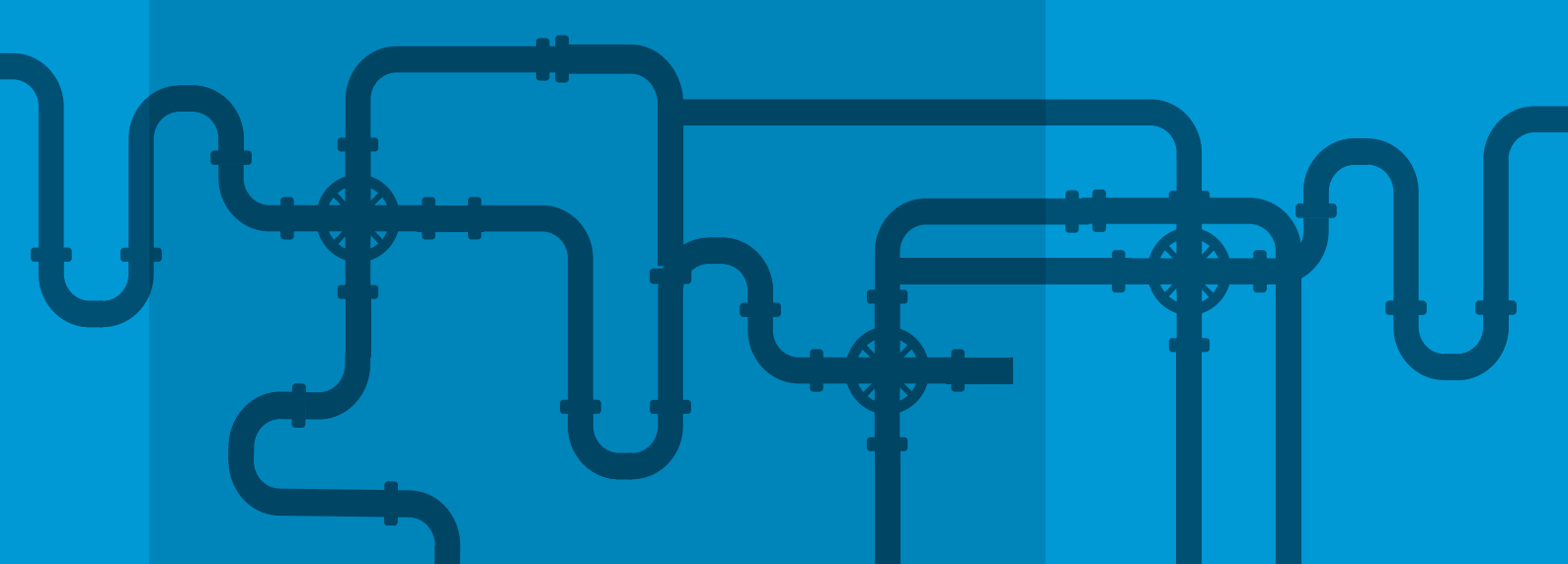


PUBLIC-PRIVATE PARTNERSHIPS IN WATER AND SANITATION

MAIN FIGURES AND TRENDS IN
LATIN AMERICA AND THE
CARIBBEAN



Inter-American Development Bank

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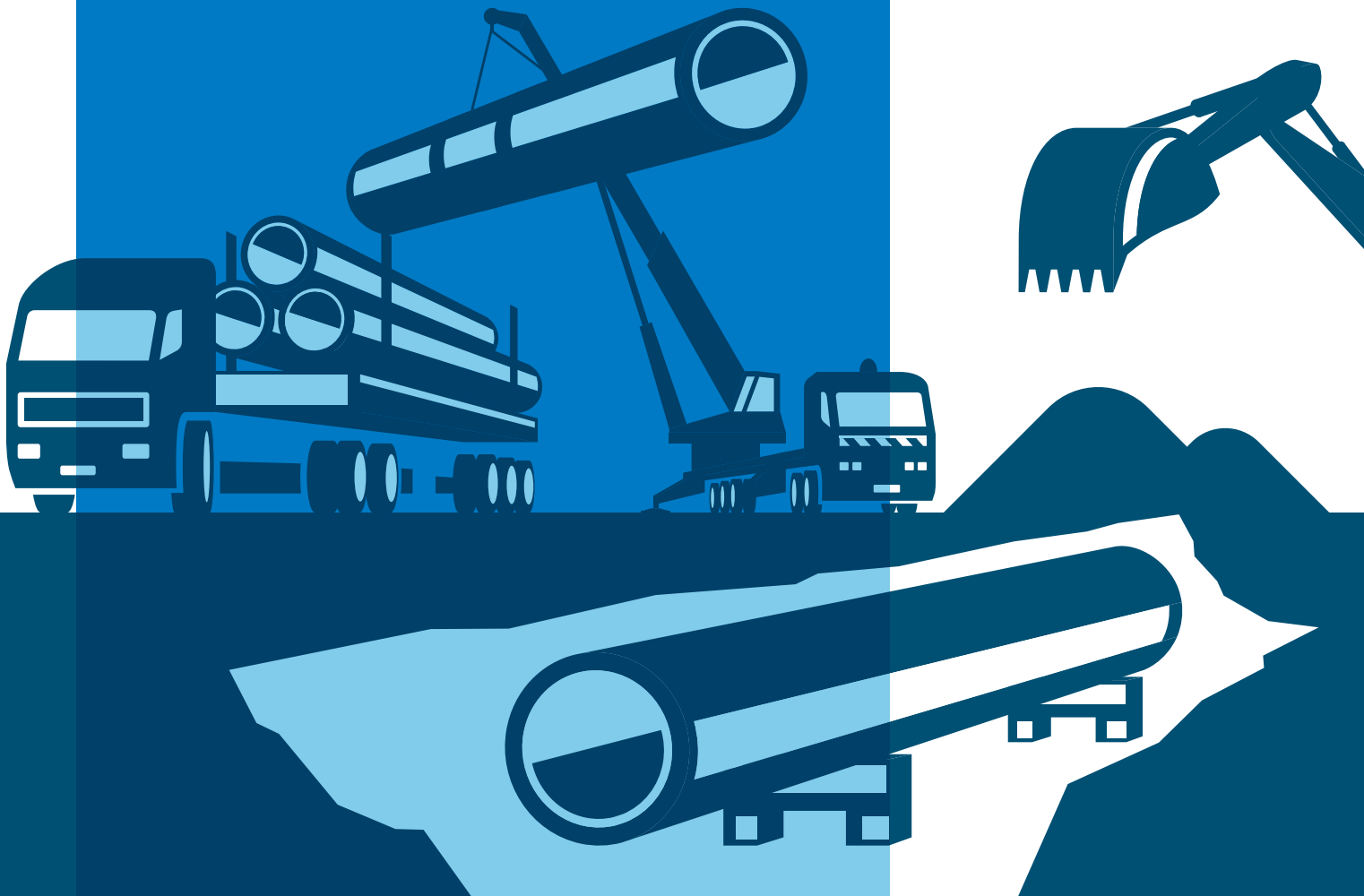
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CONTENTS

1	Introduction	01
2	Overview of the regulatory framework for private participation in the water and sanitation sector	05
3	Public-Private Partnerships in water and sanitation: subsectors and types	09
4	Main private operators present in water and sanitation Public-Private Partnerships in the region	28
5	Infrastructure considered, types of contracts and tender processes in the water and sanitation sector	33
6	Scope of investments required in contracts and performance indicators	40
7	Features of contracts and risk allocation in water and sanitation Public-Private Partnerships	47
8	Performance of water and sanitation Public-Private Partnerships	61
	• References	67
	• Annex A1 Water and sanitation coverage levels in Latin America and the Caribbean by nation 2000 - 2017	70
	• Annex A2 Water and sanitation coverage levels in urban and rural areas of Latin America and the Caribbean	71
	• Annex B Regulatory frameworks for private participation in the water and sanitation sector in Latin America and the Caribbean	74
	• Annex C Water and sanitation PPPs' performance indicators - Sample of contracts with available information	78

1

INTRODUCTION



1

INTRODUCTION

Latin America and the Caribbean have made a huge effort to significantly increase water and sanitation coverage levels over the past decades. On average, 95% of the population has access to at least one drinking water service in Latin America and the Caribbean (LAC). However, there are still “last mile” issues, since only one in five countries has a national coverage level above 99%. As regards sanitation, widespread access level is lower than in the case of drinking water, with an 84% average regional coverage. Only 4% of the countries have national coverage equal to or higher than 99%. Furthermore, these average figures hide more complex realities in rural areas, where conditions are considerably worse; see Annex A¹.

However, the sector faces many challenges in terms of supply, scope and quality of the service. Quality issues related to the supply of the drinking water service have serious effects on the health of the population. According to the IDB’s DIA 2020, more than 9,000 lives could be saved every year if the region managed to increase the quality of the water supply service up to European levels. The Americas Barometer 2018/2019 shows that many of the survey respondents state that, even though they have access to piped water, intermittent supply and unscheduled interruption rates are high. Data for El Salvador, Guatemala, Honduras, Mexico and Dominican Republic show that over 20% of the population does not receive water supply two or more days a week, and on average, service can last only for half a day. In these countries, the percentage of people who do not have access to water supply services 24 hours a day is fairly high, Dominican Republic, El Salvador and Guatemala being the most affected (DIA 2020)².

¹ Coverage data were collected by UNICEF - World Health Organization.

² One way to measure the quality of the water supplied is by assessing its properties, like cleanliness and absence of contaminants. The region’s poor water quality can be estimated using data from the Americas Barometer 2018/2019 on the consumption of bottled water. These data reveal, for instance, that in Mexico 81% of the survey respondents state they have access to piped water, but 77% say they drink bottled water, rather than tap water. The reasons may lie in the fact that the process from water extraction to its final consumption is lengthy and exposes water to several risks. These include low wastewater treatment rates and inappropriate management of solid waste, heavy metals and pesticides, but also events resulting from climate change. In this sense, not only is water initial treatment important, but the poor quality of distribution networks must also be considered, as an inadequate maintenance of pipes and irregular pressure lead to water pollution.

Furthermore, access to sanitation in urban areas is usually enabled by developing sanitation networks connected to a treatment plant. However, in the areas where houses are few and scattered, lower-scale solutions tend to be adopted, like septic tanks or composting latrines, which have significant consequences (and differences) in terms of service quality. This is reflected in the differences in coverage between urban and rural areas. Another sanitation-related issue is that not only are coverage rates low, but wastewater treatment rates are estimated between 20% and 40%.

To sum up, investment needs are high and the resources available to meet them are scarce. It is estimated that the water and sanitation sector needs to invest on average around US\$23,000 million a year between 2020 and 2030 to meet infrastructure needs, including those necessary to reach Sustainable Development Goals³. This goal is defined as reaching “safely managed” water access by 2030, which means improved water supplied on site (usually the household), available when needed and pollution-free. Reaching this goal not only will require substantial effort and financial resources, but will also imply improving the availability of data on existing access gaps, designing solutions and monitoring progress (IDB 2020).

There is huge potential to increase private sector participation in the provision of water and sanitation services. Considering all private investments in infrastructure in the region, approximately 15% are related to water and sanitation but account for only 6% of the total amount invested⁴. These relatively low private participation rates could be explained by the following reasons⁵:

- **Large capital requirements and difficulties to meet operating costs:** large sums of money are needed to finance long useful-life assets. Once these infrastructures are operational, they may not provide the revenue needed to meet construction and operation expenses, which may be explained in some cases by users’ reluctance to pay for water and sanitation services, and governments’ difficulty to increase tariffs; in other cases, the reason lies in management efficiency issues that lead to higher operating costs, such as non-revenue water losses⁶.
- **Challenging governance and regulatory framework:** this type of services are usually managed and regulated by several agencies at multiple government levels. This fact limits the sector’s chances to achieve performance improvements and attract private investments. Besides, regulatory frameworks in some countries restrict private sector participation in the water and sanitation area. The low institutional capacity and lack of independence would prevent them from fulfilling their duties efficiently, contributing to the lack of sustainability of service provision.

³ Global Infrastructure Hub. Infrastructure Outlook. May 2020

⁴ According to data from the World Bank’s PPI database, a total of 2057 projects with private participation (classified as PPP) have been developed in the region, 306 of which involve the water and sanitation sector. As regards investment level, the total amount for the region is US\$608,381 thousand million and particularly in the water and sanitation sector, the amount reaches US\$34,289 billion.

⁵ Ikeda et al, 2020

⁶ As compared to other developing regions, the average tariff level in Latin America and the Caribbean is high, although there is great internal heterogeneity, which causes concern given the low cost-recovery level in the sector (Brichetti, 2019).

- **Project design complexity and weakness:** there are limited opportunities to reach scale economies in infrastructure investments when each project has different characteristics. This distinctive feature is found in water and sanitation projects, which include different types of investments and technologies. Another factor that influences complexity are the characteristics of each location: water management has distinctive features that range from hydrological aspects (like the natural source water comes from) to historical and cultural factors. This whole complexity precludes appropriate investment planning (preinvestment process), which leads to weak designs and the development of below-target infrastructures.
- **Limited transparency:** as public reliable data available in the sector are limited, it is difficult to assess performance and make decisions.

Strengthening private participation in the sector is paramount to close quantity (access and coverage levels), quality and efficiency gaps in the sector. Private sector participation may contribute both to ensuring improved development, operation and maintenance of infrastructure assets and services and to preserving appropriate investment levels against a backdrop of huge tax difficulties. With the appropriate conditions and implementation, Public-Private Partnerships (PPPs)⁷ are effective when it comes to reducing the infrastructure gap in the region, not only quantity wise but also (and particularly) in terms of quality and efficiency, thanks to:

- 1- improved asset planning, development and maintenance;
- 2- improved incentive alignment; and
- 3- improved risk management throughout the project life cycle. In sum, PPPs may generate more value for money than the traditional service provision option. Performance-based contracts in non-revenue water projects in the region are proven evidence of the benefits of private participation in the sector⁸.

This document lays out a profile of PPPs' private participation schemes in the region's water and sanitation sector, focusing mainly on both drinking water and wastewater treatment plants and comprehensive drinking water and/or sanitation service provision contracts, based on the analysis of 505 projects carried out in the region over the past three decades⁹. After an overview of the regulatory framework for private participation in the sector in each of the region's countries, the document reviews the main figures and trends of private participation in the water and sanitation sector under several types of projects and contracts, reviewing tender processes and contract features. Lastly, the document reviews risk allocation schemes and briefly analyzes contract/project performance based on existing evidence.

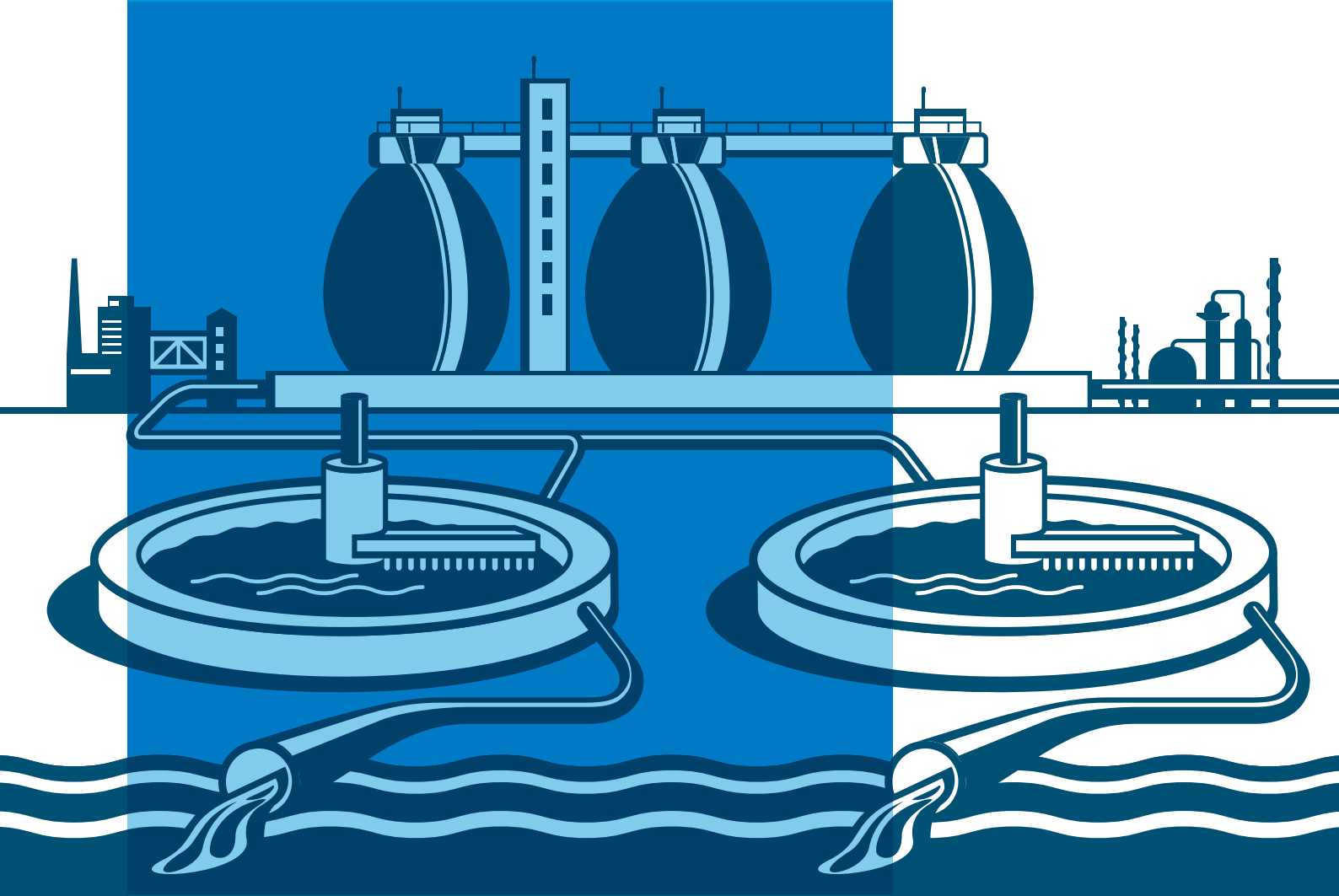
⁷ This document considers the standard definition of PPP agreed by the Multilateral Development Bank, that is, 'a long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration is linked to performance'. (PPP Reference Guide 3.0 World Bank)

⁸ A recent IDB study for the Bahamas case shows how this mechanism had huge benefits, such as the following: the recovery of operating costs increased substantially and EBITDA loss decreased by more than 50%, just like the government's operating subsidy (Wyatt, 2018).

⁹ Out of the 505 contracts reviewed, 363 were executed. The remaining agreements refer to projects undergoing different stages prior to the execution of the contract, as reported by the Global Water Intelligence Project Tracker downloaded in February 2020.

2

OVERVIEW OF THE REGULATORY FRAMEWORK FOR PRIVATE PARTICIPATION IN THE WATER AND SANITATION SECTOR



2

OVERVIEW OF THE REGULATORY FRAMEWORK FOR PRIVATE PARTICIPATION IN THE WATER AND SANITATION SECTOR

Regulatory frameworks in force in the vast majority of Latin America and the Caribbean (LAC) countries (92%¹⁰) reflect the possibility to include private sector participation in the Water and Sanitation (WAS) sector –Argentina, Bahamas, Brazil, Chile, Colombia, Dominican Republic, Ecuador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Peru, Panama, Trinidad and Tobago, Belize, Costa Rica, El Salvador, Paraguay, Barbados– for the purpose of increasing service coverage and achieving better service quality. There are some notable exceptions. One is the case of Bolivia, where the State Political Constitution provides that the access to water and the sewerage system are human rights, and may not be the object of concession or privatization; however, it does highlight private companies' role as input and technical assistance providers. The other one is Uruguay, which the Constitution specifies that public sanitation and water supply for human consumption services shall be provided solely and directly by state companies, thereby making it impossible to develop PPPs in the Uruguayan WAS sector¹¹. Chile is at the opposite end, as its urban market is served almost completely by private companies (see box 1). However, the region still has many PPP laws which do not include the WAS sector within their scope of action¹². Table 1 of the Annex summarizes regulations governing private participation in the sector, by country.

¹⁰ Out of a total of 25 countries in the region. Data for Venezuela have not been considered in this analysis.

¹¹ Likewise, Ecuador and Suriname present two particular cases. In the first one, private sector participation is allowed, but shall be declared as an exception by presidential decree, as the Constitution of the Republic of Ecuador specifies that the State shall be responsible for providing drinking water and irrigation services and further prohibits any form of water privatization and makes it clear that sanitation, drinking water supply and irrigation services shall be provided solely by state or community legal persons. As for Suriname, there is no constitutional or lower-rank rule prohibiting PPPs in the WAS sector, but also no public policy or law promotes such partnerships (García et al., 2020).

¹² In Panama, for instance, the PPP Act precludes the Instituto de Acueductos y Alcantarillados Nacionales (IDAAN) from acting as contracting authority, but projects might be developed in other forms through other authorities in the sector. In Guatemala, in turn, the Partnership for Infrastructure Development Act does not apply to the water sector. However, as the service is provided by municipalities, they might carry out PPP projects through the Municipal Code. Bahamas' PPP Policy does not explicitly mention the WAS sector either but the National Development Plan (under preparation) mentions the possibility of private partners participating in this sector. In El Salvador, the Special PPP Act did not include WAS among the sectors where PPPs could be developed; however, the Special Act amendment of 2018 waived the inapplicability of the act to the design, construction, repair, improvement, equipment provision, operation and maintenance of infrastructure for wastewater treatment in the metropolitan area of San Salvador, San Miguel and Santa Ana.

Box 1

THE WATER AND SANITATION MARKET IN CHILE

The Water Code defines water as a national good for public use, but in order to use or extract water from an affluent the possession of Water Use Rights is required. These rights are transferred free of charge by the State to whomever may request them, whether it is a public or private person, for an indefinite period of time and become private property of the user permanently and may be the object of market transactions like any other asset, which leads water to be considered private in Chile. Later on, Law 18885 of 1990 authorized the state to conduct business activities in the drinking water and sewerage system sector and incorporated companies in each of the country's regions, which were subsequently tendered to private parties. Starting in 1998, the private-party incorporation process was conducted by the Corporación de Fomento (CORFO), which owned the country's sanitation companies. Some of the companies were privatized, but 8 of them were granted in concession for 30 years (and the companies' ownership remained in the hands of the state), which served 24% of the sanitation market customers¹. These concessions are administered by ECONSSA².

¹ García et al, 2020.

² Empresa Concesionaria de Servicios Sanitarios S.A. (ECONSSA) Chile.

Considering all the countries which allow private participation in the sector, 77% have developed PPP contracts: Argentina, Bahamas, Bolivia, Brazil, Chile, Colombia, Ecuador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Peru, Panama, Dominican Republic, Trinidad and Tobago. In Costa Rica, while these are not considered PPP, the private sector participates in the provision of the service through small private supply companies, mostly in coastal high-income areas. The situation in Guatemala is similar. In Jamaica, 16 private operations were identified in the WAS sector related to tap water supply, sewerage services and irrigation services; however, these operations only account for a small part of the drinking water produced. In Paraguay, there are the so called Aguateros (small-scale water providers), which have built piped-water supply systems for twenty years with no public sector financing. These are private businessmen, with a legal personality of their own, organized as sole proprietorships or corporations, which provide only drinking water services by exploiting underground wells¹³. In the urban areas of El Salvador there are private operators who can provide services in specific neighborhoods or populations, under ANDA's oversight. In Honduras, due to the shortage of water, several population groups are willing to pay prices higher than those charged by the national company or municipal authorities for the provision of drinking water by means of private water trucks.

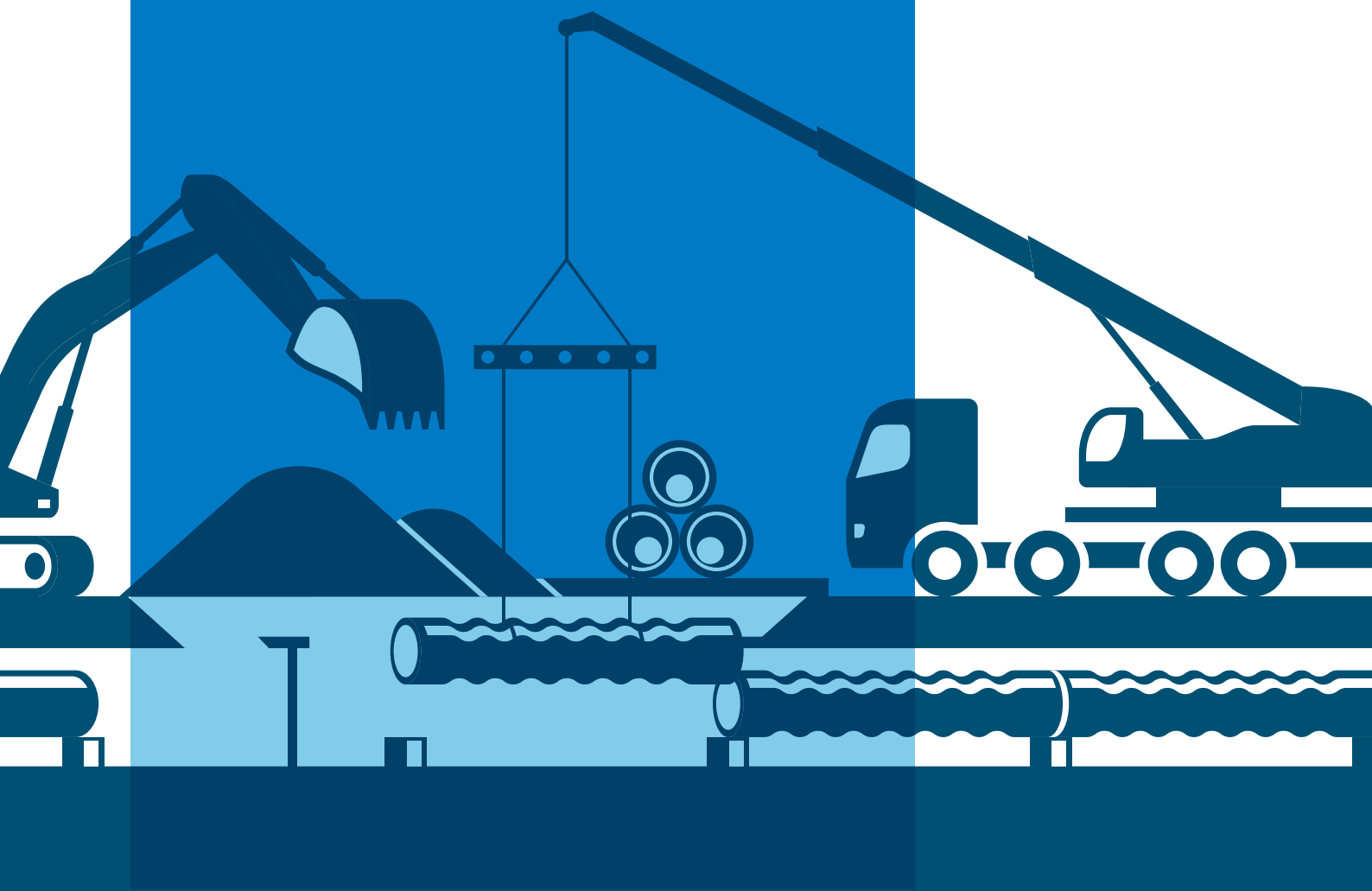
¹³ García et al, 2020.

Even so, it may be estimated that the private participation rate through PPP schemes in the region is relatively low in general terms, except for the main Latin America and the Caribbean economies, where figures range from 10 to 25% of the market total. PPP schemes' participation rate in the WAS market in LAC varies from country to country. Some examples are Argentina (10%), Brazil (15%), Colombia (19%), Mexico (25%) or Chile (23%)¹⁴.

¹⁴ The companies considered are those granted in concession and under ECONSSA's control.

3

PUBLIC-PRIVATE PARTNERSHIPS IN WATER AND SANITATION: SUBSECTORS AND TYPES



3

PUBLIC-PRIVATE PARTNERSHIPS IN WATER AND SANITATION: SUBSECTORS AND TYPES

PPP contracts may be executed in different parts of the entire water cycle and through different contractual schemes; therefore, a comparative analysis of these contracts requires preparing taxonomy of private participation in the sector. We may therefore find PPPs ranging from greenfield projects including the construction, operation and maintenance of water extraction and transmission to population centers, irrigation projects, and water or wastewater treatment plants, among others. In some cases, the private sector usually participates in projects including more parts of the water provision and sanitation cycle by means of contracts whereby they take responsibility for drinking water treatment, its distribution to the end consumer, the collection of the applicable tariffs and other commercial management duties, wastewater collection, treatment and final disposal, etc.

This reports covers 505¹⁵ PPP contracts and projects¹⁶ in drinking water and wastewater treatment plants and contracts for drinking water and/or sanitation service comprehensive provision¹⁷. Sixty six percent of these contracts and projects relate to the provision of services and only 34% refer to the construction and operation of these treatment plants.

¹⁵ The database was prepared using the World Bank's PPI's original information, supplemented by K&M Advisors' information for BID Invest, as well as information from Global Water Intelligence. Furthermore, specific contracts have been identified and added for Bahamas, Chile, Jamaica, Haiti, Honduras, Panama, and Trinidad and Tobago.

¹⁶ According to the World Bank's Public-Private Partnerships Reference Guide 3.0, a PPP is a long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration is linked to performance. In this case, mixed companies are considered, which are formed between a public and a private partner to provide water and sanitation services. Management agreements are also considered, which usually have a shorter term but wherein risks are split between the parties and remuneration is linked to performance.

¹⁷ In this type of contracts the private partner bears responsibility for the existing infrastructure, the rehabilitation and expansion of the distribution networks and plants needed to provide the water and/or sanitation service subject to the terms provided in the PPP contract. They generally imply significant capital expenditure, which usually exceeds the one invested in water treatment plant agreements.

Contracts may in turn be divided into three types:

- **Construction:** contracts for construction, operation, maintenance and subsequent transfer to the State.
- **Rehabilitation:** contracts for rehabilitation and occasionally construction, operation and maintenance for a period of time.
- **Management:** management agreements wherein the private party only bears certain risks related to the provision of the service, like non-revenue water (NRW) loss reduction.

Table 1
TYPES OF PPP CONTRACTS

	Treatment plant	Service provision	Total projects
Construction type	95%	4%	35%
Rehabilitation type	5%	90%	61%
Management type	-	5%	4%
Total projects	34%	66%	100%

Source: Produced by the authors.
Note: N = 505

Most of the cases noted (61%) relate to contracts including mostly existing-infrastructure rehabilitation activities as well as the operation and maintenance thereof for a period of time, although in general they also include construction activities. The following 35% relates to the development of new facilities (Construction type). Lastly, 4% relates to management contracts.

Ninety five percent of water treatment plant contracts belong to the Construction type, 90% of service provision contracts belong to the Rehabilitation type and 100% of the Management type contracts are service provision PPPs. This last type of management contracts usually implies hiring a firm specialized in the sector to provide the local utility with a series of recommended actions and, in some cases, for this firm to implement some of these actions in order to improve service provision. For example, in the case of Cantón de Pedro Moncayo in Ecuador, the situation prior to the execution of the management contract was complex: users received drinking water supply once or twice a week because of the many leaks along the different transmission sections, the municipal water management system was inefficient, with default payments nearing 90% (which made it necessary to subsidize costs), industries made an inappropriate use of drinking water, there were illegal occupations and destruction of aquifer-related ecosystems.

As a result of the performance of this management contract, the billing system has changed; the entire population has been guaranteed access to good-quality drinking water 24 hours a day, 365 days a year; management capacity has improved by updating its database, establishing an effective sanitation system and significantly reducing water leaks; bills have been adjusted to consumption to ensure the system works properly; network maintenance has improved through prevention activities and the correction of the transmission system in order to avoid losses due to damage and leaks; the distribution network has been improved in Tabacundo, the main city in the canton, thanks to the creation of an improved hydraulic balance pressure; a company-specific fund has been established to promote the Reforestation Plan with native species in surrounding lands. In this way, the public company improves the surrounding ecosystems and makes sure there is an appropriate water course to be used in provision services¹⁸.

Table 2
NUMBER OF PROJECTS BY COUNTRY

Country	Percentage of projects
Argentina	7.1%
Barbados	0.2%
Bolivia	0.4%
Brazil	48.1%
Chile	2.4%
Colombia	11.1%
Ecuador	1.2%
El Salvador	0.8%
Guatemala	0.2%
Guyana	0.2%
Haiti	0.4%
Honduras	0.6%
Jamaica	0.6%
Mexico	16.8%
Nicaragua	0.4%
Panama	1.0%
Peru	7.9%
Trinidad and Tobago	0.4%
Bahamas	0.2%

Source: Produced by the authors.

Note: N = 505

18 Drinking water infrastructure management and improvement in Cantón Pedro Moncayo (Ecuador). 2006

In the sample analyzed, 48.1% of projects are located in Brazil. The sanitation sector has the largest representation among PPP contracts executed in Brazil. Around 1 in 4 PPP contracts in operation belongs to this sector¹⁹. The first concession contract for a water and sanitation service in Brazil was executed in 1995 in the Municipality of Limeira, to provide service to a population of approximately 250,000 inhabitants²⁰. The Jaguaribe Ocean Outfall System (also known as Salvador's submarine emissary) is the first PPP implemented in the state of Bahia and also the first partnership contract in the basic sanitation sector in Brazil. When it was launched, in June 2006, the tender stood out for being the first public-private partnership (PPP) in the sanitation sector in the country. However, the concession agreement was not executed until December 27 of the same year, when the Rio Claro (SP) PPP contract had already been signed²¹.

Box 2

WATER AND SANITATION PPPS IN BRAZIL

Brazil makes a distinction between PPP and (partial and full) concession contracts. Partial concession contracts usually belong to the Build, Operate and Transfer (BOT), Build, Transfer and Operate (BTO) and Build, Own and Operate (BOO) types. In general, they are designed to expand drinking water production or to implement wastewater treatment systems, while the drinking water distribution and wastewater treatment system is still managed by the municipal utility, which transfers part of the tariffs collected to the concessionaire. Full concession contracts transfer the private party the entire operation and maintenance of the drinking water and wastewater treatment system, jointly with the responsibility to make investments and the right to charge users tariffs. PPPs, in turn, are concessions that contemplate a payment to be made by the public administration, whether it is to supplement tariff collection (sponsored concession) or because the services are rendered directly to the public administration (administrative concession). This remuneration is usually subject to compliance with service standards and/or target achievement. The Associação Brasileira das Concessionárias Privadas de Serviços Públicos de Água e Esgoto (Abcon) estimates that the investment level in the 2016 – 2020 period will reach 12,700 million Brazilian reals and total investments committed in concession contracts amount to 34,800 million Brazilian reals. This investment level accounts for approximately 20% of the total amount invested in the sector. Private participation projects in the sector are successfully used in 325 municipalities in the country and their continued application is important for the private sector to provide financial resources, planning, technology and good management practices, with the aim of expanding water and sanitation coverage in Brazil.

Source: Casos Práticos. Formação em PPPs. Esgotamento Sanitário de Serra, Espírito Santo. Radar PPP <https://www.saneamentobasico.com.br/modalidades-de-contratacao-saneamento/>
Abcon Panorama 2019

¹⁹ Casos Práticos. Formação em PPPs. Esgotamento Sanitário de Serra, Espírito Santo. Radar PPP (2015).

²⁰ Ducci 2007.

²¹ Barbosa et al, 2009.

In the case of Peru, following the failure of SEDAPAL privatization process in the 1990s, virtually no other similar process has been started. Up until 2010, private participation has been formalized only in two sanitation service utilities: SEDAPAL, where the execution and operation of some works has been transferred by means of BOT (building, operation and transfer) type contracts and Aguas de Tumbes concession contract executed in 2005 and cancelled in 2018²².

Colombia, in turn, has been incorporating the private sector into the water and sanitation sector since the 1990s using different schemes. Private participation involvement in public utilities has adopted several contractual forms and policy instruments, including construction-operation contracts (San Estanislao de Kotska, Villanueva, Santa Rosa and Soplaviento in Bolívar -Giscol SA ESP-; Marinilla, Sonson, Puerto Berrio in Antioquia with Conhydra SA ESP), operation contracts (Cúcuta and San Andrés) and concession contracts (Barranquilla, Montería and Tunja), mixed companies (Aguas de Cartagena). Over the past 25 years, 114 municipalities included private participation under different contractual forms with varying performance results²³.

In Mexico, with the adoption of the National Water Act in 1992, several forms of organization were authorized for municipalities to use in the provision of the drinking water and sanitation service, including concessions. Private participation commenced even before the adoption of this law, in the 1980s. There appeared block water-supply schemes, total or partial system management and the construction of wastewater treatment plants²⁴. Contracts were executed in the cities of Monterrey, Ciudad Juárez, Puebla, Laredo, Saltillo, Aguascalientes, Piedras Negras, Ciudad Acuña, Cancún, Mexico City, Torreón and Matamoros (all under Suez' management). The cases of Cancún and Aguascalientes were comprehensive management contracts, while those in the Federal District and Puebla were partial service provision contracts. We can also mention contracts for the design, start-up, operation and maintenance of wastewater treatment plants, like the case of Puerto Vallarta, Toluca, Ciudad Juárez and Chihuahua. The first service provision PPP was organized in Aguascalientes, which started in 1989 upon the direct contracting of a three-year management contract; due to its good performance, in 1993 it became a full 20-year concession, subsequently extended to 30 years in 1996²⁵.

In Argentina, the private sector incorporation process began in 1991 in the province of Corrientes, but the most important milestone was the concession of the services of Capital Federal and 13 districts in the province of Buenos Aires to the company Aguas Argentinas SA, whose main partners were Suez and Aguas de Barcelona. This private participation model was then applied in some 10 provinces, but as we will see below, many of these contracts were either cancelled or renegotiated²⁶.

²² Oblita de Ruiz, 2010.

²³ Rodríguez Porcel et al, 2018.

²⁴ <https://www.jornada.com.mx/2005/07/12/index.php?section=opinion&article=019a1pol> y <https://www.citizen.org/wp-content/uploads/mexicoisnotforsale.pdf>

²⁵ Ducci, 2007

²⁶ Ducci, 2007

Table 3
NUMBER OF PROJECTS BY DECADE

Type of contract/ year	1990 - 1999	2000 - 2009	2010 - 2019	Number of treatment plantcontracts	1990 - 1999	2000 - 2009	2010 - 2019	Number of service provision contracts	Total
Construction type	35%	29%	36%	77	0%	25%	75%	4	81
Rehabilitation type	50%	25%	25%	8	24%	39%	37%	257	265
Management type	-	-	-	-	29%	41%	29%	17	17
Total	-	-	-	85	-	-	-	278	363

Source: Produced by the authors.

Note: N = 363

In the history of private participation in water and sanitation in the region, three generations can be identified, from the early 1990s to this day. The first generation responded to LAC's governments' financial needs. In the early 1990s, private participation in the WAS sector grew exponentially. Latin American governments sought greater investment and efficiency from the private sector to make up for public administration deficiencies and financial resource shortage against a backdrop of debt crisis. The second generation starts in the late nineties and extends until late 2010. PPP contract execution dropped significantly in this stage, due to the following reasons:

- 1 -** failure to comply with contractual targets;
- 2 -** insufficient private sector investment and
- 3 -** macroeconomic and social risks.

This led to renegotiations, conflicts of interest and contract cancellations. At the same time, the public sector acquired greater significance in the provision of WAS services, increasing its financial commitments and participation in contract execution. Furthermore, with the departure of some foreign private companies, local private partners grew more important in new PPP contracts. The Colombian example may be noted which, through the Entrepreneurial Modernization Program (PME, by its Spanish acronym), encouraged local operators to win PPP contract tenders carried out between 2001 and 2004. Lastly, the third generation currently underway shows renewed interest in PPPs, through the different systems existing in the sector. The international financial crisis of 2008 was a turning point in the international financial system. Once the initial uncertainty period was over, PPP schemes in the sector expanded once again, accumulating investments exceeding US\$15,000 million in the region²⁷.

²⁷ This reflects data on total accumulated investments as of 2016, according to the World Bank's Public-Private Infrastructure Advisory Facility (PPIAF).

The low international interest rates and the return opportunities this type of contracts offered generated further incentives for the private sector, particularly in developing countries, where there are greater infrastructure investment needs. In LAC, the need to improve the provision of public services, infrastructure deficit, regulatory framework improvement and tax consolidation policies renewed governments' interest in partnering with the private sector and triggered the creation of regulations for the implementation of PPPs with an inter-sector view in terms of infrastructure²⁸.



WATER TREATMENT PLANTS

Table 4
WATER TREATMENT PLANT CONTRACTS BY TYPE, DECADE AND COUNTRY

	1990 - 1999	2000 - 2009	2010 - 2019	Construction type Number of contracts	1990 - 1999	2000 - 2009	2010 - 2019	Rehabilitation type Number of contracts	Total number of contracts
Brazil	47%	29%	24%	77	33%	33%	33%	3	20
Chile	-	-	-	0	50%	50%	-	2	2
Colombia	50%	50%	-	2	100%	-	-	1	3
Mexico	35%	29%	37%	49	100%	-	-	1	50
Panama	-	-	100%	1	-	-	100%	1	2
Peru	-	33%	67%	6	-	-	-	0	6
Trinidad and Tobago	50%	-	50%	2	-	-	-	0	2
Total	-	-	-	77	-	-	-	8	85

Source: Produced by the authors.

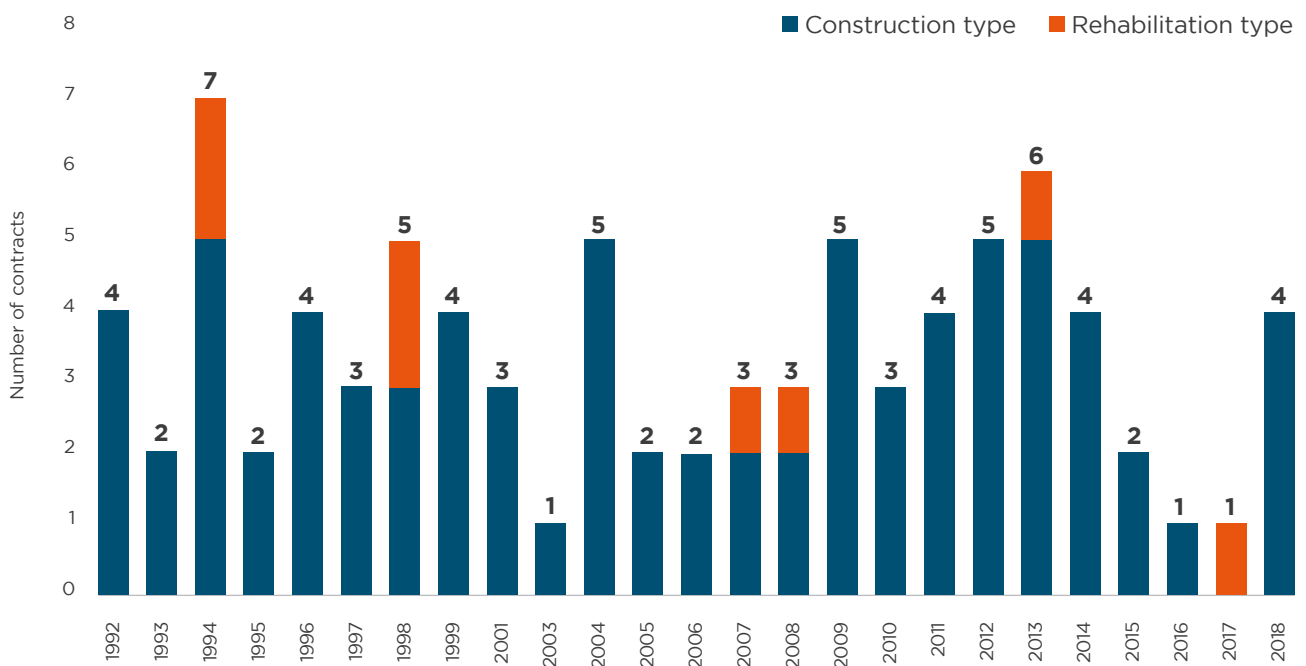
Sixty four percent of water treatment plant contracts of the Construction type were executed in Mexico, and 22% in Brazil. One of them is the Atotonilco water treatment plant in Mexico, a Construction-type project started in 2010 which began operations in 2017. The contract includes the design, construction, electromechanical equipment provision, testing, operation and maintenance for 17 years and the transfer of the plant. The aim was to clean up 60% of the wastewater generated in Valle de México; promote treated wastewater irrigation in over 80 thousand hectares in Valle de Tula, increasing its agricultural potential; clean up surface water bodies and waterways that receive wastewater; and improve sanitary conditions for over 300 thousand people living in irrigation areas²⁹.

²⁸ Frigerio, 2018.

²⁹ Suárez Alemán et al, 2019.

Some water treatment plant Rehabilitation-type contracts include the Alto Tiete PPP in São Paulo, Brazil, a brownfield project for the following purposes: dam maintenance; mud treatment and final disposal; civil and electromechanical maintenance; auxiliary transmission and delivery services; the expansion of Taiaçupeba Wastewater Treatment Plant capacity from 10 to 15 square meters/s; and the construction of 17.7 km of water pipes with diameters from 400 to 1800 mm and 4 deposits with a total capacity of 70,000 square meters, besides booster pumps, pumping stations and incidental works³⁰.

Graph 1
NUMBER OF WATER TREATMENT PLANT PROJECTS BY FINANCIAL-CLOSING YEAR



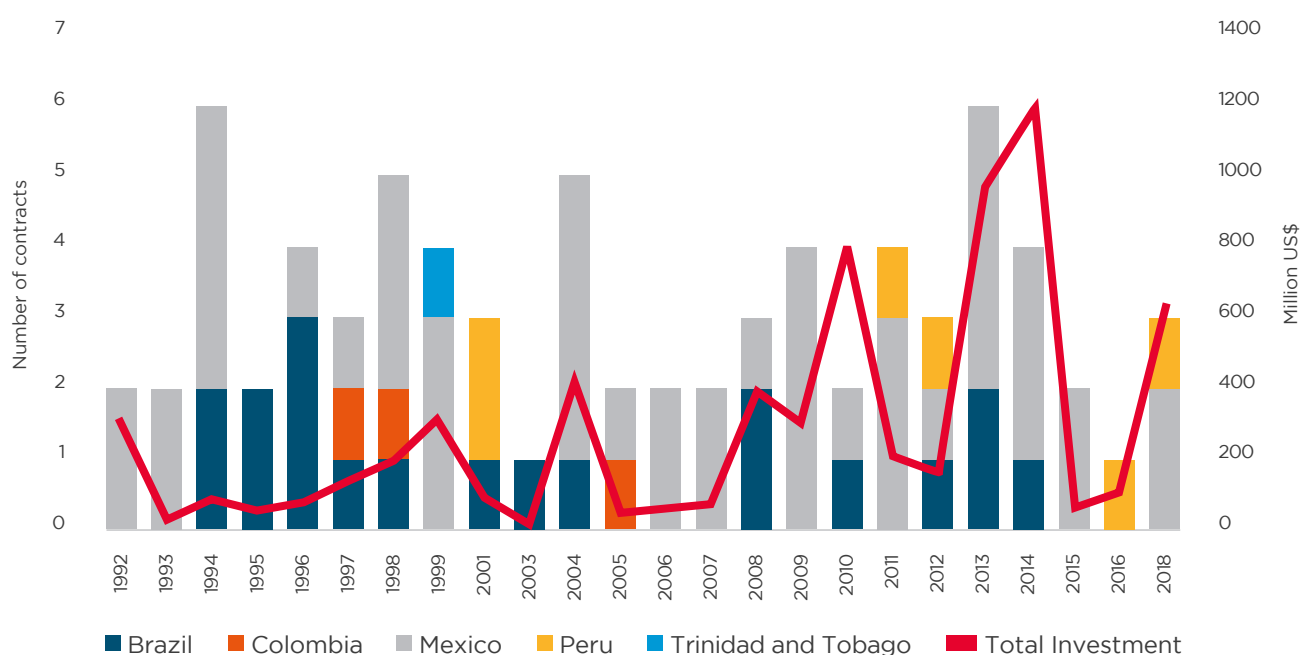
Note: N = 85

Source: Produced by the authors.

Water treatment plant PPP contracts are mostly of the Construction type and some countries sporadically execute Rehabilitation-type contracts. For example, the Rehabilitation-type project of 2017 related to the renewal of the operation and expansion contract for the Juan Díaz Wastewater treatment plant in Panama.

³⁰ [Meira de Menezes, 2007.](#)

Graph 2
NUMBER OF CONTRACTS AND INVESTMENT LEVELS
FOR WATER TREATMENT PLANT CONTRACTS



Note: this graph includes only the contracts for which we have information on the year of signature and investment amount (N = 75), which account for 88% of the contracts executed according to the database used.

Source: Produced by the authors.

In general the amount of investments in water treatment plant contracts is smaller than service provision contract amounts, because the latter usually include not only the construction of plants, but also the rehabilitation thereof and/or the expansion and rehabilitation of drinking water distribution or wastewater collection networks, that is to say, a more extensive work package.

Table 5
STATUS OF WATER TREATMENT PLANT CONTRACTS

	Active	Cancelled	Completed	Prior to contract execution
Construction type	43%	4%	7%	47%
Rehabilitation type	88%	0%	13%	0%
All types	45%	4%	7%	44%

Source: Produced by the authors.
Note: N = 158

Forty three percent of water treatment plant Construction-type contracts are active³¹ and 47% are in the stages prior to contract execution. These are projects like the desalination plant of Guaymas and Empalme in Mexico, which contract was executed in 2018, involving the design, construction, equipment provision, installation, operation, maintenance and exploitation of the desalination plant of Guaymas and Empalme, in Sonora. This plant will have vertical beach wells, desalination or pretreatment plant, reverse osmosis ultra-filtration, power recovery system, posttreatment, CO2 dosing, calcium hydroxide dosing, sodium hypochlorite dosing, auxiliary equipment, system automatic control, effluent neutralization equipment, membrane chemical cleaning system, drinking water storage tank, drinking water transmission line and pumping system. In sum, freshwater treatment or desalination plants produce bulk water, but do not distribute it to end consumers³².

Table 6
STATUS OF WATER TREATMENT PLANT CONTRACTS BY DECADE

	1990 - 1999	2000 - 2009	2010 - 2019
Active	55%	96%	93%
Construction type	82%	91%	93%
Rehabilitation type	18%	9%	7%
Cancelled	13%	4%	3%
Construction type	100%	100%	100%
Completed	32%	-	3%
Construction type	90%	-	100%
Rehabilitation type	10%	-	-

Source: Produced by the authors.
Note: N = 85

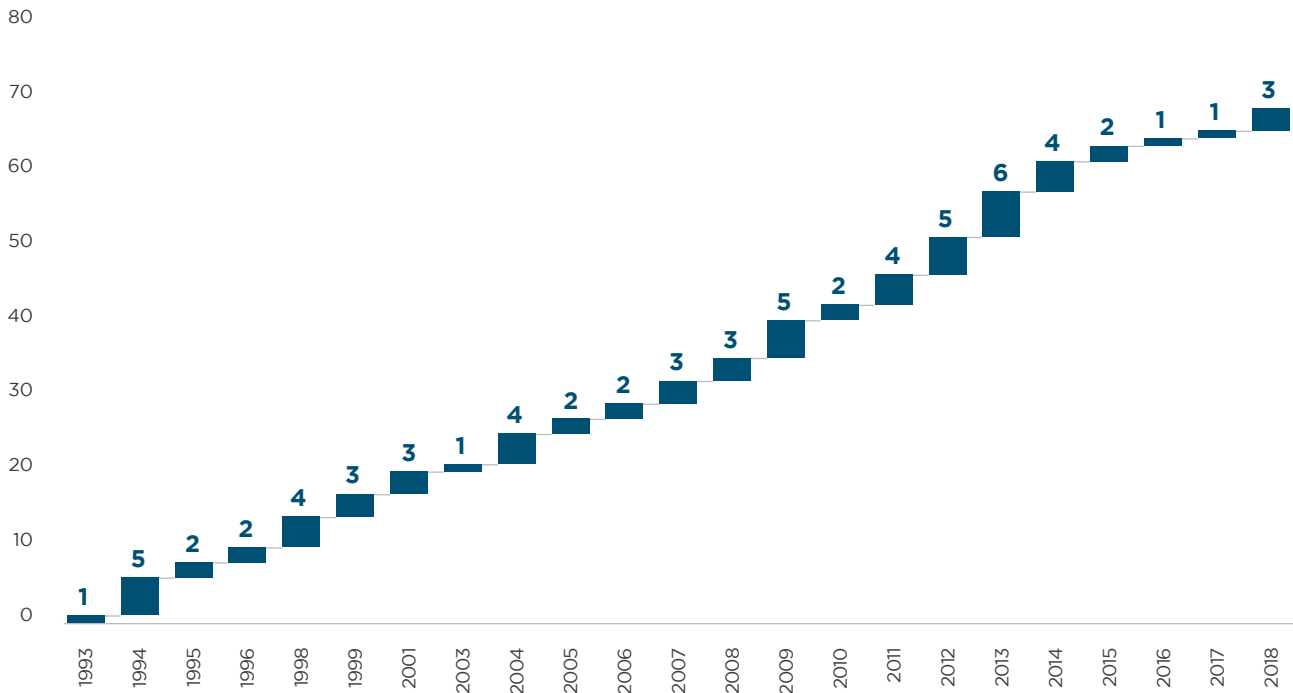
Fifty five percent of water treatment plant contracts with financial closing in the 1990 – 1999 period are still active³³. This percentage increased in the past two decades. In turn, 13% of plant contracts executed in the 1990 – 1999 period were cancelled, while 32% were completed. The percentage of projects cancelled is slightly smaller than in the case of service provision contracts.

³¹ Based on information available as of January 2020.

³² Proyectos México.

³³ Based on information available as of January 2020.

Graph 3
ACTIVE WATER TREATMENT PLANT CONTRACTS



Source: Produced by the authors based on information available as of January 2020.

The number of active water treatment plant contracts has shown an upward trend since the early 1990s. Active contracts include the Capivari wastewater treatment plant (ETE, by its Portuguese acronym), a construction and rental contract in charge of BRK Ambiental in Brazil, which started in 2009 and will have a 20-year duration.

As regards the geographical distribution of active contracts, it may be noted that 58% of active projects in water treatment plants are located in Mexico and 25% in Brazil. Eighty six percent of water treatment plant contracts in Brazil are active, followed by Mexico with 68%. Sixty seven percent of cancelled water treatment plant contracts and 73% of completed projects were performed in Mexico. One hundred percent of Trinidad and Tobago’s contracts are active. They involve two Construction-type desalination plants. The first one, Desalcott, was established in 1999 by means of a build, own and operate contract, whereby drinking water is sold to the Water and Sewerage Authority (WASA), for a 20-year period. Then, in 2012 and by means of an amendment to the water purchase contract, WASA contracted the expansion of the plant in order to increase water supply. The second case was the Point Fortin Seven Seas Desalination Plant in Trinidad, established in 2012 by means of the same type of contract for 17.5 years.

Table 7
STATUS OF WATER TREATMENT PLANTS BY COUNTRY

	Active	Cancelled	Completed	Prior to contract execution
Argentina	-	-	-	100%
Construction type	-	-	-	100%
Barbados	-	-	-	100%
Construction type	-	-	-	100%
Brazil	86%	5%	5%	5%
Construction type	83%	100%	100%	100%
Rehabilitation type	17%	-	-	-
Chile	50%	-	-	50%
Construction type	-	-	-	100%
Rehabilitation type	100%	-	-	-
Colombia	14%	14%	14%	57%
Construction type	100%	100%	-	100%
Rehabilitation type	-	-	100%	-
Ecuador	-	-	-	100%
Construction type	-	-	-	100%
El Salvador	-	-	-	100%
Construction type	-	-	-	100%
Mexico	68%	7%	13%	12%
Construction type	98%	100%	100%	100%
Rehabilitation type	2%	-	-	-
Nicaragua	-	-	-	100%
Construction type	-	-	-	100%
Panama	25%	-	25%	50%
Construction type	-	-	100%	100%
Rehabilitation type	100%	-	-	-
Peru	15%	-	-	85%
Construction type	100%	-	-	100%
Trinidad and Tobago	100%	-	-	-
Construction type	100%	-	-	-

Source: Produced by the authors.
Note: N = 158



Table 8
TREATMENT PLANT CONTRACTS BY TYPE, DECADE AND COUNTRY

	Construction type			Rehabilitation type				Management type				Number of contracts
	2000 - 2009	2010 - 2019	Number of contracts	1990 - 1999	2000 - 2009	2010 - 2019	Number of contracts	1990 - 1999	2000 - 2009	2010 - 2019	Number of contracts	
Argentina	-	-	0	80%	20%	-	20	100%	-	-	1	21
Bahamas	-	-	0	-	-	-	0	-	-	100%	1	1
Bolivia	-	-	0	100%	-	-	2	-	-	-	0	2
Brazil	33%	67%	3	13%	35%	53%	168	-	-	100%	1	172
Chile	-	-	0	-	100%	-	8	-	-	-	0	8
Colombia	-	-	0	40%	57%	2%	42	43%	57%	-	7	49
Ecuador	-	-	0	-	100%	-	3	-	50%	50%	2	5
Guatemala	-	-	0	-	100%	-	1	-	-	-	0	1
Guyana	-	-	0	-	-	-	0	-	100%	-	1	1
Haiti	-	-	0	-	-	-	0	-	50%	50%	2	2
Honduras	-	-	0	-	100%	-	1	100%	-	-	1	2
Jamaica	-	-	0	-	-	-	0	-	-	100%	1	1
Mexico	-	-	0	45%	9%	45%	11	-	-	-	0	11
Panama	-	100%	1	-	-	-	1	-	-	-	0	1
Peru	-	-	0	-	100%	-	0	-	-	-	0	1
Total	-	-	4	-	-	-	257	-	-	-	17	278

Source: Produced by the authors.

Sixty two percent of PPP contracts in the WAS service provision sample analyzed were performed in Brazil, followed by Colombia, Mexico and Chile. Argentina is also worth mentioning, especially in the 1990s, although few of these contracts are still in force, as we will see below.

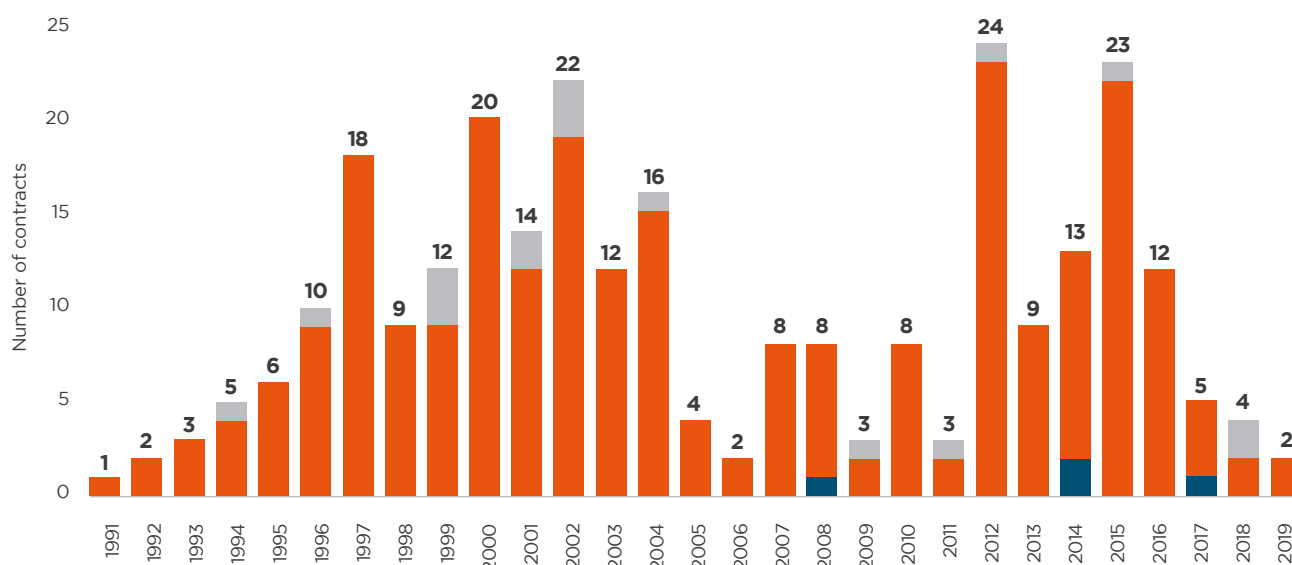
Service provision Construction-type contracts include that of Saneamento Alta Maceió (SANAMA), which is responsible for building and operating the sewerage system for 300,000 residents in the upper area of the capital city of Alagoas. The PPP contract executed with Casal - Companhia de Saneamento de Alagoas has a 30-year term and includes the construction and operation of the Benedito Bentes Wastewater Treatment Station, the implementation of collection networks, interceptors and elevators³⁴.

³⁴ SAMANA

Eighty percent of service provision Rehabilitation-type contracts in Argentina were executed in the 1990 – 1999 period. For example, the contract of Aguas Cordobesas, the drinking water service concessionaire for the city of Córdoba since 1997. That year, the Undersecretariat of Water Resources, the public service owner that sets tariffs and controls the Concessionaire’s performance through the regulating agency called Ente Regulador de Servicios Públicos (ERSEP) granted the service in concession for 30 years. The purpose of the concession is the extraction, potabilization, preservation, transport, distribution and marketing of water for household, commercial and industrial consumption in the city of Córdoba. It also includes all entrepreneurial, industrial, commercial, operational and economic-financial activities necessary to provide the service and those intended for the conservation, maintenance and improvement of facilities and other property used for managing the service³⁵.

In Brazil, an upward trend is observed, but in Colombia we see a concentration in the 2000 – 2009 period and few projects in the past few years.

Graph 4
NUMBER OF PROJECTS BY FINANCIAL-CLOSING YEAR
IN SERVICE PROVISION CONTRACTS



Note: N = 278

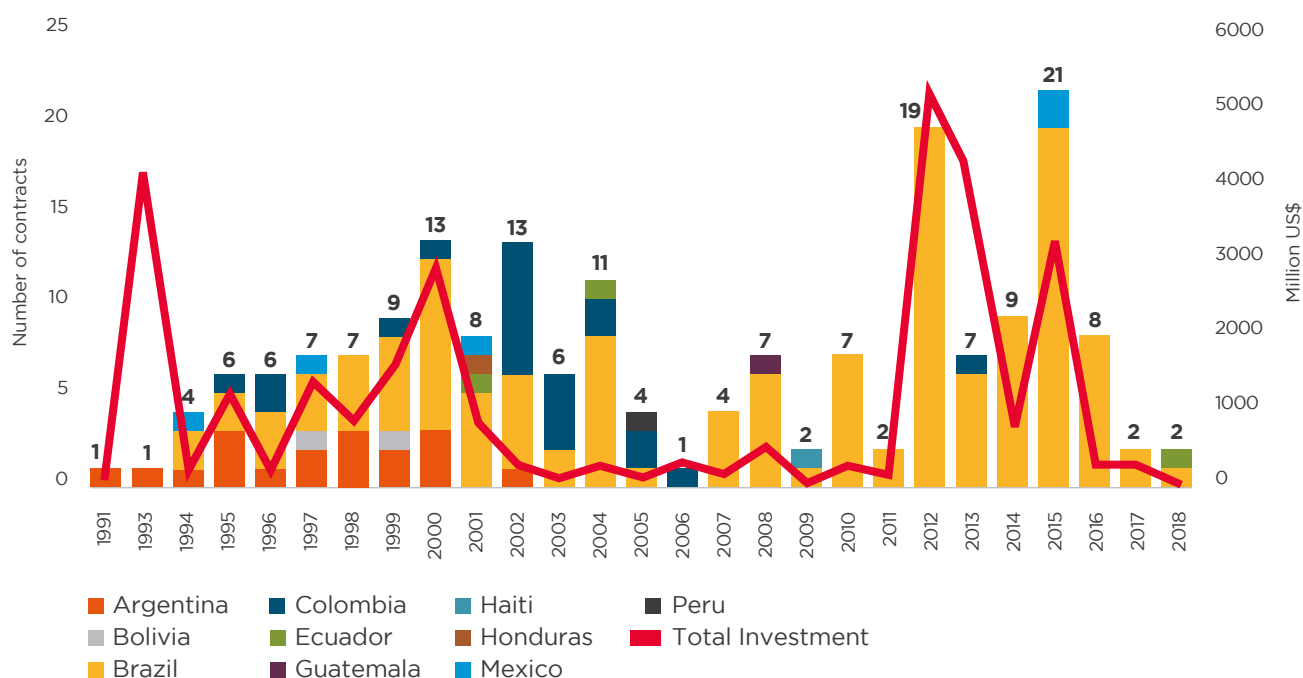
Source: Produced by the authors.

■ Construction type ■ Rehabilitation type ■ Management type

In the early 1990s, an upward trend is observed in service provision PPP contracts, most of them of the Rehabilitation type and to a smaller extent, the Management type. From the 2000s onwards, the number of projects decreased and regained momentum towards the end of the decade. It is around this time that some service provision Construction-type contracts appear. In the early years of the 2010– 2019 period, a new increase in contracts is observed, with a drop towards the end of the period.

³⁵ [Aguas Cordobesas](#)

Graph 5
NUMBER OF CONTRACTS AND INVESTMENT LEVELS
FOR SERVICE PROVISION CONTRACTS



Note: the number of contracts includes only those for which we have information on the year of signature and investment amount (N = 187), which account for 52% of the contracts executed according to the database used.

Source: Produced by the authors.

The largest investment in service provision PPPs occurred in Aguas Argentinas, for a 4000 million dollar amount in 1993. By means of this contract, the Suez – Aguas de Barcelona consortium provided services in the Federal Capital City and 17 districts of the province of Buenos Aires, until the contract was terminated by the state in 2006.

Seventy four percent of water and sanitation service provision PPP projects of the Rehabilitation type are active. Then, 15% are in the stages prior to the execution of the contract (design stage, conceptual stage, prequalification, etc.). We can also see that 6% of this type of contracts were cancelled and another 5% was completed.

Table 9
STATUS OF SERVICE PROVISION CONTRACTS

	Active	Cancelled	Completed	Having problems	Prior to contract execution
Construction type	29%	0%	0%	0%	71%
Rehabilitation type	74%	6%	5%	0%	15%
Management type	39%	6%	50%	0%	6%
All types	71%	5%	7%	0%	17%

Source: Produced by the authors.

Note: N = 333. Fifty six of these contracts are in the stages prior to the execution of the contract, as reported by the Global Water Intelligence Project Tracker downloaded in February 2020.

Table 10
STATUS OF SERVICE PROVISION CONTRACTS BY DECADE

	1990 - 1999	2000 - 2009	2010 - 2019
Active	61%	87%	98%
Construction type	-	1%	3%
Rehabilitation type	98%	97%	93%
Management type	3%	2%	4%
Cancelled	17%	6%	0%
Rehabilitation type	91%	100%	-
Management type	9%	-	-
Completed	23%	6%	2%
Rehabilitation type	80%	17%	50%
Management type	20%	83%	50%
Having problems	0%	1%	0%
Rehabilitation type	-	100%	-

Source: Produced by the authors. Note: N = 277

Sixty one percent of the service provision contracts executed in the 1990 – 1999 period are still active, 17% were cancelled and 23% were completed. The percentage of projects cancelled drops in the 2000 – 2009 and 2010 – 2019 periods, which may be explained by an improvement in the contracts developed over the past decades. As one might expect, the percentage of projects concluded will be higher for the 1990 – 1999 period, as the average term of service provision PPP contracts is 26.4 years.

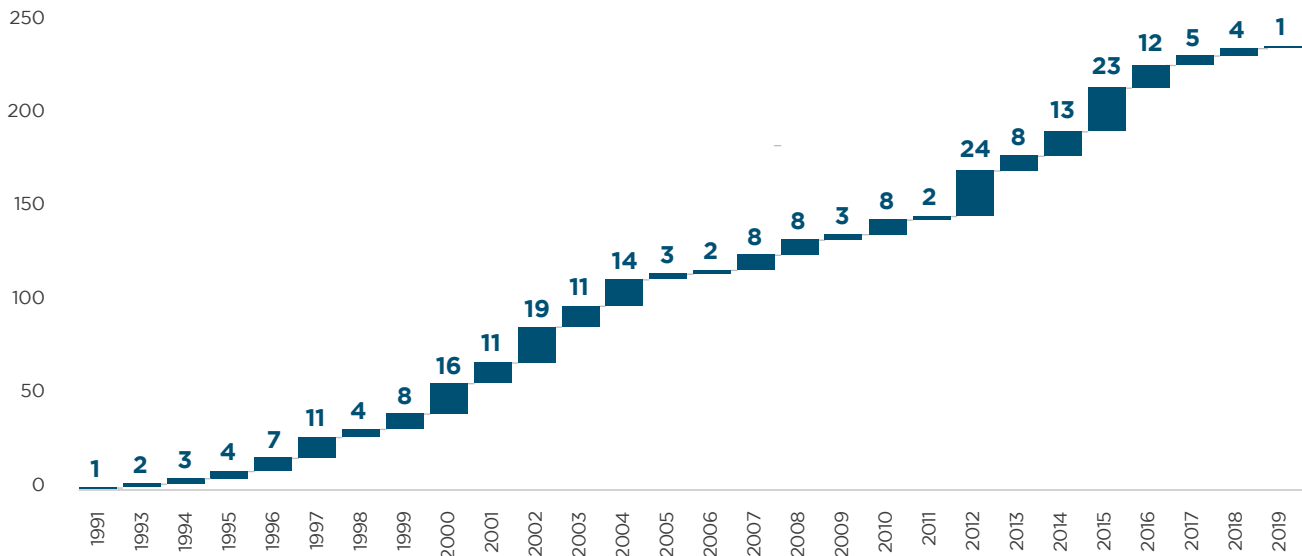
An upward trend may be seen in the number of service provision contracts in the region, although in some periods there were fewer projects per year and a slight flattening of the curve is noted. (See graph 6).

Seventy percent of active service provision contracts are located in Brazil. One example of these projects is Aguas Andradina in the state of São Paulo, Brazil, which is a concession granted in 2010, for thirty years, for drinking water provision and distribution, and wastewater treatment. The company provides this service to 57000 people³⁶ and is in charge of charging tariffs to such users. When the concession began, only 8% of wastewater was collected and treated, most of it ran outdoors and the municipal system had some problems, like leaks and treatment inefficiency. There was a huge need to perform works, which required the concessionaire's prioritization. With a particular focus on sanitary wastewater, the first work carried out for the universal wastewater treatment service was the recovery and modernization of the Pereira Jordão Wastewater Treatment Station (ETE, by its Portuguese acronym). The recovery of the sanitary sewerage system, involving collection and treatment, was another work performed. The company also invested to improve the water supply system, with an intensive recovery and operation program for 39 wells, reservoirs and lifting stations³⁷.

³⁶ Igua SA.

³⁷ Panorama da Participação Privada no Saneamento. Brasil. 2018. Associação Brasileira das Concessionárias Privadas de Serviços Públicos de Água e Esgoto.

Graph 6 ACTIVE SERVICE PROVISION CONTRACTS



Source: Produced by the authors.

Fifty three percent of cancelled service provision contracts were performed in Argentina. There were also cases in Bolivia, Colombia and Mexico. In Argentina, some examples are Aguas Argentinas, Aguas de Santa Fe and Aguas de Mendoza. Section 8 includes more details on the causes that led to the cancellation of these contracts.

In Bolivia, 100% of the service provision contracts were cancelled because, as explained above, the Constitution declared that the private sector was precluded from participating in WAS service provision activities. In the case of Cochabamba, the main trigger was the tariff increase applied at the beginning of the contract, which did not have social acceptance. Social protests began even before the new tariffs were applied. The Departmental Coordinator for the Defense of Water and Life led the so called “Water War”. As a result, the Cochabamba contract was terminated a few months after it commenced³⁸.

In Argentina, 41% of the contracts were cancelled and 18% were completed and not renewed. Service provision was resumed by the state, involving different levels of government. For example, in the case of Aguas Argentinas, a public company called Agua y Saneamientos Argentinos (AySA) was created, which has been in charge of providing the service in Buenos Aires and part of the metropolitan area since 2006.

³⁸ Ducci, 2007

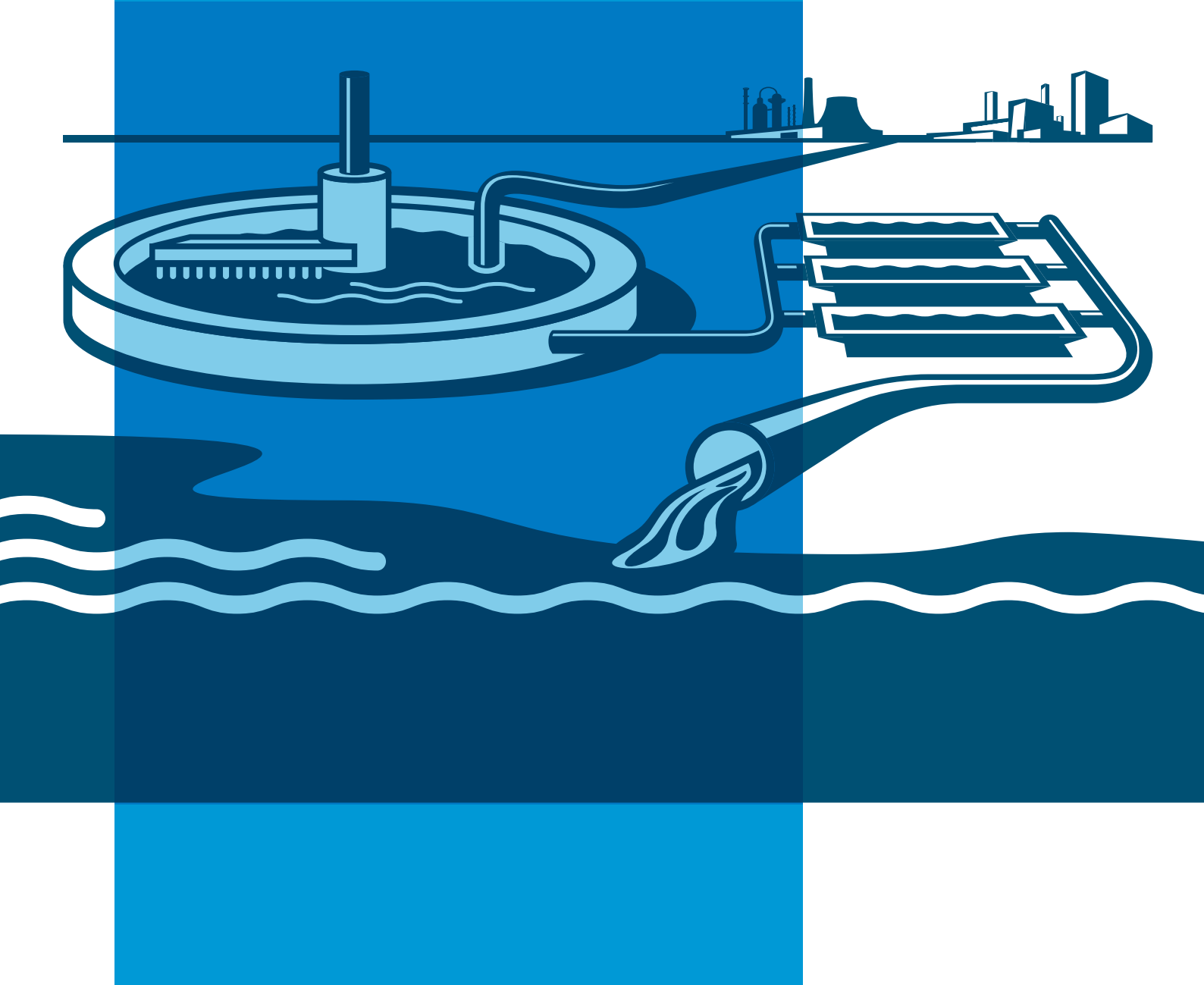
Table 11
STATUS OF SERVICE PROVISION CONTRACTS BY TYPE AND COUNTRY

	Active	Cancelled	Completed	Having problems	Prior to contract execution
Argentina	36%	41%	18%	-	5%
Construction type	-	-	-	-	100%
Rehabilitation type	100%	100%	75%	-	-
Management type	-	-	25%	-	-
Bahamas	100%	0%	0%	0%	0%
Management type	100%	0%	-	-	-
Bolivia	0%	100%	0%	0%	0%
Rehabilitation type	-	100%	-	-	-
Brazil	76%	0.5%	1%	0%	23%
Construction type	2%	0%	0%	-	12%
Rehabilitation type	98%	100%	100%	-	88%
Management type	1%	0%	0%	-	0%
Chile	100%	-	-	-	-
Rehabilitation type	100%	-	-	-	-
Colombia	67%	6%	27%	0%	0%
Rehabilitation type	97%	67%	62%	-	-
Management type	3%	33%	38%	-	-
Ecuador	40%	20%	20%	20%	0%
Rehabilitation type	50%	100%	0%	100%	-
Management type	50%	-	100%	-	-
Guatemala	100%	0%	0%	0%	0%
Rehabilitation type	100%	-	-	-	-
Guyana	0%	0%	100%	0%	0%
Management type	-	-	100%	-	-
Haiti	50%	0%	50%	0%	0%
Management type	100%	-	100%	-	-
Honduras	67%	0%	0%	0%	33%
Construction type	0%	-	-	-	100%
Rehabilitation type	50%	-	-	-	-
Management type	50%	-	-	-	-
Jamaica	33%	0%	0%	0%	67%
Construction type	-	-	-	-	50%
Rehabilitation type	-	-	-	-	50%
Management type	100%	-	-	-	-
Mexico	83%	8%	0%	0%	8%
Rehabilitation type	100%	100%	-	-	0%
Management type	0%	0%	-	-	100%
Nicaragua	0%	0%	0%	0%	100%
Construction type	-	-	-	-	100%
Panama	100%	-	-	-	-
Construction type	100%	-	-	-	-
Peru	-	100%	-	-	-
Rehabilitation type	-	100%	-	-	-

Source: Produced by the authors.
Note: N = 333

4

MAIN PRIVATE OPERATORS PRESENT IN WATER AND SANITATION PUBLIC-PRIVATE PARTNERSHIPS IN THE REGION



4

MAIN PRIVATE OPERATORS PRESENT IN WATER AND SANITATION PUBLIC-PRIVATE PARTNERSHIPS IN THE REGION

Generally speaking, the LAC water and sanitation market does not evidence a high concentration ratio and is marked by a strong involvement of local companies working with international operators. In the Brazilian case, the main market in the region, we do see how 85% of the contracts are concentrated among five companies, although there still are several local operators³⁹. International companies do not seem to play a major role in the Brazilian market, especially in large PPP projects. Table 12 sums up the main private participants present in the companies providing water and sanitation services.

³⁹ https://br.boell.org/sites/default/files/prorietarios_do_saneamento-pesquisa-institutomaisdemocracia-fundacao_boll_brasil.pdf

Table 12
STATUS OF SERVICE PROVISION CONTRACTS BY TYPE AND COUNTRY

Country	PPP Private operators/Private contractors
Argentina	<ul style="list-style-type: none"> • Sagua International (Argentina): Aguas de Santiago y Aguas de Formosa • Latinaguas (Argentina): Aguas de La Rioja - SAPEM • Urbaser (Spain): Servicio de Aguas de Misiones S.A. • Grupo Chamas (Argentina): Aguas de Corrientes • Benito Roggio (Argentina) / Inversora Central (Argentina): Aguas Cordobesas
Bahamas	<ul style="list-style-type: none"> • Miya (Israel)
Brazil	<ul style="list-style-type: none"> • BRK Ambiental (formerly Odebrecht Ambiental) (Brazil): 69 contracts • Aegea Saneamento e Participações (Brazil) (belonging to Equipav group): 42 contracts • Igúa Saneamento AS (Brazil) (formerly companhia de Aguas do Brasil - CAB Ambiental, which then became a part of Queiroz Galvão group. Currently property of Alberta Investment Management Corporation - AIMco y BNDESpar): 36 contracts • SAAB - Saneamento Ambiental Aguas do Brasil SA (Brazil) (Grupo Aguas Do Brasil whose majority shareholder is the company Carioca Christiani- Nielsen Engenharia): 14 contracts • GS Inima Brasil LTDA (Brazil) (GS Group, a South Korean company): 8 contracts
Chile	<ul style="list-style-type: none"> • Empresa Aguas Nuevas SA (Chile) (formerly Grupo Solari): Aguas del Altiplano SA, Aguas Nueva Atacama SA, Aguas Araucanía y Aguas Magallenes • Grupo EPM (Empresas Públicas de Medellín) (Colombia): Aguas de Antofagasta SA • Icafal Inversiones (Chile): Tratacal SA, Aguas Patagonia • Sembcorp (Singapore): Sembcorp Aguas del Norte • Esva (Chile): Aguas del Valle • Nuevosur SA (Chile): Aguas Nuevo Sur Maule
Colombia	<ul style="list-style-type: none"> • Aguas de Barcelona (Spain, belonging to the Suez group): Aguas de Cartagena and Aquaoccidente • Grupo INASSA (Spain, belonging to Canal de Isabel II): Avanzada Soluciones de Acueducto y Alcantarillado SA ESP (ASSA), Sociedad de Acueducto Alcantarillado y Aseo (Triple A) de Barranquilla (6 contracts), Metro Agua • Veolia (France): Aguas del Archipiélago, Aguas de Montería, Aguas de Tunja, Tibitoc Drinking Water Treatment Plant • Conhydra (Colombia): Hidropacífico SA
Ecuador	<ul style="list-style-type: none"> • Grupo INASSA (Spain, belonging to Canal de Isabel II): Amagua • Veolia (France): Interagua • Suez (France): contract to improve the performance of the drinking water network, Empresa Pública Municipal de Agua Potable y Alcantarillado Santo Domingo (EPMAPA-SD)
Guatemala	<ul style="list-style-type: none"> • Seinco (Uruguay): Aguas de Izabal
Haiti	<ul style="list-style-type: none"> • Lysa (France): management contract with SESAM
Honduras	<ul style="list-style-type: none"> • Agac Spa y Acea Spa (Italy): Aguas de San Pedro
Jamaica	<ul style="list-style-type: none"> • Miya (Israel): Management Agreement with the National Water Commission

Country	PPP Private operators/Private contractors
Mexico	<ul style="list-style-type: none"> • Empresas Publicas de Medellin (EPM) (Colombia): 11 WWTP BOT contracts • Ticsa (EPM group) (Colombia): Tierra Negra WWTP, Morelia WWTP, Colima Villa de Alvarez WWTP, Tuxtla Gutierrez WWTP, Acapantzingo WWTP, Durango WWTP • Aguas de Barcelona (Spain, belonging to the Suez group): Aguas de Saltillo and Grupo Mas Agua y Saneamiento • Atlatec SA de CV (Mexico, subsidiary of Mitsui (Japan)): at least 10 WWTP BOT contracts • Aqualia (Spain, belonging to Grupo FCC): Guaymas and Empalme Desalination Plant • Veolia (France): Aguascalientes, • Impulsora de Desarrollo y el empleo en América Latina (IDEAL) (Mexico): Saneamientos de Saltillo (WWTP) and Aguas Tratadas del Valle de Mexico (WWTP where Atlatec SA de CV also participates) • OHL Medio Ambiente Inima (Spain - GS Inima): El Salitral Desalination Plant and Los Cabos Desalination Plant. • Degremont (Spain and Portugal, now Suez Treatment Solutions): WWTPs in Ciudad Juárez. • Suez (France): Treatment Plant of Leon, San Luis de Potosí and Cancún
Panama	<ul style="list-style-type: none"> • Suez (France): Juan Diaz WWTP and Ciudad David Sanitation Network
Peru	<ul style="list-style-type: none"> • Tedagua (Spain - ACS Group y Grupo Cobra): Provisur Wastewater Desalination and Purification Plant, Taboada WWTP, Optimization of Drinking Water Supply and Sewerage in Northern Lima • Consortio Agua Azul (Peru). The consortium is made up by the international companies Acea SpA (Italy), Impregilo International Infrastructures N.V. (The Netherlands), Marubeni Corp. (Japan): Drinking Water Treatment Plant • Acciona Agua (Spain): La Chira WWTP • LatinAguas (Argentina) and Concysa (Peru): EMFAPATUMBES Concession
Trinidad and Tobago	<ul style="list-style-type: none"> • Hafeez Karamath Engineering Services Limited (Trinidad and Tobago): Desalination Company of Trinidad y Tobago (Desalcott) • Seven Seas Water Corporation (United States): Seven Seas Trinidad • Atlatec (Mexico, subsidiary of Mitsui (Japan)): Puerto España WWTP

Source: Produced by the authors.

As regards international operators present in the region, some outstanding examples are Suez and Veolia (France), FCC, INASSA, Aguas de Barcelona -AGBAR- (Spain), and EPM (Colombia, acting in other countries in the region). The French company Suez has presence in PPP contracts in Colombia, Mexico, Ecuador and Panama, through subsidiary companies like Aguas de Barcelona and Degremont. The French company Veolia has participation in the Mexican, Colombian and Ecuadorian markets. Fomento de Construcción y Contratas, a Spanish company, has participation in the Mexican market, among others, through Aqualia and Acciona Agua. In Colombia, there is strong presence of Grupo INASSA, the main expansion company of Canal de Isabel II Latin American Management, with a strong track record in the entire water cycle management. It operates through Sociedad de Acueducto, Alcantarillado y Aseo de Barranquilla (Triple A), Avanzada de Soluciones de Acueducto y Alcantarillado and Metro Agua, among other companies. In turn, it has presence in Ecuador by means of Amagua. Miya, a NRW-contract specialized company, has management contracts in Jamaica and Bahamas.

Empresas Públicas de Medellín (EPM) has WWTP contracts in Mexico. Moreover, TICSÁ, which belongs to EPM group, has several WWTP BOT contracts. This same group has Aguas de Antofagasta in Chile.

There has been little presence of international operators in Colombia. One of the relevant examples is Aguas de Barcelona (AGBAR), which in 1995 executed a contract as operating partner with the District of Cartagena, in 1996 contracted in Barranquilla and in 1997, in Santa Marta. In 1999 and in 2000, AGBAR left these last two cities, and the services remained in the hands of Colombian company Triple AAA, controlled by Spanish company Canal Isabel II, and Tecvasa, a private company from Valencia. Other companies present are Fomento de Construcciones y Contratos (FCC), which jointly with Veolia Water (formerly Vivendi), operates the service for the city of Montería (Córdoba), through Proactiva company, and has a drinking water treatment plant concession contract in Bogotá (Tibitoc Plant) and a service provision contract in Tunja, since 1997.

5

INFRASTRUCTURE CONSIDERED, TYPES OF CONTRACTS AND TENDER PROCESSES IN THE WATER AND SANITATION SECTOR



5

INFRASTRUCTURE CONSIDERED, TYPES OF CONTRACTS AND TENDER PROCESSES IN THE WATER AND SANITATION SECTOR

Generally speaking, the experience in the region shows how most water treatment plant PPP contracts are of the greenfield type, while the opposite is true for service provision contracts, where there is an ample majority of brownfield contracts. Sixty five percent of PPP contracts or projects of the sample analyzed are of the brownfield type⁴⁰ and 35% are greenfield. Ninety two percent of greenfield contracts are water treatment plants and the remaining contracts are service provision contracts. The opposite is observed for brownfield contracts, where 98% are service provision contracts and only 2% are water treatment plant contracts.

Table 13
GREENFIELD VS. BROWNFIELD CONTRACTS

	Treatment plant	Service provision	Total projects
Greenfield	92%	8%	35%
Brownsfield	2%	98%	65%

Source: Produced by the authors. Note: N = 505

⁴⁰ Management and rental contracts are included within the brownfield category.

CONTRACT DURATION



The average duration of water treatment plant contracts is 21.2 years. The maximum duration has been 37 years, in the case of the Rosarito desalination plant, and the minimum length has been 4 years, the Juan Díaz Wastewater treatment plant in Panama. The average duration of water treatment plant Construction-type contracts has increased 3.5 years if we compare the 1990 – 1999 and 2010 – 2019 periods. In Chile, the average duration of water treatment plant contracts is 28.5 years, the longer one among the countries analyzed. The average duration of contracts in Panama is 6 years.

Table 14
AVERAGE DURATION OF WATER TREATMENT PLANT CONTRACTS

	Average	Maximum	Minimum
Construction type	21.4	37.0	4.0
Rehabilitation type	19.5	30.0	8.0
Total	21.2	37.0	4.0

Source: Produced by the authors. **Note:** N = 114

The average duration of service provision contracts is 26.4 years. Rehabilitation-type contracts have a longer duration, even if we leave out the particular case of the water and sanitation service concession contract in Mendoza, Argentina, which was granted for 95 years and was subsequently cancelled. Management type contracts have the shortest duration in the sample considered, with an average of 7.6 years. The average duration of service provision Rehabilitation-type contracts increased from 25.4 years in the 1990 – 1999 period to 30.6 in the 2010 – 2019 period. Service provision Rehabilitation-type contracts in Bolivia had the highest average duration in the region, with 35 years, although they were cancelled before completion of the term. Similarly, Argentina’s contracts may be mentioned, with an average duration of 31.8 years and those of Chile, where the duration of all contracts is 30 years. In Panama one service provision Construction-type contract stands out, with a duration of 6.8 years. The contract involves the design, construction, operation and maintenance of the new sanitation network of Ciudad David: the East sewerage system that included a Wastewater Treatment Plant and the West system with pumping and wastewater collection stations.

Table 15
DURATION OF SERVICE PROVISION CONTRACTS

	Average	Maximum	Minimum
Construction type	21.2	30	6.8
Rehabilitation type	28.0	95	5
Management type	8.4	20	2
Total	26.7	95.0	2.0

Source: Produced by the authors. Note: N = 281



TENDER PROCESS

Tender criteria governing water treatment plant contracts are somewhat heterogeneous, with increasingly lower payments on the part of the government. Thirty eight percent of water treatment plant Construction-type contracts used the lowest construction and operation cost as tender criterion. In the 1990 - 1999 period, the tender criterion of 100% of the contracts was the lowest payment required from the state. Over the years, other criteria were added, such as the lowest construction or operation cost, or the lowest government subsidy required. One hundred percent of water treatment plant contracts in Brazil used the lowest payment required from the state as tender criterion: the Alto Tiete drinking water treatment plant and Jundiai and Mogi Mirim wastewater treatment plants. In Mexico, 44% of water treatment plant contracts used the lowest construction or operation costs as tender criterion. Some examples of this are the wastewater treatment plant (WWTP) of the municipality of Colima and the San Pedro Mártir WWTP.

Table 16
TENDER CRITERIA IN WATER TREATMENT PLANTS

	Lowest construction or operation costs	Lowest government payments	Lowest subsidy required
Construction type	38%	54%	8%
Rehabilitation type	-	100%	-

Source: Produced by the authors. Note: N = 15

Furthermore, 100% of the water treatment plant contracts analyzed were awarded using a competitive tender process. Some examples include the wastewater treatment plants in San Luis Potosí, Mexico, or in La Chira, Peru.

Table 17
TYPE OF TENDER IN WATER TREATMENT PLANT CONTRACTS

	Competitive tender
Construction type	100%
Rehabilitation type	100%

Source: Produced by the authors. Note: N = 35

Competitive tension: in the wide majority of the cases observed, there was a high number of tender bids. This is evidenced particularly in Construction-type contracts, where in 66% of the cases there were at least four bidders. In Brazil and Colombia, plant contracts have been awarded with only one tender bid submitted. Two WWTP cases can be mentioned, one in Mogi Mirim, Sao Paulo and the other one in Barranquilla.

Table 18
NUMBER OF BIDS IN WATER TREATMENT PLANT TENDERS

	1	2	3	4	5	7	10
Construction type	17%	8%	8%	33%	8%	17%	8%
Rehabilitation type	-	33%	33%	33%	-	-	-

Source: Produced by the authors. Note: N = 15

As for service provision Rehabilitation-type contracts, the criterion used was in most cases (54%) the lowest tariff to be charged to users. This makes sense, as the main source of revenue for most contracts are the tariffs charged to users. Twenty seven percent of these contracts were awarded based on the lowest price paid to the governments for taking responsibility for the water provision service. These are cases of brownfield contracts, wherein the private party has duties related to existing infrastructure rehabilitation, operation and maintenance for a period of time. In the 1990 – 1999 period, the tender criterion of 71% of Rehabilitation-type contracts was the lowest tariff charged to users. Over the following years, other criteria gained relevance, such as the highest price paid to the government. In over 50% of service provision contracts in Argentina and Brazil, the tender criterion was the lowest tariff charged to users. In Colombia, 75% of service provision contracts were awarded based on the lowest subsidy required: these are contracts for the provision of drinking water service and sewerage, like Aguas de la Mojana and management contracts in Aguas de la Rivera and the water service of Nátaga. The example of the Sanitation Network in the municipality of Serra is worth mentioning, where a unit price was estimated by multiplying the volume of wastewater treated. Bids were assessed based on the discount percentage on that unit price offered by participants⁴¹.

⁴¹ Asociación Público-Privada en América Latina. Afrontando el reto de conectar y mejorar las ciudades.CAF. 2018

Table 19
TENDER CRITERIA IN SERVICE PROVISION CONTRACTS

	Largest new investment	Largest price paid to the government	Lowest construction or operation cost	Lowest subsidy required	Lowest tariff
Construction type	-	-	-	-	100%
Rehabilitation type	10%	27%	2%	7%	54%
Management type	-	-	-	100%	-

Source: Produced by the authors. Note: N = 44

Ninety seven percent of service provision Rehabilitation-type contracts were awarded based on competitive tenders. The rest were awarded by means of competitive negotiations or direct negotiations. Those countries that have used the competitive negotiation method were Brazil, Chile and Ecuador. In Chile, a call for competitive tender was made for the concession contract for Aguas Nueva Atacama, but neither of the two bids submitted reached the minimum price expected by the public company Empresa de Servicios Sanitarios de Atacama. Then, the two companies that had participated were invited to submit proposals again⁴². In Colombia and Ecuador, the direct negotiation method was also used. In Colombia the second municipal water service management contract of Ocaña was executed in 1999, which was cancelled later on.

Table 20
TYPES OF TENDERS IN SERVICE PROVISION CONTRACTS

	Competitive tender	Competitive negotiation	Direct negotiation
Construction type	100%	-	-
Rehabilitation type	97%	1%	1%
Management type	73%	18%	9%

Source: Produced by the authors. Note: N = 154

⁴² [ECONSSA](#)

Competitive tension: in the vast majority of cases observed, there was a high number of tender bids: in 41% of service provision Rehabilitation-type contract tenders there were two bids, while 31% had three bids and 10% had four. It should be noted that 18% of the contracts had only one bid, which might suggest a lack of competition in the sector. Forty five percent of service provision contracts awarded with only one tender bid were performed in Brazil. Following are some examples: CAB Tibia, Tubarao Saneamento, Aguas de Penha Saneamento, Aguas de Rolim de Moura, Servicios de Agua y Saneamiento de Maua.

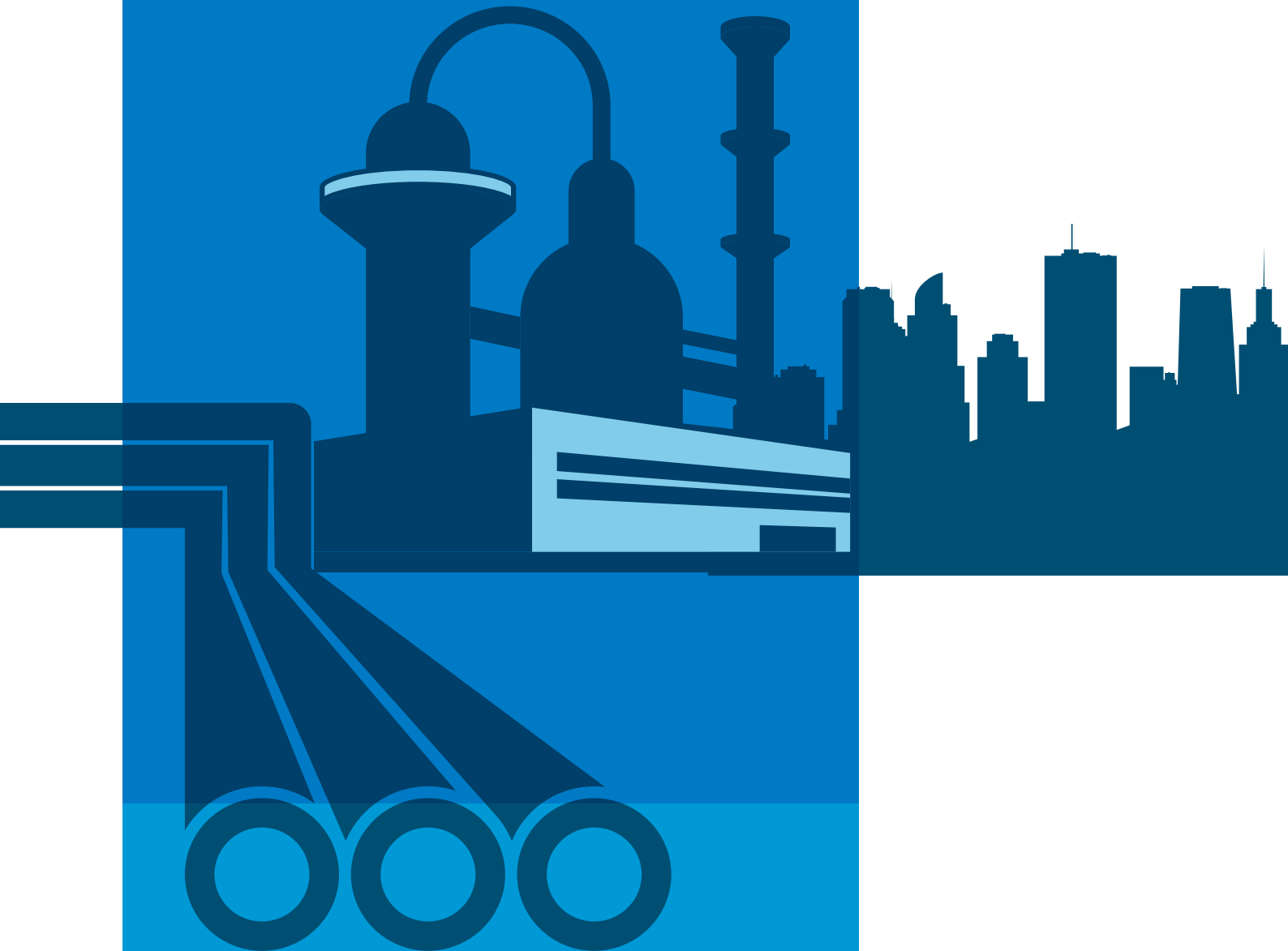
Table 21
NUMBER OF BIDS IN SERVICE PROVISION CONTRACTS

	1	2	3	4
Construction type	-	100%	-	-
Rehabilitation type	18%	41%	31%	10%
Rehabilitation type	-	100%	-	-

Source: Produced by the authors. **Note:** N = 63

6

SCOPE OF INVESTMENTS REQUIRED IN CONTRACTS AND PERFORMANCE INDICATORS



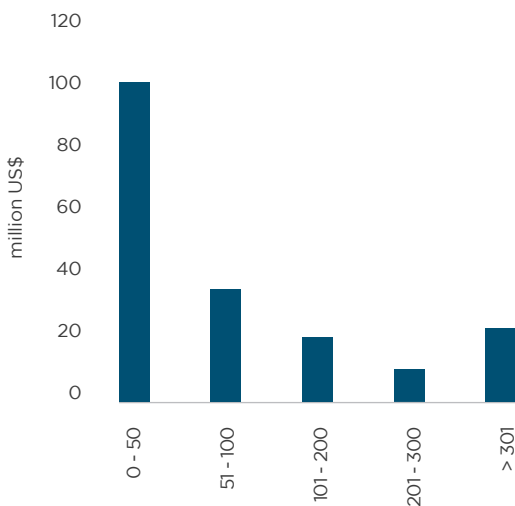
6

SCOPE OF INVESTMENTS REQUIRED IN CONTRACTS AND PERFORMANCE INDICATORS

Fifty four percent of the service provision PPPs analyzed involve investments for up to US\$50 million dollars. These include drinking water treatment plant constructions, as is the case of the municipality of Biringui in São Paulo for the benefit of 30,000 people, or investments in drinking water services and treatment, like the rehabilitation, operation and maintenance project of Aguas de la Mojana in Colombia. Among the largest investments made, we could mention the one in the state of Pernambuco, Brazil, through a rehabilitation, construction, operation and transfer contract to provide service to 3.7 million people.

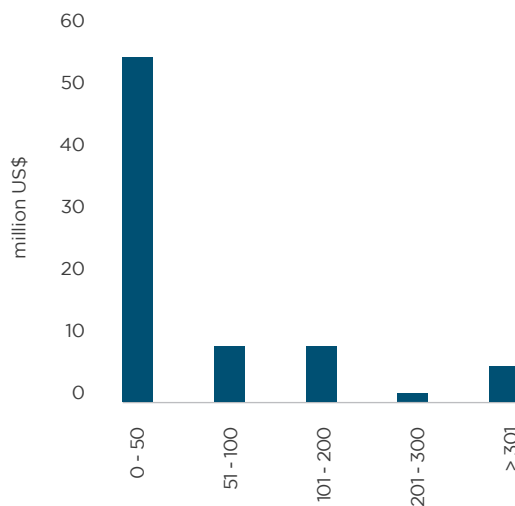
Graph 6
INVESTMENT LEVELS FOR PPP CONTRACTS

SERVICE PROVISION



Source: Produced by the authors. Note: N = 187

WATER TREATMENT PLANTS



Source: Produced by the authors. Note: N = 76

In turn, 72% of water treatment plant investments do not exceed US\$50 million. It should also be noted that generally the amount invested in water treatment plant contracts is smaller than the investment in service provision contracts, because the former imply fewer activities.

The countries in the region which develop water and sanitation PPP contracts usually have sector-specific regulations. The contracts specify that companies must comply with the rules governing the quality of the drinking water to be supplied and quality parameters in the product (both liquid and solid) resulting from wastewater treatment.

Las inversiones requeridas varían dependiendo de cada contrato implicando en algunos The investments required depend on each contract: in some cases it implies complying with a predefined investment plan, while in others, the private partner is allowed to handle its own investment program, as long as it complies with the performance indicators established. In Chile, a contractual investment plan is established, which is approved by the Superintendency of Sanitary Services and moreover the contract includes a mechanism for the payment of a residual value for those investments which are not remunerated over the 30-year contract term; therefore, the private party’s incentive to invest is not lost, as the termination of the contract approaches⁴³.

Table 22
INVESTMENTS REQUIRED AND CONTRACTUAL PERFORMANCE INDICATORS
- SELECTED CONTRACTS

Contract	Investments required	Performance indicators
Service provision		
Proactiva Aguas de Montería (Colombia)	Compliance with service indicators implies investments amounting to nearly US\$70 million (values as of the year 2000), but the concessionaire is not obligated to follow a predefined work plan.	<ul style="list-style-type: none"> • Coverage expansion according to a schedule established in the tender specifications. • Compliance with regulations on drinking water quality and treated water quality • Increase of installed capacity for the production and treatment of drinking water, which shall exceed daily demand at the time of contract execution by 100 l/s • Upon termination of the concession, wastewater treatment systems shall have a 10% excess capacity • NRW must reach a 30% maximum in 5 years • Water pressure of 10 mWC measured at the home entrance • 24-hour service continuity must be reached in the first three years • Repair the sewerage system to avoid pavement overflows • Repair networks and connections to minimize leaks • Claim handling service with less than 5-days response time • Maintenance of infrastructure in perfect condition. After five years, it must switch to preventive maintenance

⁴³ Garcia et al, 2020

Contract	Investments required	Performance indicators
Service provision		
Aguas Kpital Cúcuta (Colombia)	US\$254 M (2006) ⁴	<ul style="list-style-type: none"> • Improve service continuity and pressure to achieve 24-hour service, 7 days a week in the entire city • NRW reduction • Expansion of extraction, transmission and treatment to at least 1 m³/s • Service coverage expansion • Compliance with service standards and levels • Installation and maintenance of macro meters outside water treatment plants and micro meters at the system users' site and maintenance thereof • Comply with water quality regulations
Grupo Mas Agua y Saneamiento (Mexico)	US\$730 M (2015) ⁴	<ul style="list-style-type: none"> • Ensure quality in the provision of services, tariff revenues, collection of applicable tariffs, users' list update, provision of consumption-fit drinking water according to the standards, wastewater treatment following the provisions established by the regulations, infrastructure maintenance, micro-meter maintenance
Blumenau (Brazil)	The value of investments to be made by the concessionaire is US\$186 M (values as of 2010) ¹	<ul style="list-style-type: none"> • Make repairs intended to ensure an adequate provision and universal access to the service; in the concession's first year, change 16000 water meters, accounting for 20% of the existing depot, which will make it possible to replace highly-obsolete meters
Aguas de Antofagasta (Chile)	<p>Prior to the concession, the public company already had a Development program approved by the Superintendency, which was updated in 2001.</p> <p>It is understood that, since the concession begins in December 2003, the private party must develop investments starting in the year 2004, estimated at US\$26.3 M (values as of December 1999)²</p>	<ul style="list-style-type: none"> • The current or future regulations governing drinking water and sewerage service conditions and quality must be complied with, as well as any instructions issued by the Superintendency • Ensure service continuity, pressure and physicochemical and bacteriological quality conditions of the water supplied and sanitation of wastewater receiving bodies under the terms of sanitary regulations
Sanitation Network of the municipality of Serra (Brazil)	Estimated amount of US\$108 M ⁶ , although PPP contractor is not obligated to follow a predefined work plan	<ul style="list-style-type: none"> • Coverage targets: Ensuring a 95% access level to the sanitation network by the tenth year of concession and maintaining it until the termination thereof. • Increasing treated wastewater ratio considering the environmental impact of the treatment methods used. Measured with a treatment safety factor: installed monthly capacity/average monthly flow > 1.1 • Infrastructure quality indicators: <ul style="list-style-type: none"> - Accident frequency rate: number of accidents per million hours < 10 - Customers' and public agencies' claims related to the works in general: number of claims per network kilometer built < 24.5 - Customers' and public agencies' claims related to the state of the pavement: number of claims per network kilometer built < 9 - Environmental regularity of treatment systems in the works stage: environmental licenses up to date during construction > 100%

Contract	Investments required	Performance indicators
Service provision		
Sanitation Network of the municipality of Serra (Brazil)	Estimated amount of US\$108 M ⁶ , although PPP contractor is not obligated to follow a predefined work plan	<ul style="list-style-type: none"> • Operational efficiency indicators: <ul style="list-style-type: none"> - Connectivity ratio: % of households connected to the network out of possible households >95% (in stages) - Organic burden elimination: Oxygen Biochemical Demand elimination efficiency > 90 (in stages) - Availability of wastewater pumping stations: % of operational hours > 100% - Residual water leaks: leaks per network km < 0.7 (in stages) - Branch obstruction: % of obstructed connections < 1.2 - Appearance of odors: % of effective odor elimination systems > 100% • Operational quality indicators: <ul style="list-style-type: none"> - Network request median response time: % of requests responded within maximum timeframes > 100% - General satisfaction: % of optimum and good in surveys >75% (in stages) - Service level satisfaction: degree of satisfaction based on the service level obtained in the surveys > 90% - Environmental regularity of treatment systems in the operational stage: environmental licenses up to date during operation > 100% • Collection investments: connections, collecting networks, main collectors and wastewater pumping stations. • Water treatment investments: water purifying stations with upward-flow anaerobic reactor technology.
Sanitation in Macaé (Brazil)	Estimated investments: US\$409.6 M (values as of December 2012) ⁷	<ul style="list-style-type: none"> • In order to qualify for 30% of the public consideration, the company had to comply with the following in the first contract year: <ul style="list-style-type: none"> - Implementation of existing and projected operation and maintenance program - Implementation of existing and projected system Management Program - Implementation of georeferenced cadastre and mapping system - Operation of existing water treatment plants - Implementation of program of works necessary to supplement, readjust and revamp the system • In order to qualify for 40% of payments, it had to complete the following within the first 5 years: <ul style="list-style-type: none"> - Centre subsystem work completion, including a wastewater treatment station - Within the first 8 years it had to complete the following, in order to qualify for the remaining payments: <ul style="list-style-type: none"> - Execution of works of the Aeroporto subsystem, including a wastewater treatment station
Aguas Cordobesas (Argentina)	Total investment estimated US\$500 M, US\$150 M of which had to be invested in the first two years. ⁵	<ul style="list-style-type: none"> • Water network operation and maintenance subject to the quality terms established in the rules. • Reaching 97% coverage in 2026 • Reducing the tariff by 8.2% at the beginning of the concession • Installing meters • Gradually incorporating the networks and services of around 44 cooperatives providing services to the city. • Expansion of the primary network, the secondary network and home connections under the responsibility of the municipality or households.

Contract	Investments required	Performance indicators
Service provision		
Aguas de Guariroba (Brazil)	Total investment expected of around US\$132 M (values as of the year 2000) ⁵	<ul style="list-style-type: none"> • Target: increasing sewerage coverage from 22% to 50% in 10 years and to 70% in 30 years.
Water treatment plants		
Sonora Desalination Plant (Mexico)	<p>Approximate investment of US\$42 M (values as of October 2017). 18-month investment period, 16-month construction period: construction of wells or other extraction works and connection to the desalination plant, power line construction, at least two tanks to store drinking water with a total volume of 34600 m³, construction of a desalination plant with a delivery flow of 200 l/s in two modules delivering 50% each, equipment installation, construction of drinking water transmission line with civil works and pumping equipment with a capacity of 200 l/s from the infrastructure to the delivery in a designated tank, construction and installation of a wastewater line to dispose reject water into the sea, construction of urbanization and complementary works</p>	<ul style="list-style-type: none"> • Compliance with regulations regarding the quality of water delivered and disposal of waste resulting from potabilization • Supply continuity: steady 200 l/s flow
Tratacal - WWTP (Chile)	<p>Prior to the concession, the public company already had a Development Program approved by the Superintendency which was updated in 2006 according to new demand projections.</p> <p>It is understood that since the concession begins in 2007, the private party is responsible for performing the following works:</p> <ol style="list-style-type: none"> 1- Expansion of aeration capacity of aerobic digester to 115 Kw 2- Fitting out of second grit channel 3- Construction and fitting out of ICEAS 7 - 8 V=5800 m³ 4- Expansion of centrifugal capacity to 400 Kg/h <p>Investment amounts: US\$900,073 (dollar value as of August 2006)³</p>	<ul style="list-style-type: none"> • Comply with current or future specific regulations governing wastewater treatment service conditions and quality, or any instructions issued by the Superintendency. • Must guarantee service continuity, sanitation of wastewater receiving bodies, treat all wastewater reaching the plant
Taboada - WWTP (Peru)	<p>The contract establishes the minimum project components which shall be executed under its terms. Maximum work-execution term of 38 months from the effective date of obligations.</p> <p>Investment: US\$149.5 (value as of 2011)⁴</p>	<ul style="list-style-type: none"> • The contract sets forth a list of national regulations and rules as well as international regulations which shall be used as a reference for complying with contractual obligations.

Contract	Investments required	Performance indicators
Water treatment plants		
Atotonilco wastewater treatment plant (Mexico)	<p>Basic investments: US\$787 (value as of 2010)</p> <p>WWTP construction and equipment provision with an average treatment capacity of 35,000 l/s, 12,000 for physicochemical treatment and 23,000 for biological treatment. Furthermore, mud treatment will be performed and biogas will be stored in 30 biogas digesters with a 13,000 m³ capacity each. Electric power co-generation plant using the biogas resulting from biological treatment. Sanitary landfill for solid waste and mud final disposal. Odor control system. Construction of roads, operation and storage buildings, and construction of hydraulic supply works.</p>	<ul style="list-style-type: none"> • Sanitation of up to 60% of Mexico City wastewater. • Reuse of wastewater used in agriculture. • Limited reduction of nutrients in treated water. • Improve health conditions for over 700,000 people • Recharge aquifers with better-quality water. • Sanitation of waterways • Prevention of septic material buildup in irrigation channels • Increase agricultural irrigation hygiene • Diversify crops over more than 80,000 hectares, eliminating restrictions for vegetable irrigation • Make water use more efficient by mechanizing agricultural irrigation, enabling drip irrigation by reducing water contaminants • Reduce landscape deterioration and river and spring pollution • Develop Tula's aquifer as a new drinking water supply source • Eliminate odors caused by wastewater

Source: Produced by the authors

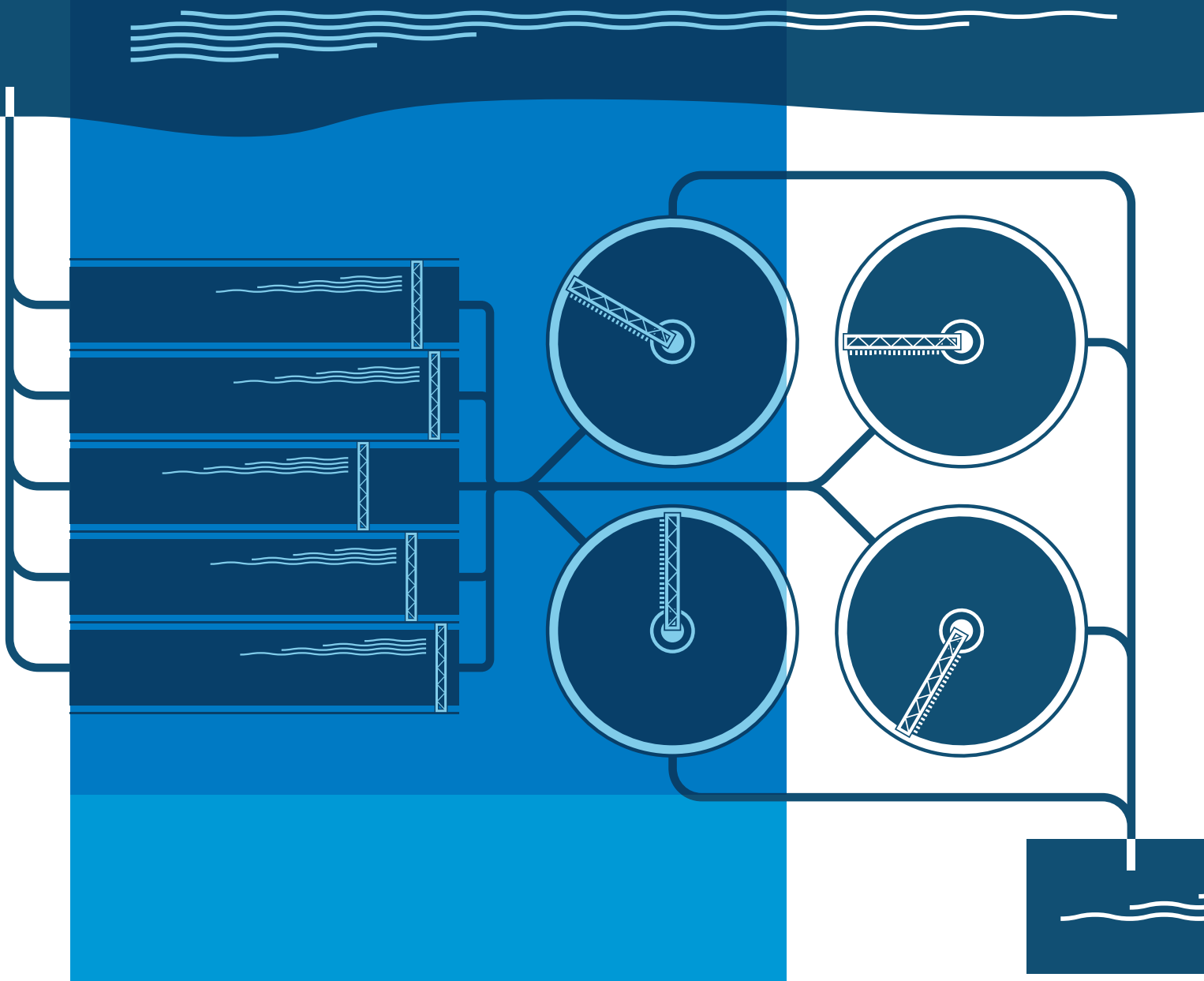
Notes:

- 1: Exchange rate used for conversion: 1.6662 Brazilian reals/dollar as of December 31, 2010. Central Bank of Brazil.
- 2: Exchange rate used for conversion: 538.22 pesos/average dollar for December 1999. Central Bank of Chile.
- 3: Exchange rate used for conversion: 538.53 pesos/average dollar for August 2006. Central Bank of Chile.
- 4: Investment amount source: PPI BM.
- 5: Ducci 2007
- 6: It equals to R\$409 million. APP en América Latina. Afrontando el reto de conectar y mejorar las ciudades. CAF 2018.
- 7: Exchange rate used for conversion: 2.1121 Brazilian reals/dollar as of December 3, 2012. Central Bank of Brazil.

The countries in the region usually have specific regulations for the water and sanitation sector, which they use to define the performance indicators that PPP contractors must comply with; in turn, non-compliance with these indicators leads to reductions in PPP contractors' revenues, which encourages them to perform well. This is the case of the Taboada WWTP contract in Peru, where the PPP contractor is required to meet over eleven rules. These include the General Solid Waste Act; the General Water Act; the Sea, River and Lake Activities' Control and Surveillance Act; and the Drinking Water and Sewerage Project Preparation Regulations, among others.

7

FEATURES OF CONTRACTS AND RISK ALLOCATION IN WATER AND SANITATION PUBLIC-PRIVATE PARTNERSHIPS



7

FEATURES OF CONTRACTS AND RISK ALLOCATION IN WATER AND SANITATION PUBLIC-PRIVATE PARTNERSHIPS

MAIN SOURCE OF REVENUE FROM CONTRACTS



Table 23
MAIN SOURCE OF REVENUE

	Fixed annual payments/availability payments from the government	Payments derived from water purchase-sale agreements	Purchase or tariff-for-transmission agreements with private entities	Purchase or tariff-for-transmission agreements with public entities	Users'tariffs	Variable annuity/availability payments from the government	Fixed and variable payments from the government
Construction type	3%	9%	-	18%	15%	56%	-
Rehabilitation Type	4%	-	1%	5%	88%	1%	1%
Management type	57%	-	-	-	14%	-	29%
All types	6%	2%	1%	8%	67%	14%	2%

Source: Produced by the authors Note: N = 144

In 67% of the projects the main revenue comes from the tariff charged to users. This percentage increases to 88% in Rehabilitation-type contracts, mostly service provision agreements. In 59% of Construction-type contracts, the main source of revenue are different forms of availability payments from the government, mostly in water treatment plant contracts.

Table 24
MAIN SOURCE OF REVENUE - SERVICE PROVISION

	Fixed annual payments/availability payments from the government	Purchase or tariff-for-transmission agreements with private entities	Purchase or tariff-for-transmission agreements with public entities	Users'tariffs	Variable annuity/availability payments from the government	Fixed and variable payments from the government
Type 1	0%	0%	0%	100%	0%	0%
Type 2	4%	1%	3%	91%	1%	0%
Type 3	57%	0%	0%	14%	0%	29%

Source: Produced by the authors

Note: N = 107

In 91% of service provision Rehabilitation-type contracts, the main source of revenue are the tariffs charged to users. Some examples include contracts in Argentina, like Aguas de Formosa and Aguas de Santiago's contracts, both signed in the late 1990s.

In the 1990 - 1999 period, in all service provision Rehabilitation-type contracts, the main source of revenue were the tariffs charged to users. Over the years, different forms of payment were incorporated in contracts, although in most of them users' tariffs are still the main source. In the past few years, fixed and variable payments from the government were incorporated into Management-type contracts, generally subject to compliance with certain performance indicators or targets, as is the case of New Providence in Bahamas, where a performance-based contract was executed for the purpose of reducing NRW losses and part of the remuneration payable to the private party was subject to the achievement of that target⁴⁴.

In Argentina, Chile, Mexico, Peru, Honduras and Guatemala, in 100% of service provision contracts, the main source of revenue are the tariffs charged to users. Then, in countries such as Brazil, even though in 90% of the contracts the main source of revenue are the tariffs charged to users, it is the country that has introduced the largest variety of forms of payment to the private party in its contracts. For example, "Payments derived from a purchase and sale or tariff-for-transmission agreement with private entities", as is the case of the Blumenau Sanitation System, Santa Catarina in Brazil, where the Serviço Autônomo Municipal de Água e Esgoto - SAMAE do Município de BLUMENAU - SC ("SAMAE") granted a concession in favor of BRK Ambiental. The contract specifically provides that SAMAE is in charge of collecting users' tariffs and BRK Ambiental shall receive its corresponding share of the collected amount for providing the sanitation system⁴⁵.

⁴⁴ Frigerio, 2018.

⁴⁵ [Contrato de Concesión Blumenau, Brasil.](#)

Table 25
MAIN SOURCE OF REVENUE - TREATMENT PLANTS

	Fixed annual payments/availability payments from the government	Payments derived from water purchase-sale agreements	Purchase or tariff-for-transmission agreements with public entities	Users'tariffs	Variable annuity/availability payments from the government	Fixed and variable payments from the government
Type 1	3%	9%	18%	12%	58%	-
Type 2	-	-	50%	25%	-	25%

Source: Produced by the authors

Note: N = 37

In 88% of water treatment plant Construction-type contracts, the main source of revenue are several types of payments from the government. The most remarkable forms of revenue are variable annuities or availability payments. As for Rehabilitation-type contracts, it should be noted that in 50% of contracts the main source of revenue are purchase agreements or tariffs for transmission paid by public entities.

In the 1990 – 1999 period the main source of revenue of water treatment plants was split between payments derived from the purchase and sale of water and a combination of fixed and variable payments from the government. Over the years, new remuneration mechanisms were introduced into contracts, such as users' tariffs, purchase agreements or tariffs for transmission paid by public entities. In the 2010 – 2019 period, fixed payments from the government were incorporated.

Ninety five percent of water treatment plant contracts with variable annuities/availability payments made by the government as the main source of revenue were executed in Mexico. An example of the latter is the Ensenada desalination plant, in Baja California, and the Atotonilco WWTP in Valle de México.

In 60% of water treatment plant contracts in Brazil, the main source of revenue are purchase/sale agreements/tariffs for transmission paid by public entities. These include wastewater treatment and final disposal contracts of the municipality of Mogi Mirim in Brazil.

In 50% of water treatment plant contracts in Peru, the main source of revenue are purchase and sale agreements (PPA or WPA) with drinking water or wastewater treatment plants. An example of the latter case is the Taboada Treatment Plant, where the service provider's remuneration depends in part on the affluent's cubic-meter volume⁴⁶.

Table 26 shows the main source of revenue and adjustment mechanisms established in the water treatment plant and service provision contracts selected.

⁴⁶ Taboada Concession Contract.

Table 26
MAIN SOURCE OF REVENUE AND ADJUSTMENT MECHANISMS.
SELECTED CONTRACTS.

Contract	Main source of revenue	Adjustment mechanism
Service provision		
Aguas de Sinop (Brazil)	Tariffs to be charged to users that were part of the bid based on a constant tariff structure.	Tariffs are adjusted according to Federal Law 8987/95 and the rules established in the contract: General Price Index adjustment every 12 months to be reviewed by the Regulating Entity
Proactiva Aguas de Montería (Colombia)	Tariffs to be charged to users that were part of the bid based on a constant tariff structure. Tariffs shall be subject to a linear transition period starting with the tariffs effective upon contract execution until the tariff tendered by the private party is reached. Furthermore, every year the State transfers resources subject to the private party's compliance with the provisions of the contract.	Once the tariff level tendered in the bid by the private party is reached, tariffs are indexed based on inflation.
Aguas Kpital Cúcuta (Colombia)	Tariffs to be charged to users established in the operator's bid following the method set forth in the tender specifications, according to the Regulator's rules. The company also receives government contributions to make up for the subsidy applicable to qualifying users. The private partner shall be responsible for the recovery of unpaid portfolio invoiced prior to the execution of the contract and shall receive 15% of the amount collected.	Any future changes in tariff determination methods shall not modify this contract's tariff. Tariffs are adjusted by inflation. Over the first 5 years of contract, tariffs may not be modified based on investment adjustments or changes in operating/administrative costs.
Grupo Mas Agua y Saneamiento (Mexico)	Tariffs to be charged to users that were part of the concessionaire's bid. The private party is in charge of collecting tariffs.	The tariff policy shall maintain the economic and financial balance established in the contract.
Blumenau (Brazil)	Tariffs to be charged to users.	Tariffs shall be adjusted based on the Consumer Price Index.
Aguas del Altiplano (Chile) and Tratacal - WWTP (Chile)	Tariffs to be charged to users.	Tariffs may be negotiated with the Superintendency of Sanitary Services. For purposes of this negotiation, studies shall be made regarding the costs necessary to provide the water and sanitation service. As a result of these studies, efficiency tariffs are established, which shall be equal to the long-term total cost considering operator's annual revenue. These tariffs shall be corrected by each provider, discounting from their facilities' replacement cost the share contributed by third parties, valued according to their replacement cost, considering the annuity necessary to renew such contributions. Finally, formulas shall be structured to express tariffs based on price indexes representing the cost structures involved in the different stages of the sanitary service. These tariff formulas are effective for five years.

Contract	Main source of revenue	Adjustment mechanism
Service provision		
Sanitation Network of the municipality of Serra	Fixed monthly remuneration based on the investment carried out (CAPEX repayment) and a variable remuneration based on a unit price to be multiplied by treated water volume. Each of the remunerations is tied to performance indicators.	The fixed part of the remuneration is reviewed every year to adjust it for inflation according to the National Consumer Price Index. The variable part is reviewed every year to adjust it for inflation.
Sanitation in Macaé	Combination of tariffs charged to users and public consideration. Public consideration: 30% subject to the delivery of certain products in the first year, 40% subject to the delivery of certain products in the first 5 years and the rest subject to compliance with works in the first 8 years.	-
Water Treatment Plants		
Sonora Desalination Plant (Mexico)	Monthly consideration from the beginning of the operation: T1 = fixed tariff to pay for the investment for 18 years and 6 months + T2 = fixed O&M tariff + T3 = variable O&M tariff tied to the volume of water delivered meeting stipulated quality requirements.	T1 depends on the CPI, T2 depends on the CPI (70%) and the invoiceable demand price variation index (30%), T3 depends on the CPI (47%) and energy price variation index (53%).
Taboada - WWTP (Peru)	Annual service remuneration (ASR) (which was part of the tender economic bid). It is made up by investment remuneration (IR) and Operation and Maintenance remuneration (O&MR). It is paid in nuevos soles (Peruvian currency). The IR is tied to the monthly issuance of the Work Progress Certificate (WPC), which entitles to the collection of WPCIR issued quarterly for 20 years. This payment shall accrue after the first quarter following the beginning of the operation. The O&MR is paid monthly from the beginning of the operation till the end of the concession.	WPCIR adjustment: a polynomial formula is defined in the contract for construction price variation with a 10% maximum. There is another adjustment based on the variation of the general wholesale price index, when this index is greater or equal to 3% accumulated from the moment the previous adjustment should have been made. O&MR adjustment: an adjustment can be made based on the general wholesale price index (when it is greater than 3% accumulated from the time the previous adjustment should have been made), a Financial Technical Audit (variation of electric power costs, chemical inputs, solid waste management and final disposal) and hazardous solid waste rating in the pilot plant operation stage and/or start-up trial period of the First stage of the Water Treatment System.
Jaguaribe Ocean Outfall System (Brazil)	Embasa (Empresa Baiana de Aguas e Saneamento) pays monthly considerations to the private party for a maximum value of US\$1.78 million (value as of June 2006) ¹	The monthly payment shall be adjusted based on the Consumer Price Index.
Atotonilco Wastewater Treatment Plant (Mexico)	Monthly payments T1: payment for investment in WWTP design, construction, equipment provision and start-up - US\$3.35 M (plus taxes) (values as of November 2017). T2: variable, largely dependent on treated water volume - WWTP fixed operation costs. T3PC: variable costs of operation, conservation and maintenance of biological treatment - variable. T3PQ: variable costs of operation, conservation and maintenance of physicochemical treatment - variable.	-

Source: Produced by the authors

Note: The Tratacal WWTP in Chile was included with Aguas del Altiplano because the Sanitary Service Tariff Act imposes the same procedure for setting and adjusting tariffs.

¹ Exchange rate as of June 1, 2006 2.2713 reals/US\$. Central Bank of Brazil.

In some of the cases observed, PPP contracts may allow the operator to cut off the supply of the service if users fail to pay. In Aguas de Sinop contract (Brazil), the private party may, giving prior notice to the user, cut off the service if a user has failed to pay the applicable tariff, if they did not allow the installation of meters in their premises or have tampered them. Moreover, in the case of the Aguas de Tumbes contract (Peru), its terms allowed cutting off the supply of the service without giving prior notice in the event of failure to pay for two consecutive months. This circumstance, added to the granting of exclusive rights for the provision of the service as discussed above, gives the private party some degree of certainty as to the revenue flow it will receive. However, in other countries like Ecuador, users' water supply cannot be cut off for failure to pay, all that can be done is to reduce the pressure to the minimum level⁴⁷.

Costs related to the provision of the water and sanitation service are covered through a combination of tariffs and/or subsidies. Under an ideal scheme, the tariffs charged to users should cover operation and financing costs, but in many cases this is not achieved and operators' revenue has to be compensated with contributions from the community or the government⁴⁸. In Colombia, tariff schemes explicitly consider a cross-subsidy system aimed at ensuring that low-income families have access to services. Tariff-based revenue is supplemented with national state resources, mainly through the General Participation System. Tariff policies implemented from the year 1995 onwards made it possible to reduce the gap between the cost of service provision and tariffs, thereby generating financial stability in operator agencies, which has in time allowed to improve coverage and quality. Moreover, this has made it possible to send out signals that the water resource is scarce, thereby reducing consumption level and allowing investment postponement⁴⁹. In Chile, an on-demand subsidy system was established, focused on favoring low-income families. Municipalities identify those families that qualify for the subsidy, following the procedures established by the Ministry of Planning and Cooperation. The company bills favored companies' subsidized share to the municipality, which must reimburse it from time to time, using resources from the central government. This way, it is the state and not the company that guarantees access to low-income families⁵⁰.

⁴⁷ Pastor et al, 2018.

⁴⁸ Pastor et al, 2018.

⁴⁹ Ducci 2007

⁵⁰ Ducci 2007

PAYMENTS TO THE GOVERNMENT



In brownfield contracts, the private partner is usually subject to the condition of making some kind of payment to the state or public company that used to provide the service before. In some cases, this is a periodic payment as rental of the property the grantor assigns for the provision of the service (like a starting canon or annual canon) as is the case of Aguas de Montería in Colombia.

In others, like Chilean contracts, this is a one-time payment made at the beginning of the contract, followed by annual payments until termination of the contract. Moreover, these payments are frequently used as criteria to select a contractor in a tender process, as in the case of Aguas de Guariroba in Brazil, where the contractor was awarded the contract offering to pay the government US\$36 million. Moreover, contracts usually include the PPP contractor's commitment to pay an audit and regulation fee, like in the case of Aguas de Sinop. Table 27 shows examples of these types of payments to the governments for selected contracts.

Table 27
PAYMENTS TO THE GOVERNMENT IN SELECTED CONTRACTS

Contract	Payments to the government
Service provision	
Aguas de Sinop (Brazil)	The concessionaire shall assign a percentage of the amount collected to the Regulating Entity for regulation and audit purposes; 2.5% for each item the first two years and 1.23% for each from the third year onwards.
Proactiva Aguas de Montería (Colombia)	Annual payment as rental of US\$440,000 (values as of the year 2000) per year during the term of the concession
Aguas Kpital Cúcuta (Colombia)	Share in monthly tariffs charged to users: US\$372,118 (values as of 2005)
Grupo Mas Agua y Saneamiento (Mexico)	The concessionaire shall pay the consideration as rental of the property from the date the Start of Operation Notice is issued. Moreover, it will make a monthly payment to be used for financing Labor and Financial Liabilities.
Aguas del Altiplano (Chile)	One-time payment as transfer of the right to exploit sanitary concessions: US\$76.5 M (values as of 2004) Annual payment: from year 1 to 28: US\$176,053 and years 29 and 30: US\$352,106 (values as of 2004) ¹
Aguas Cordobesas (Argentina)	Fixed annual canon of US\$9.92 M for using the concession Variable annual canon of US\$0.019/m ³ for using the water resources ²
Aguas de Guariroba (Brazil)	Approximate payment of US\$36 M (values as of 2000) ³ . Half the amount was paid upon the execution of the contract and the balance was payable in instalments over the 30-year term of the concession.
Water treatment plants	
Tratacal - WWTP (Chile)	One-time payment as transfer of the right to exploit sanitary concessions: US\$5.2 M (values as of 2007) Annual payment: US\$31,271 (values as of 2008)

Source: Produced by the authors

Notes:

1 Exchange rate used to calculate the US\$ amount: 2284.22 pesos per dollar.

2 The amounts in the contracts are expressed in Unidades de Fomento (UF) and were converted to US\$ for purposes hereof.

3 Ducci (2007).



Design, construction and operation risks are typically allocated to the private partner.

In most service provision contracts the operator bears the **commercial risk** (demand), since it is responsible for collecting the tariffs charged to users. In some cases, as in the Municipality of San José de Cúcuta, Colombia, lower-income users' tariffs are subsidized. In this case these subsidies are covered with funds received by the Municipality from the Colombian state and transferred to the granting agency. During the term of the PPP contract, the granting agency is obligated to transfer subsidy amounts to the operator by means of a trust⁵¹. In the case of water treatment plant contracts, sometimes it is the state that pays for drinking water availability, like the specific case of the Sonora Desalination Plant, in Mexico. This contract in particular has a monthly consideration from the beginning of the operation and is made up by a fixed tariff to pay for the investment for 18 years and 6 months, plus a fixed O&M tariff and a variable O&M tariff tied to the volume of water delivered meeting stipulated quality requirements.

Electricity supply in the water and sanitation sector plays a major role as it enables the operation of pumps that distribute water throughout the cycle, accounting for 15 to 20% of operation expenses. For this reason some contracts include mechanisms to mitigate the risk of a power outage that might affect the service provision levels demanded. This is the case of the Sonora Desalination Plant, where the private party is asked to build an electric line and the power supply risk is transferred.

In most cases, the political and/or change-of-regulation risk is allocated to the public sector. However, in the Chilean case, this risk is allocated to the private party. This might be offset by the fact that the private operator has a right to negotiate the tariffs to be charged to users with the Superintendency of Sanitary Services, as specified in the Sanitary Service Tariff Act⁵².

Also in Colombia, Law 142/94 has specific elements to determine tariffs based on long-term efficiency and self-financing criteria⁵³. The fact that tariffs are calculated according to a law provides legal certainty to the contract.

Service provision contracts usually grant exclusive rights to private operators/partners in a specified area. This on the one hand mitigates commercial risk because those users who wish to have the service shall hire it with this company and, on the other hand, leads to problems related to the capture of consumers' surplus which are observed in monopolistic services. An example of this is the Blumenau Sanitation Service contract in Santa Catarina and the Taboada Water Treatment Plant in Peru. This last scenario creates the necessity to have regulating entities that will guarantee an adequate service provision at a reasonable price.

⁵¹ Operation Contract in San José de Cúcuta.

⁵² Sanitary Service Tariff Act. Decree-law 70/1988 of the Ministry of Public Works.

⁵³ Ducci 2007.

Another fact that usually leads to tariff distortion is the presence of taxes, charges, rates or levies. These may be directly related to the service provided, e.g., a rate to finance infrastructure works; may be linked to positive or negative external factors related to the provision of the service, such as taxes or subsidies to correct market failures; and lastly, instruments related only to the public sector’s tax collection and financing needs⁵⁴.

Table 28 shows risk distribution for a set of service provision and water treatment plant contracts in LAC..

Table 28
RISK ALLOCATION IN SELECTED WATER AND SANITATION PPP CONTRACTS

Contract	Land	Design	Construction	Operation	Commercial (Demand)	Inflation/Exchange rate	Social and environmental	Political and regulatory	Force majeure
Service provision									
Aguas de Sinop (Brazil)	Shared (The State handles expropriations and easements, but the cost thereof is covered by the private party)	NA	Private	Private	Private (tariffs are reviewed if the economic and financial balance is lost)	Users: Tariff adjustment-based on the General Price Index every 12 months to be reviewed by the Regulating Entity	Shared	Public	Public
Proactiva Aguas de Montería (Colombia)	Public	Private	Private	Private	Private (If tariffs drop below a threshold, the economic-financial equation is rebalanced)	Users: Tariffs are indexed based on inflation. Exchange rate: Private	-	Public	-
Aguas Kpital Cúcuta (Colombia)	Private	Private	Private	Private	Private (Municipal subsidy for lower-income users)	Users: Tariffs are indexed based on inflation.	Private	Public (in the event of a tax increase, may be transferred to users by means of an increase in tariffs)	Shared (Insurance required from the private party)

54 Pastor et al, 2018.

Contract	Land	Design	Construction	Operation	Commercial (Demand)	Inflation/Exchange rate	Social and environmental	Political and regulatory	Force majeure
Service provision									
Grupo Mas Agua y Saneamiento (Mexico)	Easements: Public	Concessionaire (mixed company)	Concessionaire (mixed company)	Concessionaire (mixed company)	Concessionaire (mixed company) (The tariff policy shall maintain the economic and financial balance)	Users: tariffs are adjusted by inflation	Concessionaire (mixed company). It shall obtain all necessary permits, concessions and licenses	In the event of a change in laws or taxation method, the effects thereof shall be analyzed and, if applicable, action shall be taken to make up for any negative impact on the Financial Model.	In the event of early termination, the investor-operator partner shall be entitled to compensation for damages
Blumenau (Brazil)	Public	Private	Private	Private	Private (The tariff is collected by the municipal water service jointly with the drinking water service tariff and the sanitation share is transferred to the private party).	Users: tariffs are adjusted by inflation	Shared (The private party informs the granting agency and competent environmental authorities about any act or omission it may be aware of which leads to water resource pollution or hinders service provision or proceedings relating thereto, so that they may take any appropriate action. The concessionaire shall obtain all licenses necessary to carry out works and investments	Users (In the event taxes change (except for income tax) or legal issues arise which affect balance) (tariffs may be modified)	-

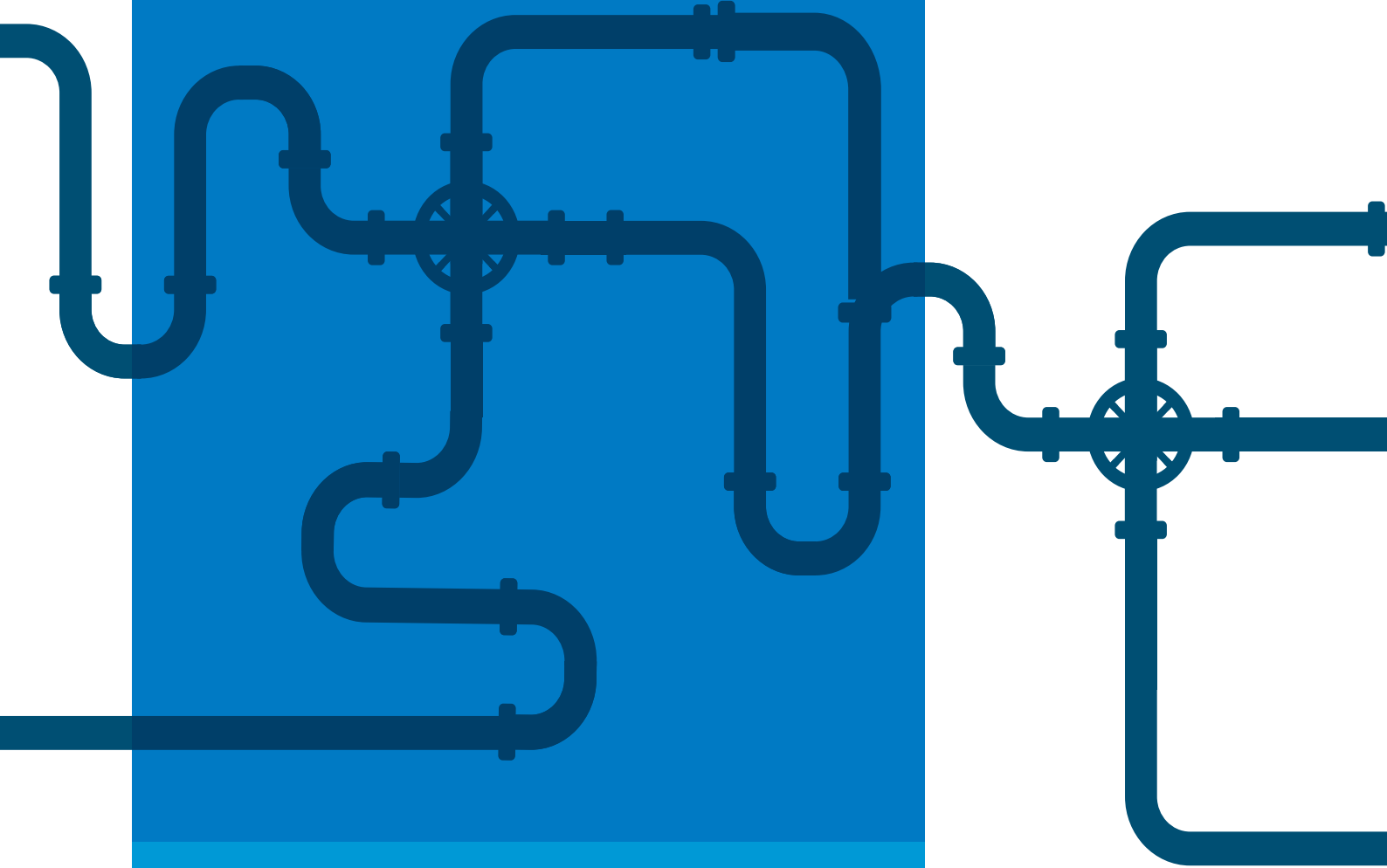
Contract	Land	Design	Construction	Operation	Commercial (Demand)	Inflation/Exchange rate	Social and environmental	Political and regulatory	Force majeure
Service provision									
Aguas del Altiplano (Chile)	Easements Private Expropriations are requested by the public party up on the private party's request Land acquisition: private	Private (although there is a prior development plan approved by the Regulating agency which shall be continued by the private party)	Private	Private	Private	Users (The tariff formula includes tariff indexation)	Private	Private (The operator shall comply with current or future regulations governing service provision). Public (By supreme decree the state may discontinue the application of agreed tariffs and establish lower ones. In that case the state pays the service provider any collection difference)	NA
Sanitation Network of the municipality of Serra (Brazil)	Expropriations: costs Private (with private sector's prior habilitation to expropriate)	Private	Private	Private	Shared	Inflation: Public Interest rate and exchange rate: Private	Private	Change in quality standards: shared Change in the law: Public	Shared
Sanitation in Macaé (Brazil)	Public	-	Private	Private	Private (responsibility for the commercial management of the WAS service is transferred to the private party)	-	Public (those that may greatly increase costs)	-	-
Water Treatment Plants									
Sonora Desalination Plant (Mexico)	Public	Private	Private	Private	NA (Availability payment from the state)	Public	Private	Public	Shared

Contract	Land	Design	Construction	Operation	Commercial (Demand)	Inflation/ Exchange rate	Social and environmental	Political and regulatory	Force majeure
Water Treatment Plants									
Tratacal - WWTP (Chile)	Easements Private Expropriations: The public company shall request any applicable expropriations, upon Operator's demand. Land acquisition: private	Private (although there is a prior development plan approved by the Regulating Agency which shall be continued by the private party)	Private	Private	Private (Collection is carried out by Aguas de Antofagasta jointly with water distribution and wastewater collection tariffs)	Users (The tariff formula includes tariff indexation)	Private	Private (The operator shall comply with current or future regulations governing service provision). Public (By supreme decree the state may discontinue the application of agreed tariffs and establish lower ones. In that case the state pays the service provider any collection difference)	-
Taboada - WWTP (Peru)	Easements: Private Land: Public (The granting agency delivers the concession area free from any liens so the private party can fulfill its obligations. Should the concession area be insufficient according to the concessionaire's design, then new land shall be acquired at the private party's expense)	Private	Private	Private	NA (Availability payment from the state)	Shared (the availability payment may be adjusted at the public sector's expense but with certain limitations)	Private	Shared (Mechanism to restore the economic and financial balance of the contract available to the concessionaire and granting agency in the event the concession is affected, solely and specifically due to changes in applicable laws and provisions, to the extent it is exclusively related to financial and economic aspects)	Shared

Contract	Land	Design	Construction	Operation	Commercial (Demand)	Inflation/Exchange rate	Social and environmental	Political and regulatory	Force majeure
Water Treatment Plants									
Jaguaribe Ocean Outfall System (Brazil)	Public	Private	Private	Private	Availability payment from the WAS service provision public company.	-	-	Public	Shared
Atotonilco Wastewater treatment plant (Mexico)	Land acquisition and permits: public Land use and rights of way: shared	Private	Private	Private	NA (Availability payment from the state)	-	Permits, authorizations and environmental regulations: private	Legal amendments: public	-

8

PERFORMANCE OF WATER AND SANITATION PUBLIC-PRIVATE PARTNERSHIPS'



8

PERFORMANCE OF WATER AND SANITATION PUBLIC-PRIVATE PARTNERSHIPS'

As mentioned above, the first generation of private sector participation in the water and sanitation sector started in the 1990s and continued until the early 2000s. Although the trend pointed to a foreseeable increase in private participation in the sector towards the end of the past century, several factors led to the failure of operators' performance and contracts were ultimately renegotiated or cancelled, which in many cases caused the renationalization of the services. Ducci (2007) classified the possible causes thereof as follows⁵⁵:

- **Changes in the national sectoral policy:** an example of this is the case of Uruguay, where the National Water and Life Defense Commission obtained the enactment of a constitutional reform prohibiting private management of water and sanitation services since late 2004. In 2005 the two operators present in the country, Aguas de Bilbao and Aguas de Barcelona, left the scene. They had been blamed for the increase in tariffs and noncompliance with investments, among other problems. In this case, leaving aside the accusations, operators thought leaving the scene was appropriate due to the consequences of the economic crisis and the market's lack of perspective, so their departure did not generate much conflict.
- **Social and political conflicts:** in the cases of Cochabamba in Bolivia and Tucumán in Argentina, an increase in tariffs was applied at the beginning of the contracts which was not feasible from a social and/or political perspective. There were also accusations of lack of transparency in contract awarding processes and in negotiations with operators, lack of local political support and population claims. In the case of Cochabamba, this led the private partner to terminate the contract. In Tucumán, the new local authority encouraged users not to pay bills, which coupled with water quality issues, led to renationalization. In El Alto and La Paz (Bolivia), the social pressure related to the failure to expand water and sanitation networks, high connection costs and tariff dollarization, coupled with the political conflicts of the so called "Water War" of Cochabamba, caused the service provision to revert to the State in 2007 and to the creation of a new public company.

⁵⁵ It should also be noted that around this time several international private operators left the market due to strategic decisions made by controlling companies. This did not mean the renationalization of the service, but shares were sold to investor groups, mostly local. The case of Córdoba in Argentina and ESVAL SA and ESSBIO SA in Chile exemplify this situation.

- **Rupture of the economic and financial balance of the contract:** this may be observed in Argentina, where the economic and social crisis of the early 2000s led to the pesification and freeze of basic service tariffs. This fact, jointly with the strong devaluation that increased the service cost of foreign currency denominated debt and the cost of tradable goods, led the contracts executed over the previous years (Aguas Argentinas, services of Santa Fe and the province of Buenos Aires) to become financially impracticable⁵⁶.

A review of the experience of this first generation of PPP projects in the Water and Sanitation sector shows aspects that are key to their success. Such aspects include: improvements in terms of contract award competition and transparency; improvements in the design thereof (clear design processes and tariff adjustment combined with effective subsidy mechanisms for lower-income families); appropriate risk allocation; for instance, in Argentina, Uruguay and Bolivia the exchange risk was erroneously allocated to users which, in a strong devaluation scenario, led to the rupture of the economic and financial equation of the contract; appropriate conflict resolution mechanisms which make it unnecessary to resort to international entities such as the ICSID; avoiding penalties for private partner's non-compliance that can be appealed; having appropriate technical information available on the situation status prior to the execution of the contract; greater control of levels of indebtedness allowed/requirements of equity capital contributions, and the presence of an experienced regulating entity to monitor contract compliance and an appropriate regulatory background, as well as political support for the implementation of PPP schemes.

Some of these aspects were taken into consideration when developing contracts in the following generations. There are specific examples where the following items stand out: Exchange rate risk has been allocated to the private sector in more recent contracts, for example, the contract executed in 2014 for the Sanitation Network of the municipality of Serra (Brazil). We may also mention the contract of Aguas de Montería (Colombia), where this risk was also allocated to the private partner (executed in 1999). Moreover, instead of penalty mechanisms to punish the private partner for contractual non-compliance that might be appealed in court and lead to a long negotiation period, some contracts implement automatic payment discounts made by the public sector to the private partner in case some standards predefined in the contract are breached. This occurs mainly in water treatment plants, where the main source of revenue are these government payments. We could mention the case of the Desalination Plant of Sonora, where one part of the tariff remunerating the operation and maintenance is tied to the volume of water delivered that must comply with the quality indicators stipulated in the contract. However, since this type of mechanisms is harder to implement in contracts where the main source of revenue are the tariffs charged to users, a stronger presence of regulating entities is required to monitor compliance with the service standards required in the contracts.

In general, PPP regulations in the region enacted after the nineties' generation of contracts require that contracts have conflict resolution mechanisms.

⁵⁶ The solution to this conflict was not the same in all cases; in the particular case of services of Aguas Argentinas and the province of Santa Fe, the conflict ended with the termination of the contract due to the private partner's fault and the transfer of services to public companies, with prior international arbitration proceedings before the International Centre for Settlement of Investment Disputes (ICSID). In the case of the province of Buenos Aires, the company terminated the contract and filed a claim with the ICSID whereby the government had to compensate the company for damages. The province undertook the provision of services through the public company Aguas Bonaerenses SA.

These mechanisms help solve conflicts in a more expeditious manner. The Taboada WWTP contract of Peru establishes the rules governing the contract and the dispute resolution mechanisms to be applied. Firstly, it is stipulated that disputes shall be solved by means of “direct dealings” between the parties. In the event this does not work, the dispute may be submitted to several types of arbitration proceedings, according to the nature thereof. As mentioned in the previous section, the tariff adjustment in Chile and Colombia is regulated by specific rules: the Sanitary Service Tariff Act (Chile) and Law 142/94 (Colombia). This ensures clarity in the establishment and conduct of tariff adjustments. Another example of aspects that have improved in more recent contracts is an appropriate starting diagnosis and survey of the main indicators to be used as baseline, like in management contracts. This was the case of New Providence in Bahamas and Port-au-Prince in Haiti, where the private sector managed to improve operational management through the Geographic Information System and commercial management through the Commercial Information System⁵⁷.

In the past few years, most water and sanitation services provided through PPP contracts in the region have improved their performance indicators⁵⁸. The Chilean contracts studied have improved in all indicators and are the ones with the best performance in the group analyzed. We should also mention Aguas de Cartagena in Colombia, which improved the coverage of the water distribution and sewerage system and reached 24-hour continuity in the provision of the drinking water service. However, there are still exceptions and aspects for improvement. An example is Aguas de Tumbes (Peru), where virtually all indicators declined, which led to the cancellation of the contract in 2018. Table 29 shows a summary of all performance indicators for a set of selected water and sanitation contracts. Annex C shows a breakdown of indicators for each contract.

When we analyze the evolution of coverage indicators in contracts, it should be noted whether percentages tend towards 100% of the population in the area of influence but also if this percentage is maintained over time, because this indicates that when new households are incorporated, any investments needed to add them to the network are made. In the case of Sociedad de Acueducto, Alcantarillado y Aseo de Barranquilla, while it improved drinking water coverage and reached 100% in 2017, its sanitation coverage indicator declined from 66% in 2004 to 60% in 2017. Honduras shows cases of success: thanks to the Puerto Cortés contract, drinking water coverage level increased from 90% in 1998, the year before the execution of the contract, to 99% in 2016. As regards sanitation, although the levels reached were not so high, there was substantial improvement with an increase in coverage from 5% to 32%.

Most contracts analyzed have improved in terms of their micro-measurement levels, reaching levels above 90%. The micro-measurement indicator measures the total number of household meters in operation as compared to total drinking water household connections. However, there are exceptions, such as Hidropacífico in Colombia, whose micro-measurement level declined, going from almost 100% in 2006, four years after the beginning of the contract, to 61% in 2017.

⁵⁷ Frigerio et al, 2018

⁵⁸ It should be pointed out that we are considering only active contracts for which we have performance data. As mentioned above, not all PPP contracts were successful, and many were either cancelled or renegotiated.

Table 29
SUMMARY OF PERFORMANCE INDICATORS. SELECTED CONTRACTS.

	Coverage (%)				Micro-measurement (%)		NRW (%)		Water quality (%)	
	Drinking water		Sanitation		Start	End	Start	End	Start	End
Average	Start	End	Start	End						
	88.5	91.6	70.9	77.7	84.0	87.3	49.0	39.9	99.5	78.2

	Continuity (hours)		Clogging density (#/Km)		Wastewater treatment (%)		Total operation costs coverage ratio	
	Start	End	Start	End	Start	End	Start	End
Average	Start	End	Start	End	Start	End	Start	End
	20.9	22.6	1.2	3.7	51.8	82.0	17.0	2.2

	Debt/Shareholders' equity (%)		Average billing of drinking water services by residential account (US\$/account)		Average billing of sewerage services by residential account (US\$/account)		Total claim density (claims/account)	
	Start	End	Start	End	Start	End	Start	End
Average	Start	End	Start	End	Start	End	Start	End
	268.3	102,475.0	114.7	142.4	91.8	91.2	0.1	0.1

Source: Produced by the authors

As regards Non-Revenue Water (NRW) levels, service providers with the best performance in the region are around 20% (BID 2020). The companies analyzed show improvements in this indicator, but only a few reach such low levels. We could mention Aguas de Tunja in Colombia, which reached 21% of NRW in 2017. We should also note the performance-based contract in New Providence, Bahamas, which developed a comprehensive NRW reduction and control plan, and achieved considerable improvement, reaching 23% in 2018 (IDB, 2020).

Water quality is measured as the percentage of total water analyzed which results conform to current regulations, considering all analyses performed. Most contracts analyzed have 90% to 100% results, except for some cases that show results nearing 50% of compliance with quality regulations. We could mention the case of Hidropacífico in Colombia, whose drinking water parameters reached 100% compliance in 2013, and declined towards 2017, when they reached 22%. This information is alarming, as the measurement level for this indicator is related to the health of the population, but it is not surprising, if we consider the high level of bottled water consumption in the region⁵⁹.

⁵⁹ According to IDB's information dated 2020, based on data from the Americas Barometer 2018-2019.

Except for the Port-au-Prince and Aguas de Tumbes contracts, all contracts analyzed have reached 24-hour a day provision continuity or levels close to this value.

This represents a good outcome considering that 24-hour water service access percentages vary greatly in the region, with percentages close to 100% in Uruguay or Chile and close to 10% in Dominican Republic⁶⁰.

Only 20% to 40% of collected wastewater is treated in the region (IDB, 2020). One of the few exceptions is Chile, where rates have increased as can be seen in the contracts analyzed with all contracts reaching levels close to 100%.

According to IDB, 2020, the success of the wastewater treatment plan in Chile responds to several measures: new emission rules to regulate contaminants linked to the release of liquid industrial waste into sewerage systems and the discharge of liquid waste into sea and inland surface waters; strengthening of the Superintendency of Sanitary Services' (SISS) oversight powers in 1998 and a new regulatory framework allowing private capital in water and sanitation sector companies.

A measurement worth analyzing is the ratio between companies' coverage of operating costs and their billing levels, as it provides a reference on the sustainability of the service. A service is sustainable revenues from users' bills cover operating costs; otherwise, it will be necessary to resort to governmental loans or subsidies. The ratio analyzed may be higher than one, which would indicate financial surplus or lower than one in case of a deficit, once operating costs are covered. In virtually all cases analyzed, a financial surplus is recorded.

While the implementation of most contracts analyzed in this section has improved the provision of the water and sanitation service in the affected populations, this is not enough evidence to assert that the choice of a PPP scheme to provide the service is better than the traditional service provision option by means of public companies.

⁶⁰ IDB's data, 2020, according to LAPOP Survey, Barometer of the Americas 2018-2019.

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ANNEX A1

WATER AND SANITATION COVERAGE LEVELS IN URBAN AND RURAL AREAS OF LATIN AMERICA AND THE CARIBBEAN BY NATION 2000 - 2017



Country	National Water Coverage (2000)	National Water Coverage (2017)	National Sanitation Coverage (2000)	National Sanitation Coverage (2017)
Argentina	96	-	87	-
Bahamas	98	99	88	95
Barbados	98	98	89	97
Belize	87	98	82	88
Bolivia	79	93	35	61
Brazil	94	98	73	88
Chile	96	>99	92	>99
Colombia	91	97	72	90
Costa Rica	94	>99	93	98
Dominica	93	-	64	-
Dominican Rep.	90	97	78	84
Ecuador	82	94	70	88
El Salvador	78	97	83	87
Guatemala	86	94	63	65
Guyana	88	96	79	86
Haiti	56	65	17	35
Honduras	85	95	63	81
Jamaica	93	91	82	87
Mexico	89	>99	75	91
Nicaragua	81	82	58	74
Panama	88	96	61	83
Paraguay	75	>99	70	90
Peru	81	91	64	74
Suriname	90	95	79	84
Trinidad and Tobago	92	98	90	93
Uruguay	97	>99	94	97

Source: UNICEF - World Health Organization

ANNEX A2

WATER AND SANITATION COVERAGE LEVELS IN URBAN AND RURAL AREAS OF LATIN AMERICA AND THE CARIBBEAN



Country	Coverage (%)		Access rules	Sanitation		Access rules
	Urban	Rural		Urban	Rural	
Argentina	99.0	97.8	Improved	96.9	92.3	Improved
	92.3	64.9	Public network outside the home	96.2	88.6	Sewerage system or septic tank
	91.0	57.3	Public network inside the home	68.2	20.4	Sewerage system
Bolivia	92.5	71.7	Improved	74.0	57.0	Improved
	86.1	21.9	Public network outside the home	62.5	18.6	Sewerage system or septic tank
	49.5	6.2	Public network inside the home	49.7	4.3	Sewerage system
Brazil	98.7	82.3	Improved	92.1	80.2	Improved
	92.3	46.0	Public network outside the home	89.3	73.2	Sewerage system or septic tank
	90.4	43.9	Public network inside the home	67.0	19.8	Sewerage system
Chile	99.7	96.3	Improved	96.2	90.8	Improved
	99.2	87.2	Public network outside the home	96.2	88.4	Sewerage system or septic tank
	98.7	85.3	Public network inside the home	94.3	47.9	Sewerage system
Colombia	96.2	73.7	Improved	93.6	73.5	Improved
	93.5	47.8	Public network outside the home	93.1	66.4	Sewerage system or septic tank
	92.5	43.4	Public network inside the home	90.3	18.3	Sewerage system
Costa Rica	95.5	86.6	Improved	96.9	94.5	Improved
	94.1	79.4	Public network outside the home	92.0	90.8	Sewerage system or septic tank
	94.0	78.8	Public network inside the home	38.5	11.7	Sewerage system

Country	Coverage (%)		Access rules	Sanitation		Access rules
	Urban	Rural		Urban	Rural	
Ecuador	98.6	95.8	Improved	92.1	90.7	Improved
	95.3	82.2	Public network outside the home	90.9	89.2	Sewerage system or septic tank
	94.6	80.1	Public network inside the home	78.3	62.8	Sewerage system
El Salvador	96.0	80.0	Improved	82.5	75.7	Improved
	90.3	61.5	Public network outside the home	77.8	60.7	Sewerage system or septic tank
	84.0	44.1	Public network inside the home	58.6	3.0	Sewerage system
Guatemala	97.2	90.3	Improved	88.6	78.6	Improved
	85.1	65.3	Public network outside the home	87.3	68.6	Sewerage system or septic tank
	83.7	60.1	Public network inside the home	75.3	26.0	Sewerage system
Honduras	97.2	92.8	Improved	88.3	80.8	Improved
	88.0	83.7	Public network outside the home	85.3	70.0	Sewerage system or septic tank
	77.4	60.2	Public network inside the home	58.6	11.5	Sewerage system
Jamaica	91.6	85.0	Improved	64.9	76.0	Improved
	78.0	57.5	Public network outside the home	60.6	67.8	Sewerage system or septic tank
	63.7	42.0	Public network inside the home	24.3	9.6	Sewerage system
Mexico	96.1	88.5	Improved	90.5	86.4	Improved
	87.2	61.0	Public network outside the home	89.4	81.2	Sewerage system or septic tank
	76.0	47.0	Public network inside the home	82.4	54.0	Sewerage system
Nicaragua	97.9	80.5	Improved	82.6	62.7	Improved
	91.2	45.7	Public network outside the home	74.7	41.3	Sewerage system or septic tank
	85.2	35.3	Public network inside the home	45.6	2.5	Sewerage system
Panama	99.3	90.1	Improved	88.7	76.0	Improved
	96.7	72.5	Public network outside the home	86.0	64.7	Sewerage system or septic tank
	94.4	64.6	Public network inside the home	49.1	8.6	Sewerage system
Paraguay	94.9	90.7	Improved	88.6	71.1	Improved
	80.4	64.2	Public network outside the home	85.1	64.4	Sewerage system or septic tank
	74.9	53.5	Public network inside the home	18.5	0.2	Sewerage system
Peru	94.0	92.8	Improved	88.2	76.7	Improved
	88.6	80.2	Public network outside the home	85.9	44.7	Sewerage system or septic tank
	86.1	72.7	Public network inside the home	84.4	19.5	Sewerage system

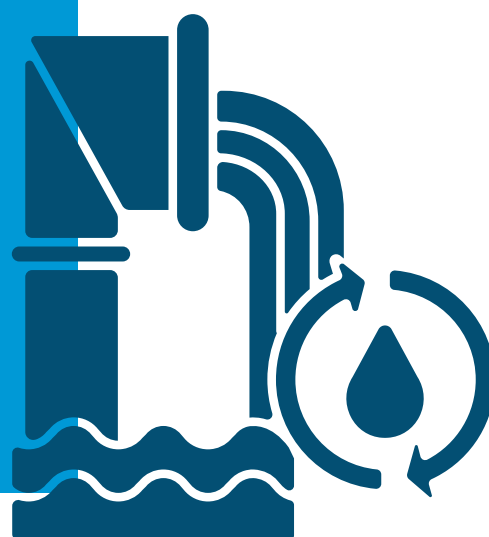
Country	Coverage (%)		Access rules	Sanitation		Access rules
	Urban	Rural		Urban	Rural	
Dominican Rep.	93.8	82.9	Improved	78.3	73.4	Improved
	71.9	54.3	Public network outside the home	70.7	65.6	Sewerage system or septic tank
	54.0	35.7	Public network inside the home	23.9	6.8	Sewerage system
Uruguay	99.8	100.0	Improved	96.7	95.8	Improved
	97.9	91.7	Public network outside the home	96.6	95.1	Sewerage system or septic tank
	97.6	90.6	Public network inside the home	67.9	30.5	Sewerage system

Source: Cavallo, Eduardo; Powell, Andrew; Serebrisky, Tomas. De estructuras a Servicios: el camino a una mejor infraestructura en América Latina y el Caribe. BID 2020.

Note: "Improved water" comes from pipes, protected wells, rainwater or protected springs. "Public network outside the home" means in the backyard or inside the home. "Public network inside the home" means within the home itself. "Improved sanitation" means a toilet or latrine to separate excretions from human contact which is used only by one household. "Sewerage system or septic tank" refers to a sanitation system where excretions are connected to sewerage pipes or a septic system. "Sewerage system" refers to a sanitation system where the household is connected to sewerage pipes.

ANNEX B

REGULATORY FRAMEWORKS FOR PRIVATE PARTICIPATION IN THE WATER AND SANITATION SECTOR IN LATIN AMERICA AND THE CARIBBEAN



Country	Is private sector participation allowed?	Private participation Experience	PPP experience	Current service provision
Argentina	YES PPP Law 27328	YES	YES	In the hands of provincial companies. Municipalities and cooperatives are in charge of small or rural communities. It is estimated that there are 1828 providers, 23 of them in the provinces, 19 of which are state-owned and serve 60% of the population. The remaining providers (6 of them private) serve approximately 10% of the population. Municipal operators account for more than 98% of the number of operators, but since they are in charge of the smallest cities, it is estimated they serve around 30% of the population.
Bahamas	YES PPP Policy (but the sector is not specifically included)	YES	YES	Public: Water and Sewerage Corporation (WS). Private: Grand Bahama Utility Company Limited provides the service in Grand Bahama - New Providence Development Company (NPDC) and Paradise Utilities (PU), apart from other WAS utilities and several independent network providers. The Bahamas' WSC supplies drinking water to 250,000 persons, and owns, operates and manages 83% of the country's water systems, while the private sector accounts for the remaining 17%.
Brazil	YES Law 11445 Water Regulatory Framework- Federal PPP Act and PPP Act by state	YES	YES	Around 15% of the population is served by PPPs and concessions. As of 2018, there were 1568 water and sewerage service providers: 28 regional services, 24 of which are mixed companies/2 municipalities: 1 public and 1 private/microregional services: 3 operated by the municipality and 5 private companies/Local services: 996 direct public, 442 municipalities, 100 private companies, 14 other.
Chile	YES Ministry of Public Works' decree-law 382 of 1988: General Sanitary Institutionality Act. The WAS sector is governed by regulations applicable to corporations	YES	YES	96.4% by international and national private companies in the urban area. Twenty three percent of the market is served by means of concessions. In the rural sector, it is administered by the communities themselves and supported by the Ministry of Public Works that carries out works.

Country	Is private sector participation allowed?	Private participation Experience	PPP experience	Current service provision
Colombia	YES PPP Law 1508 of 2012 and its Decree 1082 of 2015 that regulates WAS contracts	YES	YES	2567 urban and rural providers in the country (2017): the highest number of providers serves only the water distribution system and comprises mainly authorized organizations, community action boards, public administrators and users' associations (1304 providers), followed by companies supplying water distribution, sewerage and/or hygiene services, sewerage-only providers being rare. Mostly public companies serve 53.3% of users, private companies serve 19.3% and mixed companies, 24.1%.
Dominican Republic	YES PPP Act: Law 47/20	YES	YES	Instituto Nacional de Aguas Potables y Alcantarillados (INAPA) provides services to 41% of the population. Moreover, since the decentralization process started in 1973, there are 7 corporations in operation, one per province, whose authorities are appointed by the Republic's president.
Ecuador	YES Organic PPP and Foreign Investment Incentive Act (Decree 652-15)	YES	YES	GAD provides drinking water, sewerage, water purification and solid waste management services and environmental sanitation activities, among others. The public concession Interagua provides drinking water, wastewater and rainwater system in Guayaquil and neighboring districts. EPMAPS is the municipal company providing the service in Quito.
Guatemala	YES Municipal Code, State Contracts Act and Municipal Regulations. The Partnership Act for the Development of Economic Infrastructure does not apply to the water sector.	YES	YES	Rural area: Drinking Water Committee Urban area: Municipalities. In new residential areas, the service is supplied by private providers (not considered PPP due to the lack of regulation thereon).
Guyana	YES Public-Private Policy Framework 2018	YES	YES	Guyana Water Company is the public provider of water and sewerage services.
Haiti	YES Water and Sanitation Act of 2009	YES	YES	Urban area: 24 Centres Techniques de Exécution (CTE) operate the WAS system in cities with over 10000 inhabitants Rural areas and small cities: more than 400 Comités d'Approvisionnement en Eau Potable et d'Assainissement (CAEPA).
Honduras	YES PPP Act (Decree No. 143-2010) - Municipalities Act	YES	YES	The public company Servicio Autónomo Nacional de Acueducto y Alcantarillados (SANAA) operates some services that are not provided by municipalities. Then, the municipalities have Users' Boards, public companies or PPPs. As this system is insufficient, there are also private systems or cooperatives that carry water in water trucks, for a higher price. In San Pedro de Sula the provision is made by a private company, through a concession.
Jamaica	YES PPP Policy	YES	YES	The National Water Commission (NWC) supplies water in all urban areas of the country and is the largest sewerage service provider. It serves 90% of the population, collects wastewater from over 700000 people and operates around 100 water treatment plants. In rural areas, local authorities (parish councils) provide drinking water. There are some private companies as well, but no PPPs.

Country	Is private sector participation allowed?	Private participation Experience	PPP experience	Current service provision
Mexico	YES PPP Act that may be enforced on a federal, regional or municipal level. Some states and municipalities have their PPP frameworks.	YES	YES	2356 operating agencies: water systems, bureaus, commissions, departments and/or committees according to the organic structure they belong to. 1567 of them are in urban populations, 98 in rural areas and 691 serve both types of populations. According to data of 2009, less than 2% of operators were private in nature. In 2018, around 25% of users received one or more services from a private entity.
Nicaragua	YES the National General Water Act (620/2007) provides a framework for concessions. Public-Private Partnerships Act (No. 935/2016)	YES	YES	Enacal is the national public company operating in 181 cities and villages, Empresa Aguadora de Matagalpa and Empresa Aguadora de Jinotega, under management agreement delegated to the municipality. Private sector concessions: EMAPEPOSA, SASA, EMAPASMOSA. In rural areas: 5150 Drinking Water and Sanitation Committees.
Peru	YES PPP Act (Legislative Decree 1362)	YES	YES	50 Public Sanitation Service Providers (EPS, by its Spanish acronym): SEDAPAL and the other EPS serve 62% of the population, municipalities supply service to 9% and the rest is served by Users' Boards (JASS, by its Spanish acronym) in poor areas of small towns. In urban areas there are also private water truck and well operators that supply small distribution networks.
Panama	YES PPP Act - Decree Law No. 2 of 1997 Regulatory and Institutional Framework for the Provision of WAS Services - Acquisitions Act	YES	YES	IDAAN (a public agency) provides services to 69.8% of the population, the rest is supplied through community-type systems (JAAR, by its Spanish acronym).
Trinidad and Tobago	YES PPP Policy	YES	YES	Water and Sewerage Corporation (WASA).
Belize	YES	YES	NO	Belize Water Service - public company (60% of the population). In rural areas, "Village Water Boards" (VWB) operate, which are financially autonomous and oversee and manage water systems in those areas.
Costa Rica	YES Regulation for Public-Private Cooperation Contracts No. 39965-H-MP, Law 7762 regulates concession contracts for public works and public services.	YES	NO	The Instituto Costarricense de Acueductos y Alcantarillados (a public agency) offers the service on a national scale, a public operator for the area of Heredia and close to 1500 small community-management associations (ASADAS) in rural areas.
El Salvador	YES only for the Wastewater Treatment project of San Salvador, San Miguel and Santa Ana (LEAPP amendment of 2018)	YES	NO	The Administración Nacional de Acueductos y Alcantarillado (ANANDA), public water and sanitation company, handles the water provision service in 167 out of 262 municipalities and provides sewerage services in 86 municipalities. The others are managed by municipalities, community boards or associations (rural water distribution system management boards or rural associations). In urban areas there are also private operators who can provide services in specific neighborhoods or villages, under ANANDA's supervision.

Country	Is private sector participation allowed?	Private participation Experience	PPP experience	Current service provision
Paraguay	YES PPP Act	YES	NO	Over 4000 providers: Empresa de Servicios Sanitarios del Paraguay SA (30-year concession, but with the state as the only partner) in cities with over 10,000 inhabitants, private providers in low-scale systems through the exploitation of underground wells, Sanitation Boards, community organizations (generally for self-supply purposes) operating systems of less than 10,000 inhabitants
Barbados	YES	NO	NO	Barbados Water Authority (BWA)
Bolivia	NO	YES	YES	Entidad Prestadora de Servicios de Agua Potable y Alcantarillado Sanitario (EPSA). In 2017 there were 70 EPSA companies considering public, mixed, cooperative and community companies
Uruguay	NO	YES	YES	Obras Sanitarias del Estado (OSE) splitting the country into five regions to provide WAS services.
Suriname	-	NO	NO	Mainly Suriname Water Company (state company), Water Supply Service (state company) that supplies water to coastal and inland areas of the country that are not connected to a distribution network. Funding Development Interior (state company): gives access to water to the most needy population in the country interior.

Source: Produced by the authors based on Garcia, L. Javier et al. BID. 2021.

ANNEX C

WATER AND SANITATION PPPS' PERFORMANCE INDICATORS - SAMPLE OF CONTRACTS WITH AVAILABLE INFORMATION



Operador	Country	Year (contract start date)	Coverage (%)		Micro-measurement (%)	NRW (%)	Water quality (%)
			Drinking water	Sanitation			
Proactiva Aguas de Montería	Colombia	1999	•On the start date: 76 •Current: 100	•Between: 27- 40 •Current: 96	•Before: insignificant •2018: 99.4	•On the start date: > 55 •2018: 36	2017: 45.3 ³
Aguas de Cartagena	Colombia	1995	•1995: 74 •2017: 99	•1995: 60 •2017: 94	-	-	•2011: 100 •2017: 90.5 ³
Aguas de Antofagasta SA	Peru	2005	•2013: 80 •2017: 80	•2013: 51.3 •2017: 49.5	•2013: 48.7 •2017: 42	•2013: 67 •2017: 69	-
Aguas Cordobesas	Argentina	1997	•2012: 98.3 •2018: 99	-	-	-	•2012: > 95 all indicators •2018: 99.75 compliance with contractual targets
Aguas del Altiplano	Chile	2004	•2004: 100 •2017: 99.95	•2004: 99 •2017: 98.75	•2004: 118 ⁴ •2017: 100	•2004: 42 •2017: 29.6	•2005: 100 •2017: 99.3
Aguas de Antofagasta	Chile	2003	•2004: 100 •2017: 100	•2004: 100 •2017: 99.9	•2004: 110 •2017: 100	•2004: 25 •2017: 29.2	•2005: 100 •2017: 99.8
Aguas Nueva Atacama (Agua Chañar SA)	Chile	2003	•2004: 100 •2017: 99.75	•2004: 94 •2017: 97.55	•2004: 101 •2017: 96.6	•2004 39 •2017 35.69	•2005: 100 •2017: 95.1
Aguas del Valle	Chile	2003	•2004: 100 •2017: 100	•2004: 94 •2017: 97.36	•2004: 102 •2017: 100	•2004: 31 •2017: 27.6	•2007: 100 •2017 99.9
Aguas Nuevo Sur Maule	Chile	2001	•2004: 100 •2017: 97.15	•2004: 94 •2017: 99.96	•2004: 98 •2017: 100	•2004: 43 •2017: 40.1	•2005: 100 •2017: 99.7
Agua Araucanía	Chile	2004	•2004: 100 •2017: 99.8	•2004: 84 •2017: 96.2	•2004: 111 •2017: 95.8	•2004: 49 •2017: 38.6	•2006: 100 •2017: 99.9
Aguas Patagonia	Chile	2003	•2004: 100 •2017: 100	•2004: 92 •2017: 96.6	•2004: 101 •2017: 100	•2004: 36 •2017: 30.4	•2006: 100 •2017: 99.9
Aguas Magallanes	Chile	2004	•2004: 100 •2017: 100	•2004: 99 •2017: 98.8	•2004: 102 •2017: 100	•2004: 15 •2017: 12.3	•2005: 99.9 •2017: 99.7
Interagua	Ecuador	2001	•2003: 62.9 •2017: 97.5	•2003: 27.6 •2017: 76.5	•2003: 31.45 •2017: 99.2	•2003: 72.8 •2017: 53.6	•2003: 97.58 •2017: 49.8

Operador	Continuity (hours)	Clogging density (number/Km)	Wastewater treatment (%)	Total operation costs coverage ratio	Debt/ Shareholders' Equity (%)	Average billing of drinking water services by residential account (US\$/account)	Average billing of sewerage services by residential account (US\$/account)	Total claim density (claims/account)
Proactiva Aguas de Montería	•Before: < de 6 - •2018: 24	-	-	•2005: 104.8 •2012: 1.97 ³	•2005: 482.8 •2017: 1158.3 ³	•2005: 62.9 •2017: 279.96 ³	•2005: 68.1 •2017: 122.4 ³	•2006: 0.08 •2017: 0.13 ³
Aguas de Cartagena	•1995: 14 •2017: 24	-	-	•2004: 2.05 •2012: 4.36 ³	-	•2004: 170 •2017: 853.05 ³	•2004: 205 •2017: 504.1 ³	-
Aguas de Tumbes SA	•2013: 16 •2017: 14	•2013: 2.36	•2015: 27.96	•2013: 1.05 •2017: 0.65	•2013: 691 •2017: -291	-	-	-
Aguas Cordobesas	•2018: 100% Compliance with respective quality target	-	-	•2011: 3.02 •2018: 2.52 ¹	•2012: 346 •2018: 165	-	-	-
Aguas del Altiplano	•2015: 24 •2017: 24	•2004: 1 •2017: 5.66	•2004: 98 •2017: 100	•2004: 2.1 •2017: 1.93	•2004: 130 •2017: 45.4	•2004: 130 •2017: 26.98	•2004: 45 •2017: 8.93	•2004: 0.1 •2017: 0.01
Aguas de Antofagasta	•2015: 24 •2017: 24	•2006: 0.87 •2017: 0.91	•2004: 99 •2017: 100	•2004: 2.75 •2017: 1.83	•2004: 130 •2017: 128.4	•2004: 210 •2017: 33.21	•2004: 35 •2017: 86.98	•2004: 0.12 •2017: 0.01
Aguas Nueva Atacama (Aguas Chafar SA)	•2015: 24 •2017: 24	•2006: 0.2 •2017: 4.61	•2004: 90 •2017: 99.9	•2004: 1.55 •2017: 1.3	•2004: 290 •2017: 238.15	•2004: 90 •2017: 23.55	•2004: 57 •2017: 8.98	•2004: 0.02 •2017: 0.01
Aguas del Valle	•2015: 24 •2017: 24	•2006: 0.01 •2017: 3.61	•2004: 95 •2017: 99.7	•2004: 2 •2017: 1.85	•2004: 160 •2017: 58.65	•2004: 80 •2017: 13.72	•2004: 59 •2017: 8.76	•2004: 0.04 •2017: 0.01
Aguas Nuevo Sur Maule	•2015: 24 •2017: 24	•2004: 0.8 •2017: 2.62	•2004: 34 •2017: 99.4	•2004: 2.4 •2017: 2.4	•2004: 390 •2017: 151.55	•2004: 70 •2017: 10.06	•2004: 56 •2017: 9.66	•2004: 0.03 •2017: 0.01
Agua Araucania	•2015: 24 •2017: 24	•2004: 3 •2017: 1.83	•2004: 12 •2017: 98.4	•2004: 2.1 •2017: 1.7	•2004: 120 •2017: 71.5	•2004: 60 •2017: 10.01	•2004: 49 •2017: 9.43	•2004: 0.02 •2017: 0.01
Aguas Patagonia	•2015: 24 •2017: 24	•2006: 0.01 •2017: 2.65	•2004: 88 •2017: 98.5	•2004: 1.52 •2017: 1.68	•2004: 220 •2017: 405.3	•2004: 100 •2017: 17.2	•2004: 80 •2017: 8.72	•2004: 0.01 •2017: 0.01
Aguas Magallanes	•2015: 24 •2017: 24	•2006: 0.63 •2017: 3.3	•2004: 92 •2017: 98.2	•2004: 2.2 •2017: 1.66	•2004: 120 •2017: 29.7	•2004: 120 •2017: 16.6	•2004: 60 •2017: 12.28	•2004: 0.07 •2017: 0.01
Interagua	•2015: 24 •2017: 24	•2003: 0.74 •2017: 12.6	•2003: 34.96 •2017: 31.3	•2004: 1.4 •2017: 1.04	•2003: 265.45 •2017: 146.7	•2004: 85 •2017: 84.04	•2003: 68.29 •2017: 75.71	•2003: 0.03 •2017: 0.28

Operador	Country	Year (contract start date)	Coverage (%)		Micro-measurement (%)	NRW (%)	Water quality (%)
			Drinking water	Sanitation			
Sociedad de Acueducto, Alcantarillado y Aseo de Barranquilla	Colombia	1996	•2004: 72 •2017: 100	•2004: 66 •2017: 60	•2004: 62 •2017: 42.6	•2004: 56 •2015: 35.36	•2011: 100 •2017: 55.8
Proactiva Aguas de Tunja	Colombia	1996	•2006: 95.7 •2017: 99.9	•2007: 95.2 •2017: 99.9	•2006: 95.8 •2017: 84.8	•2011: 30.98 •2017: 21.2	•2013: 100 •2017: 59.5
Aguas Kpital de Cúcuta	Colombia	2006	•2006: 93 •2017: 83.6	•2006: 93 •2017: 81	•2007: 63 •2017: 93.4	•2009: 68 •2017: 62.6	•2013: 100 •2017: 87.1
Centro-aguas	Colombia	2000	•2006: 95.4 •2017: 75.6	•2006: 95.5 •2017: 75.2	•2007: 97.11 •2017: 94.1	•2011: 47.49 •2017: 46.85	•2017: 26.2
Hidropacifico	Colombia	2002	•2006: 79.7 •2017: 41.7	•2006: 64.3 •2017: 26.2	•2006 99.76 •2017: 61.1	•2011: 88.84 •2017: 91.68	•2013: 100 •2017: 22.1
Puerto Cortés Honduras	Honduras	1999	•1998: 90 •2016: 99	•1998: 5 •2016: 32	•1998: 33 •2016: 92	•2006: 45.31 •2017: 23.94 ³	•2003: 100
Aguas de San Pedro	Honduras	2001	•2000: 84 •2012: 95	•2000: 65 •2012: 66	•2000: 55 •2015: 71	•2000: 64 •2012: 45	-
DINEPA - Port-au-Prince (Technical Operational Assistance)	Haiti	2011	The number of users increased by 63% (2010 - 2016)	-	-	-	Samples with chlorine level below standard: •2010: 15% •2016: 7%
Bahamas Water and Sewerage Corporation - New Providence (Performance-based contract)	Bahamas	2012	•2011: 57 •2016: 56	•2011: 13 - •2016: 13	-	•2011: 55 •2016: 30	100% absence of Escherichia coli bacteria • 98.6% desinfectado • 90.9% claridad

Operador	Continuity (hours)	Clogging density (number/Km)	Wastewater treatment (%)	Total operation costs coverage ratio	Debt/ Shareholders' Equity (%)	Average billing of drinking water services by residential account (US\$/account)	Average billing of sewerage services by residential account (US\$/account)	Total claim density (claims/account)
Sociedad de Acueducto, Alcantarillado y Aseo de Barranquilla	•2015: 24 •2017: 23.6	-	•2006: 15 •2009: 12	•2004: 1.1 •2012: 4.47	•2004: 250 •2017: 174	•2004: 110 •2017: 290.87	•2004: 50 •2017: 323.91	•2004: 0.04 •2017: 0.24
Proactiva Aguas de Tunja	•2015: 24 •2017: 23.8	-	-	•2005: 65.1 •2012: 1.44	•2006: 308 •2017: 228.54	•2008: 138 •2017: 141.78	•2008: 75.5 •2017: 64.77	•2006: 0.02 •2017: 0.14
Aguas Kpital de Cúcuta	•2015: 23.6 •2017: 23.1	-	-	•2005: 2.8 •2012: 4.76	•2007: 100 •2017: 1,356,148.7	•2007: 51 •2017: 367.66	•2007: 250 •2017: 145.4	•2013: 0.15 •2017: 0.26
Centro-aguas	•2015: 24 •2017: 23.9	•2017: 0.44	-	•2011: 0.78 •2012: 0.98	•2007: 182 •2017: 218,079.52	•2006: 11.4 •2017: 125.74	•2007: 85.4 •2017: 100.34	•2006: 0.06 •2017: 0.11
Hidropacifico	•2015: 23.98 •2017: 22.7	-	-	•2011: 0.6 •2012: 4.39	•2006: 99 •2017: 267,385.9	•2006: 366.3 •2017: 50.43	•2007: 201.3 •2017: 13.66	•2006: 0.44 •2015: 0.16
Puerto Cortés Honduras	•1998: 24 •2016: 24	•2006: 4.82 •2013: 3.31	•1998: 0 •2016: 100	•2005: 123.4 •2012: 1.09	•2006: 545 •2012: 225.36	•2003: 95.3 •2012: 75.34	•2006: 116 •2012: 46.06	•2006: 0.17 •2011: 0.2
Aguas de San Pedro	•2015: 20 24 hours a day for 89% of users ²	-	•2000: 15 •2012: 100	-	-	-	-	-
DINEPA - Port-au-Prince (Technical Operational Assistance)	•2010: 2 •2016: 3	-	-	-	-	-	-	-
Bahamas Water and Sewerage Corporation - New Providence (Performance-based contract)	-	-	-	-	-	-	-	-

Source: Produced by the authors based on data from the Association of Drinking Water and Sanitation Regulating Entities of the Americas. Unless otherwise stated, the data about Proactiva Aguas de Montería and Aguas Cordobesas were taken from each company's webpage. In the case of Puerto Cortés, Aguas de San Pedro, Port-au-Prince and New Providence, the data were obtained from Public-Private Partnerships in the Water and Sanitation Sector in Latin America (IDB 2018). (1) The ratio was built using data from the Sustainability Report published by Aguas Cordobesas: operating income (accrued) in relation to operating costs (accrued). (2) No prior information is available. (3) Source of information: ADERASA. (4) Chilean services have values above 100% because measurement is made by billing unit or "account".

