires (Almirante Brown, Avellaneda, Esteban Echeverría, Ezeiza, Hurlingham, Ituzaingó, La Matanza, Lanús, Lomas de Zamora, Morón, Quilmes, San Fernando, San Isidro, San Martín, Tigre, Tres de Febrero, Vicente López). Between 2016 and 2018, following an agreement between the national government and the government of the province of Buenos Aires, AySA incorporated into its concession area municipalities that were previously supplied mainly by Aguas Bonaerenses S.A. (ABSA) – a company

owned by the province – and to a lesser extent by some municipalities (Belén de Escobar, Florencio Varela, José C. Paz, Malvinas Argentinas, Merlo, Moreno, Pilar, Presidente Perón, San Miguel). At present, AySA provides water and sanitation services to the city of Buenos Aires and 26 municipalities of the Buenos Aires conurbation (Figure 4.A.4), through a 20-year concession which may be extended by mutual agreement between the parties. AySA's capital belongs 90% to the national government and 10% to the workers, through a share participation programme.

AySA provides drinking water to about 10.7 million inhabitants and sanitation service to approximately 8.5 million inhabitants, representing a coverage of 74% and 59% respectively (AySA, 2018). Overall, it serves 3.7 million customers and counts 7 841 employees (Table 4.A.2). Water consumption averages 338 litres per inhabitant per day (AySA, 2017). The level of metering remains low, with only 17% of customers with a metre (AySA, 2018). More than 304 000 customers benefit from social tariffs, which represents 8% of the customer base (Box 4.A.2). AySA's central laboratory produces approximately 133 500 analyses per year to monitor the quality along different stages of water and sanitation systems. In 2018, AySA collected 18 631 million of Argentinian pesos of revenues and generated a net negative operational result of 18 723 million of Argentinian pesos. Investments represented 20 149 million of Argentinian pesos.

Figure 4.A.4. AySA's service area



Source: AySA (2018), *Informe anual 2018*, Agua y Saneamientos Argentinos S.A. https://www.aysa.com.ar/media-library/usuarios/informacion_util/informes_anuales/Informe_Anual_2018.pdf

Table 4.A.2. Selected reporting indicators for AySA

Indicator	Value for 2018
Population served with drinking water	10 713 262
Water service coverage	74.18%
Population served with sanitation service	8 525 772
Sanitation service coverage	59.04%
Total number of customers	3 690 728
Residential customers	3 164 784
Number of employees	7 841
Customers benefiting from social tariff	304 943
Drinking water compliance rate	99.23%
Wastewater discharge compliance rate	99.74%
Metered customers	17%
Unmetered customers	83%
Revenues collected	18 631 million of Argentinian pesos
Net operational result	18 723.6 million of Argentinian pesos
Investments	20 149.5 million of Argentinian pesos

Source: AySA (2018), *Informe anual 2018*, Agua y Saneamientos Argentinos S.A. https://www.aysa.com.ar/media-library/usuarios/informacion_util/informes_anuales/Informe_Anual_2018.pdf

Box 4.A.2. AySA's social tariffs

In 2018, 304 943 users were benefiting from one of AySA's three social schemes, which represented subsidies equal to 478.7 million of Argentinian pesos. The Water and Sanitation Regulatory Entity (ERAS) is responsible for authorising and implementing these three social schemes described below.

Table 4.A.3. AySA's social schemes

Social scheme	Number of beneficiaries
Social rate	302 857
Social case	802
Community rate	1 284

Social rate for households

This social scheme is based on income (subject to verification by ERAS), and encompasses three different types of social support. First, it supports connection to the water or sewer service by providing a 50% discount on the connection fee for households that are not yet connected to the water or sewer service. Second, it allows variable discounts for households that cannot afford to pay their water bills due to low incomes. Third, it provides debt cancellation when households are unable to pay back their arrears due to low incomes.

Social case

This social support is targeted towards households that are in a critical social situation and cannot pay the social rate payment described above. For these households, the connection

charge to the service is free, water and wastewater services are provided for free, and all past debts are entirely cancelled.

Community rate

This social scheme is targeted towards non-residential customers such as civil or non-profit associations or organisations, universities, public schools, public hospitals, community sports clubs, theatres, food charities, and any other institution upon agreement by ERAS. These institutions benefit from a 50% discount on the connection fee for their first connection to the water or sewer service. They also get a 30% discount on the tariff for metered customers and a 25% discount on the general daily rate of the variable charge when they are non-metered. They are entitled to 50% debt cancellation when they are unable to pay their arrears due to economic issues.

Source: AySA (2019), "Tarifa Social", https://www.aysa.com.ar/usuarios/Tarifa-Social, (accessed in June 2019)

In the AMBA, in locations where AySA is not delivering services, other operators are in charge of service provision. The largest one is Aguas Bonaerenses (ABSA), created in 2002, after the termination of the concession contract to the private company Azurix S.A. ABSA serves 79 localities within the province of Buenos Aires, representing 2.5 million inhabitants, while small or municipal providers operate in other areas of the province.

ERAS is a self-governing public body, created in 2006 by a tripartite agreement between the National state, the province of Buenos Aires and the government of the Autonomous City of Buenos Aires. It is in charge of controlling AySA's compliance with its legal obligations as a service provider with regard to the concession contract, including water pollution control of AySA´s discharges. The tariff structure and levels are set by the Secretariat of Infrastructure and Water Policy with the previous review of ERAS and APLA. For instance, the SIPH passed yearly tariff increases since 2016, and in May 2018, the coefficient K rose by 26% inducing a general growth of the tariff regime. Likewise, in May 2017, the SIPH modified the tariff structure by means of Resolution SSRH No. 19/17. In 2019, the tariff increased by 17% in January and 27% in May.

Since 2016, there has been a significant cost recovery improvement due to tariff increases decided by the SIPH. This evolution mechanically allowed improving the financial autonomy of ERAS and APLA that until 2015 depended on contributions from the National Treasury to finance their operations. As both ERAS and APLA are funded through a rate of 1.79% perceived on services (water and sanitation) invoices (prior to 1 July 2019 this rate was 2.67%), successive tariff increases resulted in an increase in the revenues they collected, which in turn terminated their financial dependency towards the National state.

With regard to stakeholder participation and customer protection, ERAS is responsible for the Users' Syndicate, which is composed of representatives of users associations and aims to protect the interests of users. The Users' Syndicate meets at least once a month and analyses issues related to AySA's and ERAS's activity. Finally, it issues opinions related to the provision of the service that must be considered by the directorate/board of ERAS. ERAS is also hosting a Users' Ombudsman, which institutionally represents users' interests and rights during public hearings for issues related to litigations or administrative procedures. In addition, ERAS must resolve disputes that arise between users or between users and the concessionaire in relation to service provision, and in this respect must issue

a well-founded resolution under the procedural principles of economy, simplicity, speed and efficiency.

APLA is a self-governing public body, in charge of reviewing and co-ordinating the expansion and improvement works made by AySA. It has competence over the evaluation, planning, execution and control of investments in the area of the concessionaire. Moreover, it liaises regularly with the municipalities and the concessionaire through its Advisory Committee, which is composed of representatives of municipalities, the province and the city of Buenos Aires, as well as representatives from AySA, ERAS and the SIPH. It reviews and approves the work plan proposed by AySA. In 2018, the "Methodological bases for the implementation of a project management system within the framework of the AySA concession" (APLA Resolution 13/2018) were approved. The consolidation of a common methodology for the implementation of the system is to be achieved by end of 2019.

Key water and sanitation services challenges

Service coverage

AySA's Plan for Improvement, Operation, Expansion and Maintenance of Services (Plan de Mejoras, Operación, Expansión y Mantenimiento de los Servicios, PMOEM) is prepared by the concessionaire and approved by the SIPH after review by APLA. Its implementation is subject to annual budget availability, and it is revised every five years. The objectives of the PMOEM 2014-18 were not met mainly because of budgetary constraints. Moreover, the unplanned incorporation of nine municipalities in AySA's provision area between 2016 and 2018 (Figure 4.A.5) increased operational expenditures, further reducing its capacity to invest and fulfil the PMOEM's targets. The new PMOEM 2019-23 that, consistently with the NWSSP, targets universal access to water and a 75% coverage for sewerage has been reviewed by APLA through a resolution (i.e. RESOL-2019-15-E) before approval by the SIPH.

Although there has been important efforts to increase water services coverages, challenges remain within the municipalities in the peri-urban area. According to the latest census (2010), in the AMBA, 76% of total households were connected to piped water and 57% to sewage. By disaggregating data geographically, it is possible to observe a great disparity of access levels between the Autonomous City of Buenos Aires and the 26 municipalities of the province of Buenos Aires. While the city of Buenos Aires enjoys levels of coverage close to universal access (99.6% for water and 98% for sewers), the 26 municipalities present values well below the regional average (67% and 41% respectively). Likewise, the coverage levels within the 26 municipalities appear heterogeneous, with municipalities furthest from the city with the highest service deficits.

In addition to this geographical disparity that characterises the expansion of services, a socio-economic differentiation can also be observed, since the most vulnerable economic and social sectors are the most exposed to the deficit of drinking water and sanitation. This is observed by jointly analysing poverty variables (measured by the Unsatisfied Basic Needs Index, NBI) and water and sanitation coverage (as showed in the previous NBI figures and in the following coverage). The absence of access to services is accentuated in the peripheral zones, in the interstices and in the *barrios populares.*[1]

Although in the AMBA many of these disfavoured neighbourhoods are within what is defined as a served area (i.e. an area with existing networks in the vicinity of the neighbourhoods), they lack formal piped services. Therefore, the inhabitants of these neighbourhoods must find alternative ways to access water and sanitation. Most water and

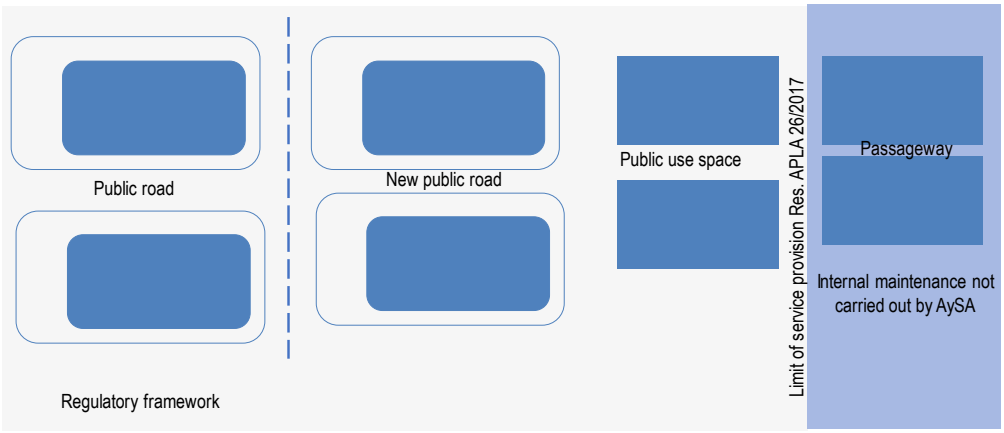
sewer networks in these neighbourhoods were financed and carried out by residents themselves, precariously and without any technical support or advice. Therefore, the existing infrastructure in these neighbourhoods is both deficient and insufficient, as it was not planned taking into account the important population growth.

The growth of disfavoured neighbourhoods is not only observed in the AMBA, but is a nationwide problem. According to the National Registry of Disfavoured Neighbourhoods (Registro Nacional de Barrios Populares, RENABAP), there are 4 416 such neighbourhoods in Argentina, representing approximately 4 million people. Of the total disfavoured neighbourhoods registered, more than 1 000 belong to AySA's concession area. This poses specific and significant challenges for the company to increase connections to water and sanitation services, as almost none of the inhabitants of these neighbourhoods have a formal connection to piped services.

In recent years, the issues associated with water and sanitation provision in disfavoured neighbourhoods have gained attention on the policy agenda, especially with Decree 358/17 ratified by Law 27.453, stating that residents from those neighbourhoods were entitled to access to public services such as water, sanitation, electricity or gas in their dwelling, even if they did not have a formal property right.

In this regard, in September 2017, APLA approved by Resolution No. 26 the "Criteria for Intervention in Construction of Infrastructure and Operation of the Water and Sanitation Service in Disfavoured Neighbourhoods/Emerging Urbanizations" to be applied in AySA's provision area. This resolution, which introduces flexibility with regard to the technical requirements for the construction of water and sewage systems, aims at increasing the development of piped services in these neighbourhoods. Prior to this resolution, AySA did not provide services in streets that were not registered or that did not comply with the width established by the regulations (ten metres). Following the revision of the technical criteria, AySA must deliver services in streets of public use with double access and that have a minimum width of four metres. As a result of these developments, AySA is legally able to provide services in some disfavoured neighbourhoods and must work jointly with other state agencies such as the Secretariat of Housing of the Nation, the Secretariat of Urban Infrastructure of the Nation and the Matanza Riachuelo Basin Authority. Taking stock of this legal evolution, AySA has developed the "Disfavoured Neighbourhoods Master Plan" as an integral part its PMOEM 2019-23. This plan contemplates the execution of network connections to dwellings in disfavoured neighbourhoods where legal technical requirements can be fulfilled.

Figure 4.A.5. New public road criteria adopted by AySA following the APLA resolution



Source: APLA (2017), "Resolución 26/17", Agencia de Planificación, http://apla.gov.ar.vxct22007.avnam.net/files/pdf/2017/10/Resolucion_N_26_17.pdf

However, when the space between dwellings is less than the required minimum (Figure 4.A.5), AySA can build infrastructure, but is not entitled to provide service. An operator will then be appointed in each particular situation (a consortium of neighbours, a neighbourhood board, a local co-operative, among other options) that will be financially supported by the state. AySA will provide technical assistance, training and water quality sampling.

Regulatory framework and co-ordination

Since the creation of ERAS in 2006, its three directors have been appointed by the national government (with one of them being recommended by the CABA and one by the province of Buenos Aires) without public competition based on professional merit and without consultation. Thus, the degree of autonomy of the directors of the regulator has been fairly compromised from the start. ERAS has the legal possibility of imposing penalties on AySA when the operator fails to comply with its legal obligations. Nevertheless, ERAS has little enforcement capacity to implement these fines. Tariff setting is decided by the Secretariat of Infrastructure and Water Policy and formally reviewed by ERAS, the Users' Syndicate and the Users' Ombudsman of ERAS. Public hearings were held for the last three tariff modifications, although they are not mandatory by law.

APLA's board is chaired by the Secretary of Infrastructure and Water Policy, which undermines its independence. The two other board members are designated by the national government and nominated by the government of the CABA and the province of Buenos Aires. Planning strategy is decided by the Ministry of Interior, Public Works, and Housing and the SIPH, and submitted to APLA for formal review. With a view to increase efficiency, the SIPH tried to make progress in the reunification of the two entities. Although the cumbersome legislative process did not allow this reform, it was possible to move forward in adjusting the entities' budgets, which are presently financed through a rate perceived on services (water and sanitation) invoices. As a consequence of recent tariff increases, ERAS and APLA went from a situation of underfunding to a situation of resource surplus, as shown by their 2016-2018 budgets.

This institutional set-up comprising multiple regulatory institutions produces a fragmented regulatory framework, co-ordination issues between the various stakeholders and weakens

decision making among the responsible organisms. Some overlaps and competition between government bodies and regulatory agencies weaken both institutions' competencies. In addition, the vague delimitation of the agencies' competences weakens further their capacities and powers.

Financial and environmental sustainability

AySA charges customers according to two tariff regimes depending on whether customers are metered or not. As 83% of customers are not metered, tariffs are unable to promote rational use of water. In 2017, some improvements were introduced in the tariff formula for metered customers following an instruction from the SIPH, and the development of a new tariff regime is still underway. In addition, three social schemes managed by ERAS are in place and benefit 8% of AySA's customers, both residential and non-residential.

Since the nationalisation in 2006, tariffs remained frozen until 2016. As a result, by the end of 2015, the national government was subsidising 88% of AySA's total expenses (opex and capex). Since then, tariffs have been increased by 629% (through the K coefficient from the price revision formula; in addition, subsidies were reduced for an important set of users), which helped reduce the huge operating deficit of the concessionaire. As of December 2015, according to the financial statements, AySA's revenues covered 42% of its operating costs, while for 2018, the operating cost coverage reached 81%. Nevertheless, and despite important efforts, this situation jeopardises the long-term financial sustainability of AySA, especially in difficult macroeconomic periods.

This low financial sustainability associated with budgetary restrictions affecting the appropriate implementation of the PMOEM lower AySA's capacity to implement a performant asset management policy for its 23 668 km of water pipes and 16 178 km of sewers. It also prevents the operator from developing investment targeted towards pollution reduction. As such, a low financial sustainability may have environmental consequences, especially in a context of increasing urbanisation and absence of effective urban planning. The SIPH and consequently AySA are under mounting pressure to take a more active role in the management of the metropolitan river basins that are now heavily polluted. A ruling by the National Supreme Court passed in 2008 has ordered the government to take the necessary measures to clean up the highly polluted Matanza-Riachuelo basin (Box 4.A.3), which raises the cost of water management substantially in the AMBA. This decision came after long-standing mobilisation of citizen organisations, water users, non-governmental organisations, local governments and environmental groups, and contributed to raise the profile of urban water issues in Argentina (Tobías M., 2018).

Box 4.A.3. The judicialisation of the Matanza Riachuelo case

The Matanza Riachuelo Basin, located in the Metropolitan Area of Buenos Aires, is the largest most polluted basin in Argentina. It covers the southern part of the Autonomous City of Buenos Aires and 14 municipalities of the province of Buenos Aires (see Figure 3.2). Although the pollution issue dates back to the industrial development of the Metropolitan Area of Buenos Aires, it was in the last decades that it gained political and media visibility.

In 2004, residents of the neighbourhood of Avellaneda filed a lawsuit about the environmental deterioration of the basin, based on the right to a healthy environment established in Article 41 of the national Constitution. The claim took legal-institutional viability when, in 2006, the Supreme Court of Justice of the Nation declared its competence in the matter. The court dictated that the state has the obligation to restore the environmental damage caused to the ecosystems as well as to prevent future damage. The three administrations with jurisdiction in the area (national government, province of Buenos Aires and the Autonomous City of Buenos Aires) were thus required to design an Integral Plan for Environmental Sanitation of the basin. The Matanza Riachuelo Basin Authority (ACUMAR) was created to design such a plan. Since 2008, several advances have been achieved (cleaning of margins and waste dumps, eliminating towpaths, controlling industrial pollution, etc.), although serious challenges still persist to achieve the full environmental recovery of the basin.

Since 2008, various progress has been made in the sanitation of the Riachuelo (cleaning borders, release of the towpath, cleaning of landfills, control of pollutants from industries and enterprises), although serious challenges to achieve the environmental restoration of the basin still persist. AySA is currently executing some important sewage structural works formed by the Left Margin Collector, Deviation of the Collector of the Baja Costanera, Riachuelo Water Treatment Plant and a subfluvial emissary that extends 12 km in the Río de la Plata, that will benefit more than 4 million inhabitants.

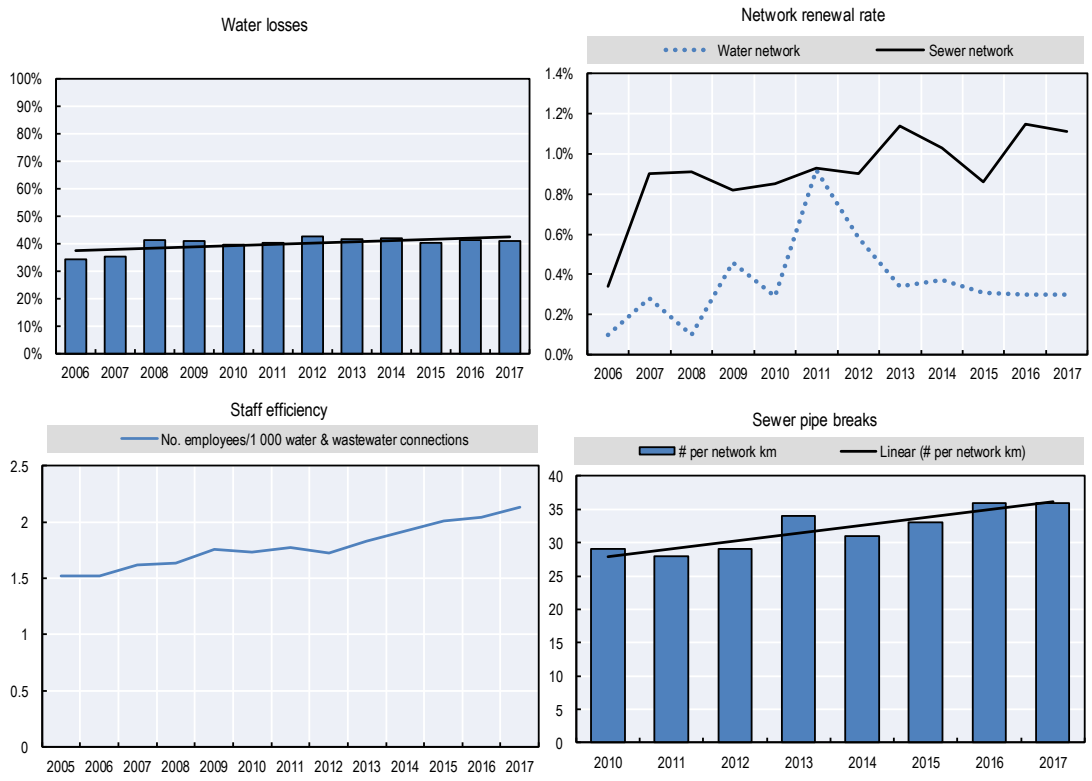
Source: ACUMAR (2019), "Institucional", http://www.acumar.gob.ar/institucional/ (accessed in June 2019).

Efficiency

On average, AySA's overall staff efficiency amounts to 2.1 employees per 1 000 connections (water and sanitation) and 3.51 employees for 1 000 water connections. AySA's workforce has steadily increased, from 4 058 employees in 2006 to 4 596 in 2009 and 7 841 in 2018. According to AySA, the latest staff increase was the consequence of the incorporation of Aguas Bonaerenses SA staff following the expansion of AySA's provision territory to include nine municipalities that were previously served by the ABSA and the municipalities. Nevertheless, this increase happened in a context of slow coverage improvement (an additional 1.8 million people for water and 1.9 million for sewers between 2006 and 2018, representing a 53% increase) compared to the increase in staff (93% increase from 2006 to 2018), thus lowering further the staff efficiency level, especially for water. The metering level of customers remains low, at 17%, which prevents the operator from setting up a tariff based on actual consumption, and thus to provide incentives to rationalise water use. Instead, the "*canilla libre*" system – a "free tap" system under which a fixed rate is charged regardless of the water volume consumed – applies to a vast majority of customers, leading to a high average level of water consumption which is estimated at

338 litres per capita per day (AySA, 2017). In its PMOEM 2019-23, AySA targets to reach a metering level of 30% within 5 years, which represents an increase of 70% with respect to current metering levels. Water losses are also high, at about 41%[2] (AySA, 2017) (Figure 4.A.6) due to poor asset management policy and poor macro-metering to improve leakage control. The PMOEM 2019-23 contemplates an ambitious network renewal plan (target of 1.5% per year compared to actual rate of 0.3% for water and 1.11% for sewers), the sectorisation of networks and the installation of regulation systems to reduce the level of physical losses (target of 3% per year).

Figure 4.A.6. Evolution of efficiency performance indicators for AySA



Source: ERAS (2018), "Informes anuales de benchmarking", http://www.eras.gov.ar/informacion-tecnica/bechmarking/

The operating cost coverage of AySA was very low, at 42% in 2015, and the operational result remains chronically negative. As such, the operator is dependent on national financial transfers to cover part of its operating costs. Nevertheless, this dependency has clearly been declining since 2016 and the tariff has been increasing. As a result, operating cost coverage rose to 85% in 2017, and 81% in 2018. This is partly linked with the incapacity of the operator to modify its tariff structure to reflect real service costs. Moreover, due to the flat topography of the provision area, a large number of pumps are required to operate the service, which generates important electricity costs. At the end of 2015, electricity tariffs went up, affecting AySA's production costs and making AySA the fourth largest consumer of electricity in the country. As a result, AySA has planned a series of actions to be implemented to achieve efficiencies in the use of electric power and to reduce costs in its PMOEM 2019-23.

Stakeholder engagement

Stakeholder engagement is limited to consultations organised through the "Users' Syndicate" and the "Users' Ombudsman", both under the responsibility of ERAS.

The "Users' Ombudsman" was created to represent users in public hearings and judicial or administrative procedures. The appointment of its chair, through public competition based on professional credentials, only started in late 2010. The current chair was nominated in 2016 by the current government. Until recently, users had little opportunity to participate in decisions such as tariff setting or infrastructure planning. The regulatory framework for AySA does not institute a mandatory procedure for tariff review. Nevertheless, stakeholder engagement has been set up through the Users' Syndicate and the Users' Ombudsman, in accordance with Article 42 of the National Constitution on the right of users to participate through their associations. Furthermore, in order to strengthen the relationship between the state and civil society, stakeholder engagement and their access to information, since 2016, a public hearing has been convened for all tariff revisions requested by AySA.

Moreover, resources dedicated to stakeholder engagement remained very limited for a long time, which further slowed down the process.

Policy recommendations

The fragmented regulatory framework for water supply and sanitation in the AMBA generates a lack of clear regulatory logic and strategy. Clarifying the regulatory model that presently mixes characteristics of self-regulation and regulation by agency will help clarify the allocation of regulatory powers and functions, thus avoiding overlaps and making regulation more effective. It will also help reduce political interference with the regulatory entities, thus strengthening the entire regulatory framework. Moreover, the appointment process of ERAS' directors and of APLA's board members should be reviewed and made based on public competition and professional merit to strengthen the independence of the regulatory entities, and limit political interference.

The fragmented regulatory framework also generates co-ordination issues between national and local stakeholders involved in the water and sanitation services policy in the AMBA. To overcome these co-ordination issues between national and local levels, a co-ordinating institution like the Metropolitan Board for Water should be re-installed and sustained (see Box 4.4 in chapter 4). Its purpose was to articulate common policies on water and sanitation between multi-level stakeholders and to overcome the lack of urban planning that characterises the AMBA. Once the goals set to the MMA were achieved, namely the transfer of service areas from the outskirts into AySA provision area, the implication of participants (particularly AySA, ABSA, DIPAC, ENOHSA and ACUMAR) decreased.

Clarification and improvement of the regulatory framework should also provide the opportunity to enhance stakeholder engagement. Existing engagement mechanisms with consumers should be strengthened and embedded in routine processes. Stakeholders should be involved especially in discussions regarding the coverage extension in disfavoured neighbourhoods as promoted to a certain extent by the legal provisions of APLA Resolution 26/2017. Strengthening the specialisation of the users' representative entities is also recommended. Evidence from case studies regarding pro-poor utility policies shows that service provision must be designed carefully to take into consideration preferences and water-use habits of poor urban populations. The operator Manila Water in the Philippines worked with "street leaders" designated by the community, and who are in charge of managing, maintaining and administrating the connections. This neighbourhood policy

recorded a 100% rate of revenue collection (Box 4.A.4). The professionalisation and reinforcement of users' representative organisations are also a key asset that should be explored.

Box 4.A.4. Pro-poor policy of the Manila Water Company, Philippines

Manila Water (MWCI) is one of two concessionaires created after privatisation of the Metropolitan Waterworks and Sewerage System in 1997, and is charged with water provision for Manila's East Zone. It is considered a success story, particularly in comparison with the other concessionaire, Maynilad, that serves the remaining part of the city. The MWCI estimates 98% coverage of its service area with a water supply 24 hours a day and its 600 projects targeting low-income neighbourhoods are estimated to have reached over 1 million people out of 5.3 million users within the service area. However, a lack of data makes it difficult to assess the proportion of the poor population within the service area that is yet to benefit from this success.

Measures to improve efficiency and performance: Structural reorganisation/streamlining, tariff reform, fiscal discipline, cost-effectiveness measures, employee reorientation and education, reduction of unaccounted-for water.

Pro-poor and accountability features:

- Creation in 1998 of Tubig Para sa Barangay ("Water for the Urban Poor") Programme.
- Decentralised service management and responsibility to Barangay (lowest political unit) level and formation of user-utility partnerships to enhance accountability and programme buy-in, design and implementation through public consultations, pre-implementation meetings and discussions during the planning stages.
- Service differentiation: Poor people in urban neighbourhoods are given service options (individual/multi-household connection or community "mother metre"), matching service level to consumers' needs and catalysing service extension.
- From 2005, connection of unauthorised slums using small piped-water networks. "Mother" metres managed by the MWCI (bypassing land tenure restrictions to household water connections), and connections are managed, maintained and administered by community nominated "street leaders". Connection fees can be paid over one to three years.
- Creation of Kabuhayan Para sa Barangay ("Livelihood Programme"), engaging community based co-operatives to provide services and products to the MWCI (e.g. workshops to produce parts).

Certain issues of concern have been highlighted in the literature reviewed, such as a lack of consultation during privatisation, a general need for institutional mechanisms for consumer representation, the absence of independent regulation, changes made to the concession contracts after privatisation and a lack of independent auditing.

Source: WaterAid (2009), *Water Utilities that Work for Poor People: Increasing Viability through Pro-poor Service Delivery*, https://washmatters.wateraid.org/publications/water-utilities-that-work-for-poor-people-increasing-viability-through-pro-poor.

Exploring alternative pathways could offer opportunities to reach policy priorities more efficiently. For instance, in order to expand coverage, moving away from the centralised development model of AySA networks could be considered (Tobías M., 2018). The creation of decentralised and local networks could help increase coverage more efficiently in some cases. However, in these cases, specific provisions should be made to ensure sustainable services and strengthen the control of the service quality. Indeed, in AySA's concession area, there are presently approximately 600 neighbourhoods with decentralised services operated by small providers. Most of them are experiencing service quality issues related to low efficiency.

Defining alternative and differentiated regulatory objectives and performance assessment adapted to the specific context of disfavoured neighbourhoods and vulnerable urban areas (mainly those recently incorporated into AySA's service area) should also be explored by regulatory entities as a potential solution to accelerate the achievement of coverage targets. Allowing differentiated levels of service can allow extending coverage for the same amount of available funds – the main provider would then extend service via standpipe or via agreements with alternative providers (Box 4.A.5).

AySA's low efficiency also underlines the weakness and the ineffectiveness of the actual regulatory framework, which does not provide sufficient incentives for the operator to improve it. AySA should seek efficiency gains as a means to improve its financial sustainability and cost-recovery ratio. This can be achieved through the implementation of an adequate asset management strategy to prioritise rehabilitation works and effectively lower technical losses. It can be achieved by lowering electricity, as the company already initiated with an 11% unit cost reduction from 2017 to 2019; and by improving staff efficiency, especially for water. All these targets (network renewal, loss reduction, energy efficiency) are explicitly mentioned in the PMOEM 2019-23 that has been reviewed by APLA (through the resolution RESOL-2019-15-E) before approval by the SIPH. Despite a significant improvement of processes in recent years, for the purchase of goods and materials, as well as for public works procurement, tendering specifications should be simplified further to allow more competition between bidders. It is worth mentioning that, in a proactive approach to improvement, AySA got a certification audit in 2019 with AquaRating system (IWA-IDB) for its management processes and good practices.

Box 4.A.5. Condominial network in La Paz, Bolivia

Under the concession contract signed in 1997 for the city of La Paz and the poor suburban area of El Alto in the Plurinational State of Bolivia, the operator agreed to take on ambitious service extension targets, with an objective of 100% coverage for water and 90% coverage for sanitation by 2026. Important efforts were made to extend coverage, but customer demand was falling short of expectations due to high connection costs.

A pilot project was designed and implemented with the support of the regulator to reduce connection instalment costs while increasing service coverage. The condominial method, which allows for shorter and less profound networks, was used to install water and sanitation networks. The local community took part in the construction and maintenance of the network. A hygiene education programme was implemented by the operator and microcredit was used to finance the construction of sanitation facilities. Network costs were reduced by 10-20% and excavation costs by 45-75%.

The community participation lead to a cost reduction of 40% for sanitation works. Despite a perception of condominial connections as a service for the poor, significant coverage improvements were achieved, and condominial connections were registered by the regulator as a new standard at the national level.

Source: Hunt, C.M. and S.C.M. Tremolet (2006), "Taking account of the poor in water sector regulation", http://documents.worldbank.org/curated/en/464491468313735847/Taking-account-of-the-poor-in-water-sector-regulation.

The financial sustainability of AySA has to be strengthened to reach at least full operating cost coverage on a routine basis (including maintenance, rehabilitation and depreciation) and reduce dependency with regard to national funding, which may be subject to the country's macroeconomic situation. To do so, the tariff level needs to better reflect operating and maintenance costs levels. The efforts to increase the metering level (both for production and distribution) should be sustained and amplified (850 additional metres in 2015, 85 000 in 2018) in order to promote an efficient use of the resource, to lower consumption and develop an adequate water quantity management policy.

The politicisation of tariff setting is an important barrier to more effective use of tariffs to promote financial sustainability and efficiency. For instance, making tariff regulation transparent and disclosing information and technical reports on the use of revenues can help to build a more consensual understanding on the link between tariffs and sustainability of service provision.

Several stakeholders have underlined that the lack of regulation regarding connection standards in internal premises hinders connection rate increases as well as quick expansion of metering into residential units of apartment buildings. Before the privatisation period, this competence was under the responsibility of Obras Sanitarias de la Nación. This issue needs to be addressed to provide the operator with a legal framework and updated norms. Likewise, in the expansion zones, there is a low level of real estate connections despite the availability of secondary networks in front of the property, particularly for sewers. According to surveys carried out by AySA, the main reasons are the lack of information of customers, the connection works and cost, and the necessary adaptation of internal facilities to allow the connection. Information and awareness-raising programs, as well as adapted financing mechanisms are key options to consider to face this challenge.

AySA's workers, administrative and managerial personnel are important and strong stakeholders that should not be overlooked. They are grouped into the Union of Gran Buenos Aires Sanitary Workers, who also own 10% of the company shares and are represented on the boards of directors. The union has a strong leadership capacity over the utilities' personnel; the managers of the operators would strongly support the implementation of institutional reforms and new regulations designed by the national government to face the sector's future challenges, and in particular, for the implementation of procedures and instruments required to strengthen corporate governance, improve operational efficiency as well as transparency and competitiveness of public purchases.

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Annex 4.B. Case study: Province of Santa Fe

Key facts and features

Box 4.B.1. Key data for the province of Santa Fe

- The province of Santa Fe is located in the centre-east of the country, neighbouring the provinces of Buenos Aires, Córdoba, Corrientes, Entre Ríos and Santiago del Estero. Together with Córdoba and Entre Ríos, the province is part of the economic and political association known as the "Centre Region". Santa Fe's economy is the fourth most important in the country.
- With a surface of 133 007 m² and a population of 3 194 537 inhabitants (2010), Santa Fe is the third most populated province in Argentina.
- The main river, and connection to open sea, is the Paraná River. The plain lands tend to be flooded after heavy rains due to the growth of the Paraná and Salado Rivers. Most of the province consists of green flatlands, part of the humid pampean region, bordering to the north with the Gran Chaco region. There are low sierras to the west. Rainfall ranges from 1 200 mm in the northeast to 800 mm in the southwest and extreme northwest. This humid, temperate climate explains why central and southern Santa Fe are among the nation's richest agricultural regions, with crops such as maize and soybeans, and a very well-developed dairy industry.

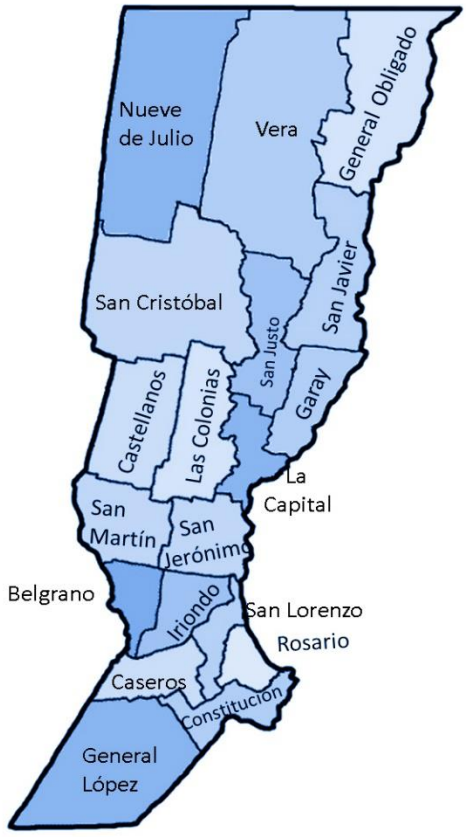
The province of Santa Fe is divided into 19 departments, which are divided into districts organised as communes or municipalities (Figure 4.B.1). The communes are smaller towns, generally administered by a local commission. The municipalities have more than 10 000 inhabitants, and have a mayor and a municipal deliberative council. There is a total of 55 municipalities and 308 communes in the province.

The province's most important cities are Rosario (population 1 193 605), the capital Santa Fe (369 000), Rafaela (100 000), Villa Gobernador Gálvez (74 000), Venado Tuerto (69 000), Reconquista (66 000) and Santo Tomé (58 000). The two main urban centres, Santa Fe and Rosario (the second largest in the country), are located by the Parana River and concentrate 53% of the total population of the province.

The province's population has steadily grown over the past 30 years, with a decrease in the number of rural inhabitants and an increase in the urban population (Table 4.B.1). The population of the province is projected to reach 4 million by 2040 (INDEC, 2019).

The actual and foreseen increase in urban population, as well as the dynamic economy of the province based on agriculture and manufacturing, put continuing pressure on the improvement in access to quality water and wastewater services.

Figure 4.B.1. Province of Santa Fe and *departments*



Source: https://www.familysearch.org/wiki/es/img_auth.php/thumb/7/7d/Santa_Fe_Provincia_Mapa.png/370px-Santa_Fe_Provincia_Mapa.png

Table 4.B.1. Evolution of the population in the province of Santa Fe

Population	1980	1991	2001	2010
Urban	2 022 792	2 429 291	2 675 392	2 897 922
Rural	442 756	369 131	325 309	296 615
Total	2 465 546	2 798 422	3 000 701	3 194 537

Source: INDEC (2019), "Censo Nacional de Población, Hogares y Viviendas (1980 - 1991-2001-2010)", oficial website, https://www.indec.gob.ar/indec/web/Nivel3-Tema-2-41 (consulted in May 2019).

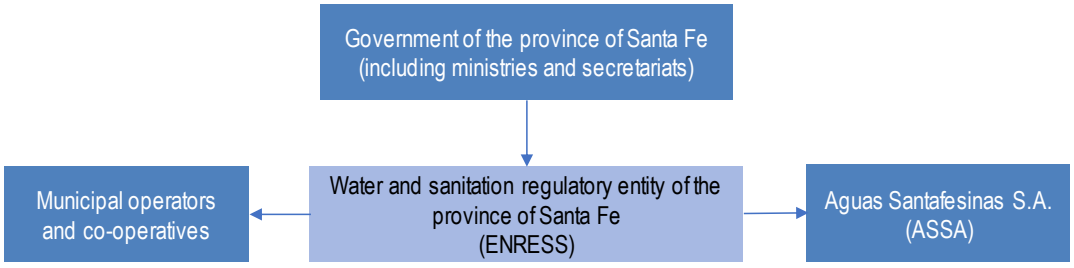
Legal and institutional framework

Rationale

The actual legal and institutional setting regarding the provision of water and wastewater services in the province of Santa Fe dates back to the privatisation period. In 1995, when the 30-year concession contract was granted to the private operator Aguas Provinciales de Santa Fe (APSF SA) led by SUEZ, the regulatory entity (Ente Regulador de Servicios Sanitarios, ENRESS) was created (Law 11.220). In 2006, the concession contract was terminated, and the executive power of the province of Santa Fe set up the public limited

company Aguas Santafesinas S.A. (ASSA) to take over the water and sanitation services formerly managed by the private operator (Decree 193/06) (Figure 4.B.2). The provincial government is the main shareholder of ASSA, with 51% of the share capital, while municipalities that are part of the concession hold 39% and the employees the remaining 10% through a share participation programme.

Figure 4.B.2. Regulatory framework of ASSA



Regulatory functions in water and sanitation services encompass economic, environmental and social aspects, and can be shared among several institutions. However, they need to be clearly spelt out and allocated to avoid overlaps and incoherence. Table 4.B.2 provides a list of regulatory functions for water and sanitation services and specifies the institution to which they are allocated in the province of Santa Fe.

Table 4.B.2. Regulatory functions for water and sanitation services in the province of Santa Fe

Regulatory function	Institution(s) in charge of exercising the function
Tariff regulation	ENRESS
Quality standards for drinking water	ENRESS
Quality standards for wastewater treatment	ENRESS
Defining public service obligations	Ministry of Infrastructure and Transport
Defining technical/industry and service standards	ENRESS – ASSA
Setting incentives for efficient use of water resources	ENRESS
Setting incentives for efficient investment	ENRESS
Information and data gathering	Water and Sanitation Secretariat – ENRESS
Monitoring of service delivery performance	ENRESS
Customer engagement	ENRESS
Consumer protection and dispute resolution	ENRESS
Licensing of water operators	Provincial executive power
Supervision of contracts with utilities/private actors	ENRESS
Analysing water utilities' investment/business plans	ENRESS
Carrying out management audits on utilities	ENRESS

Note: ENRESS: Water and Sanitation Regulatory Entity of the province of Santa Fe; ASSA: Aguas Santafesinas S.A.

Main players and instruments

Since 2006, Aguas Santafesinas S.A. has been in charge of providing water and sewage services in 15 municipalities in the province (Figure 4.B.3). ASSA provides water services to about 2 million inhabitants, representing 60% of the province's population. The remaining 40% of the population (347 towns) has access to water either through piped networks or tanks. ASSA has also been designated as the provisional operator of the

Acueducto Centro Oeste, a system through which it provides bulk water to another 11 municipalities where the distribution of water remains under the responsibility of municipal services or co-operatives. The financial contributions of the provincial government to fund the expenses of the service allowed increasing service quality through the construction of priority works.

Figure 4.B.3. ASSA's service area

Source: ASSA (2019), "Área de Servicio", https://www.aguassantafesinas.com.ar/portal (accessed on June 2019)

Apart from ASSA, 347 other water and sanitation operators provide services to the rest of the population of the province of Santa Fe, including 24 municipal operators, 124 co-operatives and 197 communes (Table 4.B.3).

Table 4.B.3. Small operators in the province of Santa Fe

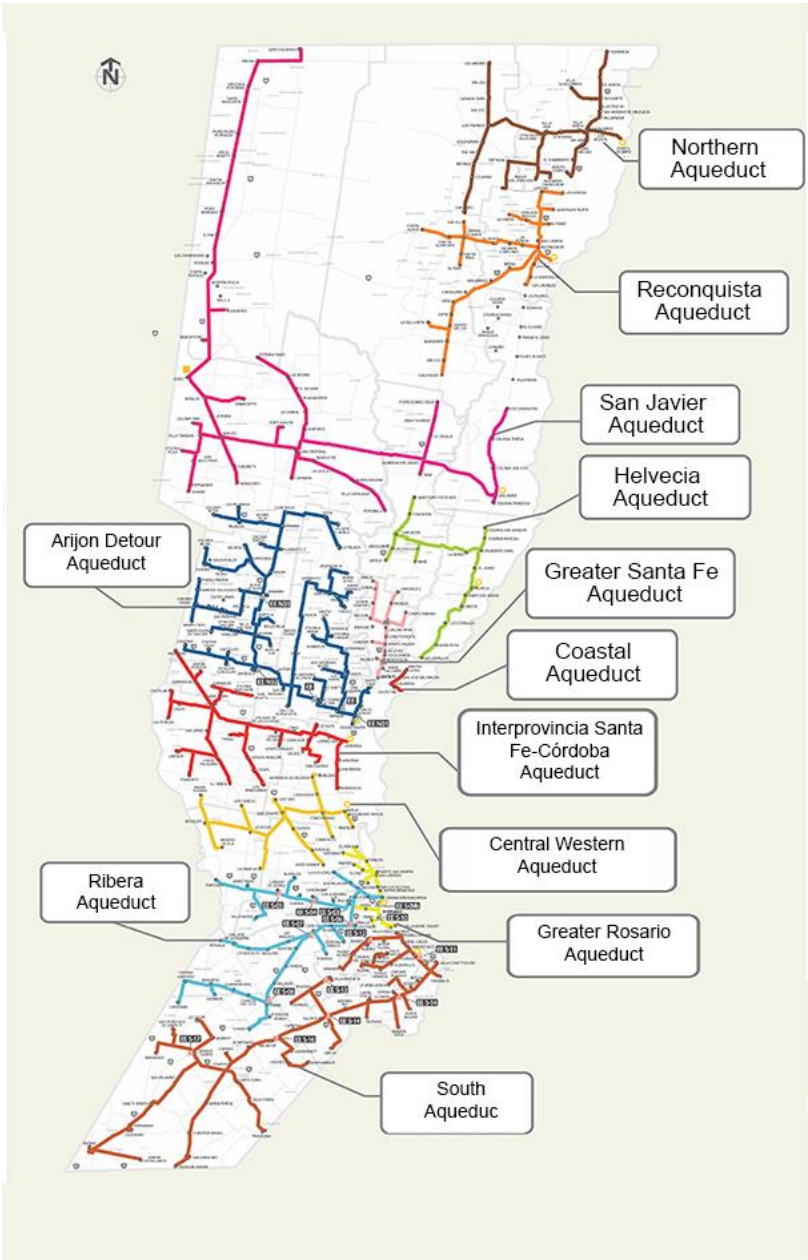
Type of small operator	Number
Municipal	24
Co-operative	124
Commune	197
Other	2
Total	347

Source: ENRESS (2019a), Jurisdicción, http://www.enress.gov.ar (accessed on June 2019).

In order to secure quality water provision, the province designed and funds a Provincial Strategic Plan (PEP) that foresees the development of a series of aqueducts to direct water

from the Paraná River to the west of the province, and thus guarantee access to safe surface drinking water as underground resources face several quality issues across the province, including arsenic, total salts, nitrates, iron, manganese, hardness, sodium (Figure 4.B.4 and Table 4.B.4).

Figure 4.B.4. Aqueducts as planned in the Provincial Strategic Plan 2030



Source: Province of Santa Fe (2012), "Plan Estratégico Provincial: Visión 2030", https://www.santafe.gov.ar/index.php/plan_estrategico_provincial

The planning of the provincial aqueduct system, which aims to bring water in block to 100% of the population of the province, was completed in 2019 with the work of the Reconquest Aqueduct, that covers an area of 12 200 km² (representing approximately 9%

of the provincial territory). It is delimited to the east by the Paraná River, to the south by an imaginary line that passes 10 km from the cities of Calchaquí and San Javier, to the west by a second line that passes close to the towns of La Gallareta and Fortín Olmos, and to the north on the third line that passes through the towns of Lanteri and Las Garzas. The population from this area represents 200 000 inhabitants, and is estimated to reach 275 000 within 30 years.

Table 4.B.4. Planning of aqueducts in Santa Fe

In operation			Project in execution			Executive project in development
Central Santa Fe Aqueduct (national funds)			Reconquista Aqueduct – 1st phase			Reconquista Aqueduct – 2nd and 3rd phase
12 municipalities	65 000 people	180 million	35 municipalities	150 000 people	118 million	Integración Santafesino – Santiagueña Aqueduct
Gran Rosario Aqueduct – 1st phase			Enlargement of the Central Santa Fe Aqueduct – Totoras-Salto Grande Branch			Arijón Detour Aqueduct – 2nd phase
7 municipalities	-	129 million	-	-	8.4 million	Río Coronada Aqueduct
Arijón Detour Aqueduct – 1st phase						San Javier Aqueduct
91 municipalities	333 000 people	205 million				Helvecia Aqueduct
Aqueduct of Northern Santa Fe – 1st phase						Coastal Aqueduct
54 municipalities	65 000 people	117 million				Aqueduct of Central Santa Fe – Enlargement
						Gran Rosario Aqueduct – 2nd to 5th phase
						Ribera Aqueduct
						Aqueduct of Southern Santa Fe

Source: Province of Santa Fe (2012), "Plan Estratégico Provincial: Visión 2030", https://www.santafe.gov.ar/index.php/plan_estrategico_provincial .

In addition to works to expand water coverage, within the PEP the province is carrying out a Master Plan for Sanitation whose main objective is to expand the coverage of the sewage service in all urban areas of the province to improve the living conditions of the population. The Master Plan also seeks to strengthen the technical, operational and management capacity of ASSA and of other service providers. The Master Plan includes the realisation of technical studies, as well as some technical assistance and training. Works will be carried out in the five regions of the province to expand and improve the reliability of wastewater treatment, and to renew and expand existing sewerage networks.

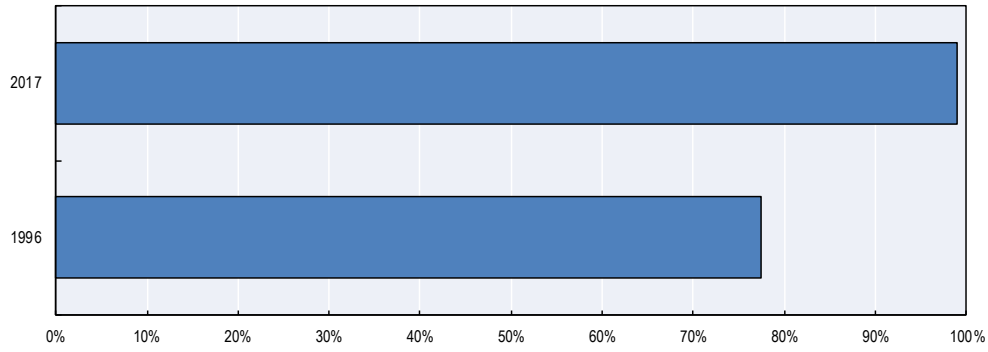
The province has also developed an effluent control programme. The environmental quality of surface courses (streams, rivers, canals, etc.) is directly linked to the discharge of domestic, industrial and agriculture effluents. The objective is to clean up surface water courses by developing comprehensive strategies for monitoring and controlling effluent discharge using a georeferenced system.

ASSA regularly integrates into its assets and operates infrastructure built by urban developers in newly urbanised areas. ASSA was granted a temporary authorisation to operate the Central West Aqueduct, which supplies water in additional municipalities and co-operatives. To improve the access to drinking water, the provincial government is investing in a provincial system of 12 aqueducts designed to match a 30-year demand forecast. As of 2016, six aqueducts were under construction.

ENRESS, the provincial regulatory entity for water and wastewater services, is a self-governing public body created in 1995 in the context of privatisation of water and

wastewater services in the province of Santa Fe. According to the provisions of Law 11.220, ENRESS is responsible for the regulation and control of service provision, for the protection of users' rights and health. ENRESS approves the improvement and development plans (Art. 98 of Law 11.220), and controls that operators comply with the plans they presented. ENRESS analyses and issues information about mandatory reporting done by operators. Tariff increase requests are submitted by operators either to the provincial Ministry of Infrastructure and Transport (ASSA) or to the municipal council (for municipal services) for validation. Once validated, ENRESS approves them, in accordance with the provisions of Chapter VII of the Regulatory Framework and Applicable Rules, and verifies the appropriateness of the revisions and adjustments requested. The tariff revision procedure is held yearly, and lasts 15-30 days. ASSA tariffs are reviewed due to inflation or because a new asset is being added to the company's inventory (stemming from new urban developments). ENRESS controls the quality of water supplied to users according to the compliance limits set in the Annex A of Law 11.200 (Figure 4.B.5), as well as the quality of sewage effluents. It should be noted that some operators in the province face water quality issues related to important concentrations of arsenic, total salts, nitrates, iron, manganese or sodium in water resources. Under such circumstances, the regulator can grant exceptional exemption for a specific period during which the utility can operate with lower levels of service.

Figure 4.B.5. Evolution of compliance rate for arsenic for a sample of water services, province of Santa Fe



Source: ENRESS (2019b), "Estado de situación del servicio de agua potable en la provincia de Santa Fe", http://www.enress.gov.ar/estado-de-situacion-del-servicio-de-agua-potable-en-la-provincia-de-santa-fe-2/. (accessed in September 2019)

ENRESS also provides financial advice with regard to cost analysis and tariff setting to the regulated entities, especially to small services and co-operatives that lack capacity. The regulatory entity is directed and administered by a board of five regular members, appointed by the executive power of the province; one member is proposed by the most representative employee trade union organisation. In all cases, the proposed members must have suitable and relevant experience to fulfil their duties. Directors are appointed for a period of four years. In the event of vacancy or inability to exercise their functions, the executive power will appoint a substitute member, who will serve until the expiration of the original term of the mandate of the replaced director. The substitute member will need legislative agreement in case his/her term of office exceeds the period of one year before expiration. The president and vice-president of the regulator are appointed by the province's executive power among the members of the Board of Directors, and hold their positions for a period of two years with the possibility of re-election.

The executive power of the province of Santa Fe is in charge of investment planning and funding for the development of water and wastewater services. The province, through its Ministry of Infrastructure and Transport, prepares annually a preliminary budget for the next year and for the coming three years (based on an Improvement and Development Plan), which is discussed by a technical committee at provincial level. When approved, the plan is then funded by the provincial Ministry of Economy (using provincial budget or external funding from donors), with limited additional contributions from municipalities.

Key water and sanitation services challenges

Service coverage

According to the 2010 National Population and Housing Census, with regard to the infrastructure services of households, 84.4% have access to piped water service (the access rate reaches 98% for ASSA); in comparison, sanitation coverage remains low, with 58% of the population being connected to sewers. Most of the population connected to sewage are ASSA customers (80% sewer connection for ASSA only); the rest of the province's population has more limited access to sanitation facilities, whether collective or individual. This underlines the important difference in service coverage and level between ASSA and the other small operators of the province. In addition to this limited level of sanitation coverage that induces health and environmental risks, it should be noted that Santa Fe is one of the provinces with the lowest effluent treatment coverage (below national average estimated at 36%). None of its large coastal cities has treatment plants.

Taking stock of this situation and of the perspective of population evolution, the provincial government has planned a series of works to expand sewage systems in various locations, including the cities of Santa Fe, Rosario and their respective suburbs. These works have been detailed in the Solidarity and Integrator Programme of Sewage Drains that is co-financed by the province, municipalities and users of wastewater services.

With regard to water, the provincial government has started implementing a new provincial aqueduct system, which includes works and investments over a period of 15-20 years, as set forth in the PEP. Another programme is being implemented in parallel to improve access to drinking water in smaller towns. This programme includes improving existing facilities, installing new water purification plants, expanding distribution networks, and strengthening the capacity to deliver water in trucks during critical periods of intense drought. Most of the funding available is dedicated to aqueducts to provide enhanced water quality to the entire population of Santa Fe. The corresponding works are estimated to be USD 1 500 million.

Investment planning

Water and sanitation investment projects are designed and decided by the provincial government. They are merely prioritised on technical grounds, and there is no explicit process, despite active communication between the authorities, to ensure that they match the priorities set in the National Water Supply and Sanitation Plan (NWSSP) and that they contribute to achieving the plan's objectives. This can sometimes lead to co-ordination issues between national and subnational water supply and sanitation policies and objectives.

Water and sanitation investment projects are funded predominantly by the province, but some investment projects also receive financial contributions from the National Entity for Sanitation Water Works (ENOHSA) (up to 80% for the Southern Recreation Plant). Some

projects are partly financed through commercial loans (Water Treatment Plant of Reconquista) or self-financed by co-operatives. Nevertheless, there is no systematic, explicit, standardised evaluation process at the provincial level to prioritise projects according to their expected economic, social and environmental benefits to society in the short, medium and long terms.

Financial sustainability

In 2016, the provincial Treasury subsidised 32% of ASSA's operating costs, which represented a contribution of 570 million of Argentinian pesos. This situation shows that ASSA is not able to cover its operating costs through the water sold and billed. This is due to a combination of low tariff and low efficiency. ASSA's current metering level only reaches 34.5%, while a five-year plan targets to reach 70%. Thus, a large majority of customers are still billed according to the *canilla libre* system, which does not reflect the real production costs of water and wastewater services. In addition, non-revenue water is as high as 50%.

In municipal services and co-operatives, the metering level is much higher, thus allowing a tariff structure that promotes a rational use of water. Nevertheless, the tariff level often remains too low to cover the expenses of the service, as reported by ENRESS, which regularly performs cost studies and proposes financial advice to small services.

This weak financial sustainability of operators lowers their capacity to set up a performant asset management policy. It also makes operators dependant on external funding to cover a part of their operational expenditure as well as their investments, which reinforces potential political discretion and interference.

Independence of the regulator

Both tariffs and investment programmes are decided by representatives of the province and/or municipalities. As a result, investment decisions may appear discretionary and funding unpredictable. This situation induces high risks of political interference, especially for tariffs that tend to be set below cost-recovery level.

The president and vice-president of the regulatory directory are appointed by the governor of the province among the members of the Provincial Directorate. This situation can be seen as a threat for the independence of the regulator, besides the fact that other members are appointed by the province's representatives. In addition, commissioners' short mandate (two years) and their replacement both at the same time may weaken further the regulator's independence.

Stakeholder engagement

The Users' Council is formed by associations that defend the rights of users and consumers under the provisions of the consumer protection law. It is hosted by the regulator. Its purpose is to advise the regulator's board on health issues, to participate and provide elements to better take into account service users and protect their rights.

Stakeholder engagement is limited to awareness-raising activities conducted by utilities, such as the distribution of booklets, annual public meetings, visits of facilities and educational sessions for pupils.

Co-operatives are gathered into a National Federation of Cooperatives of Drinking Water and other Public Services, where they can share experience and exchange good practices.

On the contrary, there is no strict equivalent for municipal services. But the Secretariat of Regions, Municipalities and Communes could possibly be articulated with the National Federation of Cooperatives of Drinking Water and other Public Services to provide the same technical assistance and capacity development activities.

Policy recommendations

Co-ordination problems between national and provincial levels have been identified, especially in a context of high decentralisation of water and sanitation services provision. In order to better align the water and sanitation services policy objectives between the provincial and national levels, the DNAPyS and the provincial departments in charge of water supply and sanitation policies should gather on a regular basis as this would help overcome vertical co-ordination issues. Such regular meetings would offer a place for the definition and co-elaboration of water supply and sanitation policy priorities, thus fostering consensus and diffusing potential conflicts.

In a decentralised and politicised sector such as water and sanitation services, a certain degree of independence of regulator (or distance from political appointees) helps to overcome political interferences in key decisions, such as tariff regulation, for instance. There should be a clearer separation between the provincial executive power and the regulatory commission. The fact that the governor of the province designates the directors reduces considerably the regulator's independence and increases the risk of highly politicised decisions. In addition, for regulators led by a board, appointments of board members should be staggered to maintain knowledge and expertise in between renewals of appointments. The length of office terms should be designed in a way that ensures that board members' terms cut across electoral cycles, compatible with each country's constitutional arrangements. Mandates should be of at least five years to allow for knowledge and expertise development. (Box 4.B.2).

Box 4.B.2. Decision making and government body structure for independent regulators

National Electricity Regulator

The governing body of ENRE has five members, one of which is the president, one the vice-president and the remaining official chairpersons (Article 57 of Law 24.065). The executive power appoints these members according to their technical and professional background for five years organised in staggered periods, which can be renewed indefinitely – two of them proposed by the Federal Council of Electric Energy (Article 58 of Law 24.065). These members, according to Article 59 of Law 24.065, can only work for ENRE, and are banned from other activities. They can only be removed by the executive power, with a well-founded justification. However, the removal order will go to a congressional commission first, which will give an opinion.

National Gas Regulator

According to Article 54 of Law 24.076, the governing body of ENARGAS is composed of five members, one of which is the president, one is the vice-president and the remaining three are chair officials. As with ENRE, members of the governing body are elected according to their technical profile for five years (Article 54). Again, members have staggered periods and are banned from working elsewhere (Article 55). These legal statutes, which seem to be consistent with OECD Principles on the Governance of Regulators, were overturned when the president intervened in ENARGAS.

Source: OECD (2019), *Regulatory Policy in Argentina: Tools and Practices for Regulatory Improvement*, https://doi.org/10.1787/d835e540-en.

The politicisation of tariff setting is an important barrier to more effective use of tariffs to promote financial sustainability. For instance, disclosing information and technical reports on the use of revenues can help to build a more consensual understanding of the link between tariffs and sustainability of service provision.

In municipal services, corporate governance of utilities should be systematically implemented to ensure a clear separation of functions and responsibilities between utilities and local governments. This would help promote transparency and accountability, and avoid political interference.

Moreover, in the case of state-owned utilities, as for ASSA, the province should act as an informed and active owner, ensuring that the governance of state-owned enterprises is carried out in a transparent and accountable manner, with a high degree of professionalism and effectiveness.

Water and sanitation investment projects should be routinely assessed in a standardised and comprehensive manner. They cannot solely be justified on technical grounds. They should also be prioritised according to their cost-effectiveness and cost-beneficial contribution to the economy and society. This would allow effectively channelling provincial funds to ensure the best use of fiscal resources and external funding.

ASSA's low efficiency underlines the weakness and ineffectiveness of the actual regulatory framework, which does not provide sufficient incentives for the operator to improve it. ASSA should seek efficiency gains as a means to improve its financial sustainability and cost-recovery ratio. This can be achieved through the implementation of an adequate asset management strategy to prioritise works and effectively lower both commercial and technical losses. This can also be done through better infrastructure management through innovative incentive-based approaches, for instance (Box 4.B.3).

Box 4.B.3. Increasing the operational efficiency of water infrastructure in Brazil

Water infrastructure is not always well utilised and managed. This is particularly true of wastewater infrastructure. In many cases, wastewater plants are built with national subsidies but they fail to treat wastewater – either because the sewage is not delivered to the wastewater treatment plant or because municipalities that own them decide that they cannot afford to operate them. In different aspects of water management, Brazil has introduced innovative incentive-based approaches to achieve cost reductions that rely on paying for proven results rather than for physical works. The River Basin Clean-Up Program has provided incentives for increasing the operational efficiency of wastewater treatment infrastructure. Private actors build and operate the wastewater treatment plants and they are paid a fee for each cubic metre of wastewater treated.

Source: OECD (2013), *Making Water Reform Happen in Mexico*, https://doi.org/10.1787/9789264187894-en. Adapted from OECD (2011), "Financing Water Resources Management", ENV/EPOC/WPWBE(2011)4, OECD, Paris.

In order to increase small operators' capacities and efficiency, and to expand small utilities' coverage, policy makers can explore aggregation of water and sanitation services as a

potential solution. Under specific conditions and circumstances, aggregation can help utilities to perform better (Box 4.B.4.).

Box 4.B.4. Examples of successful aggregations of small and rural utilities

Austria

Founded in 1946, Upper Austria Water is an autonomous non-profit association of more than 1 700 rural service providers located in the federal state of Upper Austria. Chaired by a board of seven directors, it is in charge of operations and maintenance of small-scale water supply and sewerage systems in rural areas through technical assistance (emergency supply, mobile technical equipment), pooling programmes (for water metre purchase and water analyses, for example) and measurement services (such as leak detection, pipe and valve location, flow rates and pressure, and aquifer tests). It aims to supply sufficient high-quality and cost-efficient drinking water through the construction and operation of autonomous installations. It also provides capacity building and staff training, and supports service providers on legal and financial issues. Similar models exist in other states of Austria.

Brazil

In 1996, when the Integrated System for Rural Sanitation (Sistema Integrado de Saneamento Rural, SISAR) was created in the Brazilian state of Ceará, its main purpose was to bring access to water supply in rural areas where such service was previously not available. These areas had been left aside by state water supply and sanitation companies, which had predominantly focused on urban access to water supply and sanitation services. From 1996 to 2016, SISAR's coverage expanded dramatically, from 18 to 153 localities, and it reached operational cost recovery in 2012. This success, which has encouraged the replication of the SISAR model in other rural contexts in the Brazilian states of Bahia and Piaui, is mainly based on a gradual improvement strategy and a specific labour arrangement.

Source: World Bank (2017), *Joining Forces for Better Services: When, Why, and How Water and Sanitation Utilities Can Benefit from Working Together*, https://openknowledge.worldbank.org/handle/10986/28095.

The financial sustainability of operators has to be strengthened to reach at least operating and maintenance cost coverage (including rehabilitation and depreciation costs) and reduce dependency with regard to provincial financial contributions, which are subject to discretionary decisions. To do so, tariff levels need to better reflect operating and maintenance costs levels, especially in those services where the metering level is high. The tariff structure also needs to be revised and the metering level increased (both for production and distribution) in ASSA in order to promote an efficient use of the resource.

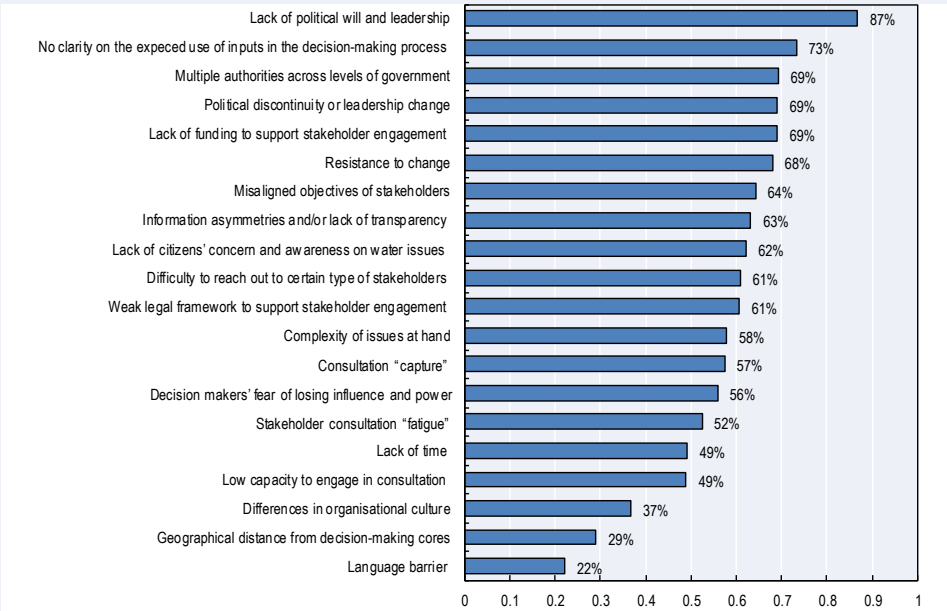
Stakeholder engagement could usefully be strengthened. Going beyond the existing awareness-raising activities would help to reinforce accountability between customers and service providers, and thus lower the risk of political interference. There are various possibilities of engagement processes between customers and service providers, ranging from communication to co-decision and co-production (Figure 4.13 in Chapter 4). In order to reinforce stakeholder engagement, different categories of obstacles should be overcome. They include obstacles that hinder the integration of the concept and approaches of

stakeholder engagement into water policies and practices, as well as bottlenecks that impede the effective implementation of the engagement processes (Box 4.B.5).

Box 4.B.5. Major obstacles to stakeholder engagement in the water sector

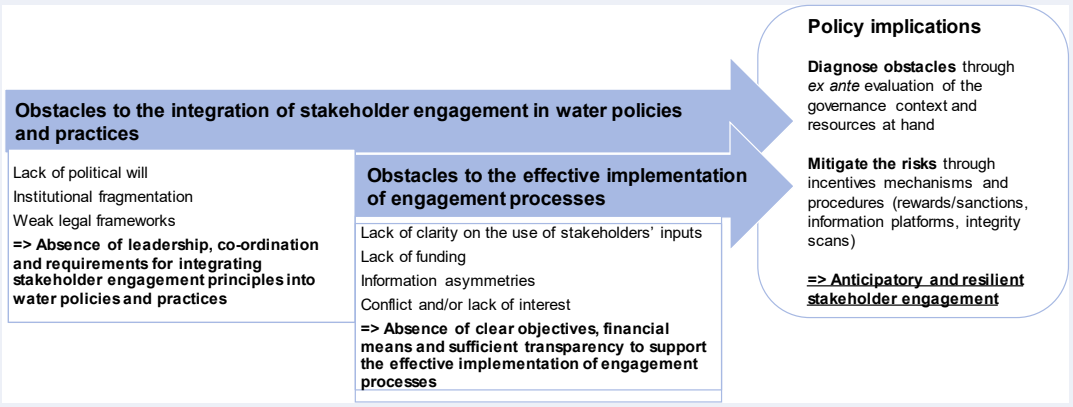
The OECD Survey on Stakeholder Engagement for Effective Water Governance identified two categories of obstacles to stakeholder engagement. The first category includes those obstacles hindering the integration of the concept and approaches of stakeholder engagement into water policies and practices. They relate to political leaders' resistance to relinquish power over other stakeholders, as well as the absence of legal frameworks to embed stakeholder engagement in institutional practices. These obstacles restrict adopting principles of inclusive decision-making. The second category includes bottlenecks that impede the effective implementation of the engagement processes. They concern the lack of clarity on the use of stakeholders' inputs, the lack of funding, misaligned objectives as well as the lack of transparency.

Figure 4.B.6. Major obstacles to stakeholder engagement in the water sector



Understanding and overcoming obstacles to stakeholder engagement requires a holistic approach, as challenges facing inclusive decision-making processes are often interrelated and can exacerbate each other. For instance, a context where roles and responsibilities are fragmented across multiple agencies and organisations at different levels of governments may also suffer from the unclear strategy of how to use the inputs from engagement processes between these multiple authorities. Because of unclear objectives, policy makers may not support the engagement process. Therefore, there is a need to understand interdependencies between obstacles and to devise appropriate solutions so that stakeholder engagement processes are anticipatory and resilient.

Figure 4.B.7. Towards anticipatory and resilient stakeholder engagement



Source: OECD (2015), *Stakeholder Engagement for Inclusive Water Governance*, https://doi.org/10.1787/9789264231122-en.

Notes

1. *Barrios Populares* are disfavoured neighbourhoods with informal settlements.

2. This leakage estimation could be underestimated as metering remains low. Therefore, it should be taken with caution.

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Annex A. List of stakeholders consulted during the policy dialogue

Institution	Name and surname
ABSA	Santiago Negri
Aguas Rionegrinas S.A.	Omar Grill
Aguas Santafesinas S.A.	Sebastián Alberto Bonet
	Guillermo Lanfranco
	Jorge Nuñez
	Hernando Quagliardi
Argentinian Centre of Engineers	Felix Yacaruso
Argentinian Forum of Water	Leandro Raúl Díaz
	Maria José Fioriti
Argentinian Institute of Water Resources	Ana Mugetti
	Victor Pochat
Association for Co-ordination of Users, Consumers and Taxpayers	Gisella Riccardi
Authority of the Matanza Riachuelo Basin	Sergio Mazzucchelli
AySA	Jose Luis Inglese
AySAM	Richard Battagion
	Alejandro Coll
CAF - Development Bank of Latin America	Carlos Orellana
	Carlota Real
	Franz Rojas
Chief Cabinet Office	Pamela Correani
CIPPEC Foundation	Gabriel Lanfranchi
	Florencia Yañez
Civil Association for Equity and Justice	Natalia Echegoyemberry
	Rosario Fassina
Commune of Alvear	Siomara Nahir
Co-operative for the Provision of Drinking Water Supply and Other Services of Sunchales	Eduardo Alasia
	Cristian Marotti
	Leandro Torres
Directorate of Hydraulics (province Buenos Aires)	Marcelo Rastelli
Directorate of Water and Sewerage (province of Buenos Aires)	Martin Heinrich
Directorate of Water Service Provision Systems	Juan Pablo Rentería
Embassy of Chile	Susan Maricel Silva Donoso
Embassy of Denmark	Jonas Boving Christiansen
	Soren Vohtz
Embassy of Hungary	Csaba Gelenyi
Embasy of the Netherlands	María José de Lazzer
	Bernd Scholtz
ENEL-El Chocón	Fabián Restelli
ENOHSA	Alejandro Avila Gallo
ENRESS	Francisco Funes
	Anahí Rodriguez
EPAS (province of Neuquen)	Mauro Millán
ERAS	Eduardo A. Blanco
	Marina N. Espeche
	Alejo Molinari
	Alberto Monfrini
FEDECOBA	Ricardo Ceriale
	Angel C. Echarren

Federal Association for Water and Sanitation Regulators	Oscar Pintos
Federal Council of Sanitation Services Entities	Sebastián Paz Zavalia
Federal Water Resources Council	Pablo Storani
	Julio Cesar Lucio Vargas Yegros
Federation of Sanitary Works Workers	Sara Elhelou
General Department of Irrigation	Marcela Andino
	Guillermo Cuneo
	Sergio Marinelli
	Carlos Martini
	Juan Andres Pina
	Raul Silanes
	Gonzalo Verdaguer
	Ruben Villodas
General Directorate of Sectoral and Special Programmes and Projects	Mabel Martín
Honorary Roundtable of Fisheries of the Alto Valle	Luis Maldonado
Hydroelectric Complex of Cerros Colorados	Carlos González
Interamerican Association of Sanitary and Environmental Engineering	Christian Taylor
Inter-jurisdictional Authority of the Limay, Neuquen and Negro River Basins	Horacio Collado
	Marcelo Gaviño
	Héctor Labollita
	Julio Porrino
	Gustavo Romero
	Elías Sapag
Ministry of Economy (province of Santa Fe)	Hugo Gabriel Rosti
Ministry of Economy, Infrastructure and Energy (province of Mendoza)	Alfredo Aciar
Ministry of Environment (province of Santa Fe)	Edgardo Seguro
Ministry of Foreign Affairs and Cult	Baldomero Casillo
	Baldomero Castro
	Javier Chalian
	Luciano Donadio
	Fernando Duarte
	Ignacio Frechero
	Marcelo Martínez Soler
	Mariano Vergara
Ministry of Health and Social Development	Miguel Dahbar
	Marina Orman
	Humberto Stepanik
Ministry of Infrastructure and Public Services (province of Buenos Aires)	Carlos Laino
Ministry of Infrastructure and Transport	Horacio Bersezio
Municipality of Armstrong	Natalia Martínez
Municipality of Lujan de Cuyo	Rolando Baldasso
	Martin Del Popolo
Municipality of Maipu	Mario Brandi
	Gabriel Martin
	Eduardo Menzzabotta
Municipality of Tigre	Alberto Lacioppa
National Budget Office	Ruben Soliani
National Co-ordination Council of Social Policies	Laila Brandy
	Nicolás Todesca
National Council of Scientific and Technological Research	Esteban Castro
National Directorate of Hydraulic Works	Constanza Patrone
National Institute for Statistics and Census	Diego Linenberg
	Gerardo Mittas
National Legislator	Hugo Alvarez Ulloa

	Laura Grau
	Fernanda Reyes
	Pablo Torello
National Technological University	Gerardo Burdisso
	Marcelo Masckauchan
	Susana Santana
National Technological University - Regional School of Mendoza	Victor Hugo Burgos
	Clarisa Israel
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