



How much do households pay for water supply and sanitation services in Latin America?

A descriptive analysis of tariffs and subsidies in the region.



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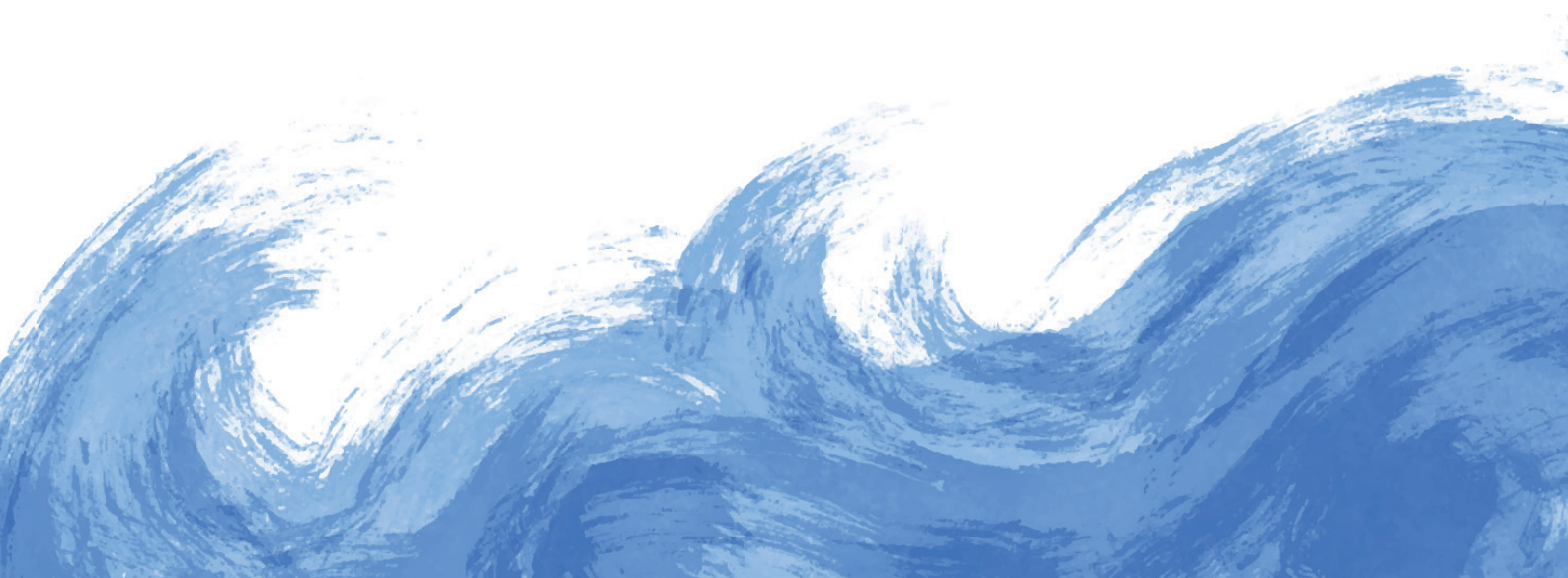
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Forward

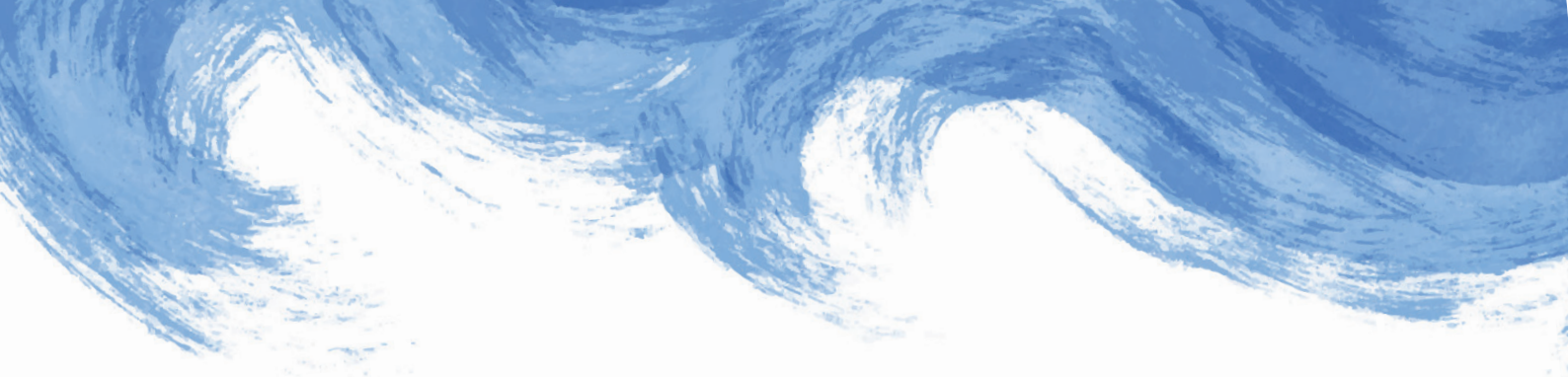
At the forefront of water resources management, pricing policies emerge as primary tools. The diversity of water uses—agriculture, industry, municipalities, and ecosystem services—and the inherent scarcity of this vital resource means that each drop consumed represents an opportunity cost. Therefore, the allocation of water resources between alternative uses should be defined based on the use that gives water the greatest economic value.

Although the productive uses of water are those that obtain the greatest benefit from its consumption, the uses necessary for human life and general well-being frequently take precedence in the allocation of water resources. For example, although the recognition of the Human Right to Water is not expressly regulated in the Constitution or other laws in some countries in Latin America and the Caribbean (LAC), the use of water for human consumption is a priority in all countries in the region. Due to the nature of water as a necessary good for life, it is usually regulated so that its price is lower than its economic value.

Since the 1990s, Latin America and the Caribbean has experienced significant regulatory reforms in the water and sanitation sector, positioning pricing policies as a standard mechanism to promote efficient use of water from an economic, social and environmental perspective. This is why water and sanitation rates play a fundamental role in promoting not only compliance with Sustainable Development Goal (SDG) 6 to “ensure the availability and sustainable management of water and sanitation for all” in the current context of increasing in scarcity problems but also the achievement of other development objectives such as the reduction of poverty, hunger and gender inequalities, and the promotion of healthy lives and well-being.

Despite its relevance, the strong municipal atomization of the water and sanitation sector together with the high heterogeneity in regulatory frameworks, regulatory structures and level of (de) centralization of governments mean that information on rates in the region is scarce.

Since you cannot improve what you cannot measure, the knowledge team of the Water and Sanitation Division at the Inter-American Development Bank (IDB) has carried out a multi-year effort to collect information on residential water rates and sanitation in more than 500 municipalities in 12 countries in the region. This effort is part of “Setting prices right”, a research program of the IDB Department of Infrastructure and Energy aimed at analyzing prices in water, sanitation, energy, and transportation services, in order to understand the factors that influence price structures and use this information to improve the quality, access and affordability of infrastructure services



in Latin America and the Caribbean. This project responds to the gaps identified in the IDB's flagship publication "From structures to services: the path to better infrastructure in Latin America and the Caribbean" 2020, which highlights the importance of focusing public policies on the most intangible aspects of infrastructure to optimize service performance.

The resulting database is a milestone at the regional level, being the most exhaustive to date in terms of the number of municipalities analyzed, including rural areas, offering a comprehensive view of the various rates that coexist within the same municipality.

This publication aims to facilitate the understanding of the highly complex system with a wide range of water and sanitation rate levels and structures present in the database. To this end and reflected through the different chapters, a deeply detailed analysis and comparison of the general characteristics of water and sanitation rates is carried out. In addition to the above, a description of consumption subsidies is also added.

Despite the high heterogeneity of the tariff systems in the region, the publication manages to identify common characteristics between them that point to the need to simplify the tariff systems in the region to provide better information to households and thus progress in objectives of equity, efficiency, and water conservation.

I invite you to read *How much do households pay for water supply and sanitation services in Latin America?*, hoping that it will broaden the understanding of the landscape of water supply and sanitation tariffs in Latin America and fuel the debate on the tariff reforms necessary in the sector.

Tomás Serebrisky

Manager of the Infrastructure and Energy Department

Inter-American Development Bank



CHAPTER 01

Introduction



Introduction

The 2030 Agenda establishes various targets for Sustainable Development Goal (SDG) 6, including the achievement of universal and equitable access to safe drinking water (target 6.1) and sanitation (target 6.2) by 2030, acknowledging the social and economic importance of these aims. These services are essential for people's health, hygiene, dignity and well-being, and for ensuring the socio-economic progress of communities. Indeed, the availability of clean drinking water and adequate sanitation reduces the spread of disease, enables better hygiene, and helps improve quality of life (Prüss-Ustün et al., 2019). Furthermore, it contributes to the achievement of other development goals relating to poverty and hunger, gender equality and quality education (Mulligan et al., 2020).

To achieve SDG 6, it is crucial to address the issue of tariffs and subsidies for water supply and sanitation. Specifically, it is essential that water tariffs balance the objectives of economic efficiency and cost recovery, equity and environmental conservation, while also accounting for the various different factors that influence the water tariff design process; namely, environmental factors, urban factors, ideological and political factors, management factors and the institutional framework (Pérez-Urdiales et al., 2023).

During the 1990s, most Latin American countries implemented major reforms in their water supply and sanitation sectors (Foster, 2005), including changes to the procedures for setting and reviewing price controls to ensure the sustainability of services. Since then, substantial progress has been made in terms of access to and quality of the service (Bertomeu Sánchez and Serebrisky, 2019).

Previous studies have analyzed the policies applied in the water and sanitation sector in Latin American countries (Bertomeu Sánchez and Serebrisky, 2018 and 2019), focusing on different tariff-related aspects. For example, Donoso and Sanín (2020) describe the regulatory framework and tariff-setting principles used in several Latin American countries. Fernández et al. (2021) compare Latin American countries with and without an economic regulatory framework, highlighting characteristic features of the tariffs and subsidies in their major cities. Pérez-Urdiales et al. (2023) detail the factors commonly assessed in the economic literature as determinants of water supply and sanitation pricing, and the status of these factors throughout the region. Conversely, subsidy systems have not generally been explored in depth (Donoso and Sanín, 2020), with most of the related research focusing on whether subsidy targeting systems do in fact help economically vulnerable users and to what extent (Gómez-Lobo and Contreras, 2003, Komives et al., 2006; Foster and Yepes, 2006). Despite the importance of tariff systems in this region for achieving the goal of universal and equitable access to safe drinking water and sanitation services, there are few studies that attempt a detailed description and exhaustive cross-country comparison of water supply and sanitation tariffs.

In fact, there is limited publicly available and easily accessible information on Latin American water and sanitation pricing and tariff structures, and only for a small number of cities and countries. Given this gap, the present document seeks to provide a valuable descriptive and comparative analysis of tariff models in the region's water and sanitation sectors. The main objective of this report is to characterize and compare tariff systems and subsidies for residential drinking water supply and sanitation services in the region. The fundamental contribution it makes lies in the level of detail on the structure, pricing and variability in the different water supply and sanitation tariffs, as well as the differences between services. Moreover, as the values of prices and other variables are standardized, the results are useful for cross-country comparisons. Nevertheless, it should be noted that the scope of this study only extends to the tariffs that apply to users connected to the supply and sewerage network, and does not deal with connection charges, among other costs.

The document is structured as follows. Chapter two presents and describes the database used for the analysis in this document. Chapter three addresses the general characteristics of water supply and sanitation services in the region, offering an overview that contextualizes the subsequent analysis. Furthermore, given the heterogeneity of tariff structures in Latin America, chapter three identifies the most common structures in the region and among countries, establishing the basis for the analysis of the "standard tariff" of each service. Chapters four and five examine in detail the tariff structure and the pricing of water supply and sanitation services, respectively, in representative

cases of each country. In chapter six, an thorough analysis is conducted of demand-side consumption subsidies for users connected to the supply and sewerage network. A comprehensive analysis of the specific eligibility criteria in each country is also presented. These three chapters include subsections analyzing the financial effort families must make to pay for these services, based always on predefined levels of basic consumption. Finally, chapter seven concludes the study by summarizing the main findings, and points to possible areas for improvement from a public policy perspective. It also highlights the issues that require a more in-depth, exhaustive analysis to fully understand their impact in the area of residential water supply and sanitation in Latin American countries.

CHAPTER 02

Description of the database



Description of the database

As indicated in the previous chapter, there is still only limited information on the pricing and tariff structure of water and sanitation services in Latin America, and it is only available for a small number of cities and countries (e.g., Gómez-Lobo and Contreras, 2003; Brichetti, 2019; Fernández et al., 2021). In this regard, the significant increase in the number of countries and municipalities analyzed in this report advances the study of the water and sanitation sector in Latin America. Provided below is a description of the database used to determine the level of generalization and the scope of the results.

Description of the database

This document examines the tariffs for water supply and sanitation services of 12 Latin American countries, with data on 577 municipalities in the region. To that end, the analysis relies on tariff data collected during 2022, based on information made publicly available by the water utilities. In all cases, the most recent tariff documentation available on the website at the time of data collection was taken for the study. The countries have been selected depending on whether they fulfil two main criteria: (i) they are included in the 2018/2019 AmericasBarometer (LAPOP), organized by Vanderbilt University, which includes data from 31,050 surveys conducted in 20 countries of the region; and (ii) the water utilities of the analyzed municipalities provide sufficient publicly available information on pricing and tariff structure, accessible online.

The analysis is limited to countries and municipalities included in LAPOP in order to reproduce the sample design of AmericasBarometer, which selects the samples in each country using a multi-stage probability sampling method (with household-level quotas for most countries), stratified by the main regions of the country, size of the municipalities and by urban and rural areas within each municipal unit.¹ This ensures representativeness not only at the national level, but also at the urban and rural level. Likewise, the analysis is limited to the 12 countries where data could be collected for a significant number of municipalities that would ensure the representativeness of the data obtained both nationally and for rural and urban environments.

From the 12 countries that meet the aforementioned selection criteria, information was collected on water supply and sanitation tariffs at the municipal level. Based on the list of municipalities covered by the LAPOP survey, information was collected by searching on the websites of local water utilities. When the information was not available online, the companies in question were contacted and asked to provide it.

The final database includes information on the following variables:

- The ownership of the water utility (public, private, or mixed ownership);

- The type of service provided by the water utility (water supply, sanitation, or both);
- The billing period (monthly, bi-monthly, quarterly, biannually or annual);
- If bills are calculated on a metered basis or a fixed charge applies;
- The different types of consumer based on classifications of socio-economic level;
- The type of tariff structure;
- The unit of measurement of consumption;
- The size of the blocks (for block tariff systems);
- The currency in which the amount to be paid by the customer is calculated;
- The fixed charge (where applicable) that each customer must pay for connection to the water supply and/or sanitation service;
- The volumetric charge, either a uniform or increasing unit price, depending on the type of tariff structure.

The availability of municipal-level data is not homogeneous across countries. As shown in Table 2.1, the percentage of municipalities with available data on water supply or sanitation tariffs varies widely from country to country. For countries such as Brazil, Costa Rica, Mexico, Panama, Paraguay and Uruguay, the data cover all or almost all the municipalities included in the LAPOP survey. In other cases, the available tariff data cover a smaller proportion of municipalities. In cases such as Colombia, El Salvador, and Honduras, the information collected covers less than 90% of the LAPOP sample, while in Bolivia, Ecuador, and Guatemala, data are available for less than 70% of total municipalities in the original database.

¹ For technical information about the sample design of LAPOP 2018/2019, refer to https://www.vanderbilt.edu/lapop/ab2018/AmericasBarometer_2018-19_Technical_Report_W_102919.pdf







Table 2.1. Municipalities covered by LAPOP versus the tariff dataset

Country	LAPOP municipalities included in the tariff dataset	LAPOP municipalities not included in the tariff dataset	Percentage of municipalities represented in the tariff dataset
Bolivia	28	35	44.4%
Brazil	103	4	96.3%
Colombia	35	12	74.5%
Costa Rica	29	0	100.0%
Ecuador	33	18	64.7%
El Salvador	46	6	88.5%
Guatemala	30	24	55.6%
Honduras	35	15	70.0%
Mexico	93	0	100.0%
Panama	30	0	100.0%
Paraguay	52	2	93.6%
Uruguay	63	0	100.0%

The differences in the percentage of municipalities represented in the tariff dataset point to disparities in the representativeness of the data collected. Given that for Brazil, Costa Rica, Mexico, Panama, Paraguay and Uruguay the data cover more than 90% of the municipalities, it can be assumed that the tariff data are representative both nationally and in terms of rural and urban municipalities. However, the same assumption cannot be made about the rest of the countries. To determine whether there are significant differences between the LAPOP municipalities that are included in the tariff dataset and those that are not, in the countries where less than 90% of total municipalities are represented (Bolivia, Colombia, Ecuador, El Salvador, Guatemala and Honduras) different t-tests were applied to four demographic variables in both groups of municipalities: (a) average proportion of urban households, (b) average household income, (c) mean number of years of education completed by household members,

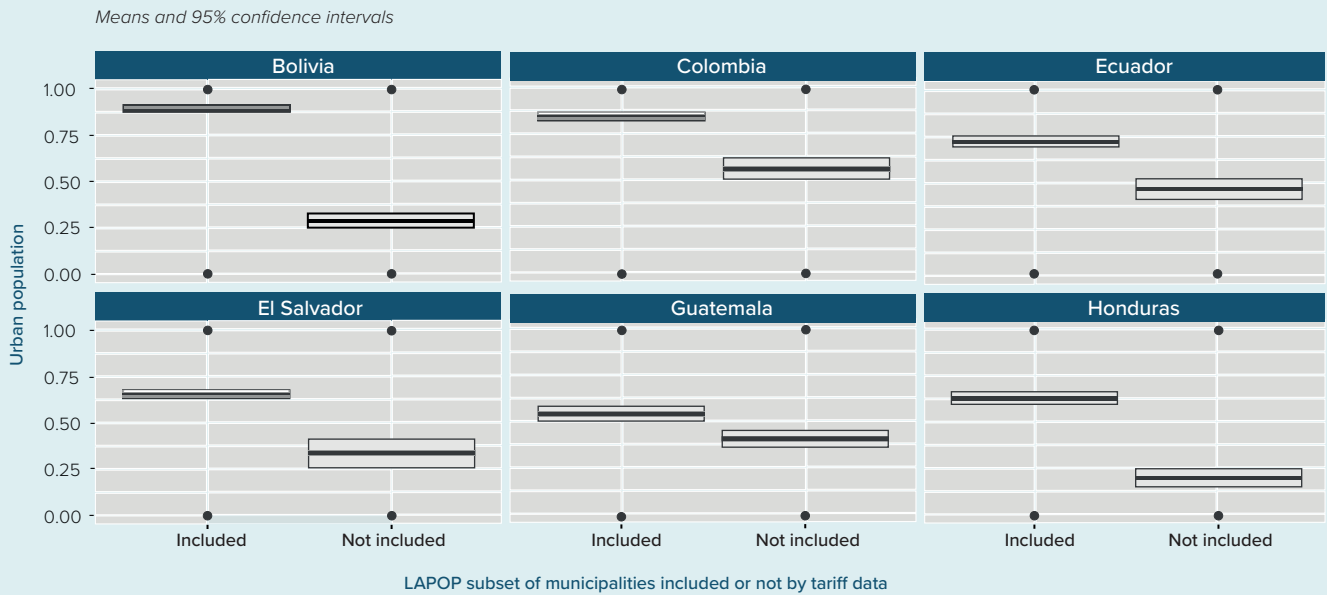
and (d) average household size. Table 2.2 presents the results of the countries and variables for which there are statistically significant differences between the two groups of municipalities.

Table 2.2. Significant differences in demographic variables between LAPOP municipalities included and not included in the tariff dataset

Dependent Variable	t-value	Degrees of Freedom	Confidence Interval	Dependent Variable	t-value	Degrees of Freedom	Confidence Interval
 Guatemala				 Ecuador			
Urban Households	5.34***	1198.45	(0.18; 0.38)	Urban Households	8.85***	509.90	(0.45; 0.70)
 El Salvador				Household income	3.62***	546.80	(0.10; 0.35)
Urban Households	7.80***	174.77	(0.51; 0.85)	 Bolivia			
 Honduras				Urban Households	20.09***	856.75	(0.57; 0.80)
Urban Households	17.21***	698.61	(0.81; 1.06)	Years of Education	4.93***	1147.22	(0.15; 0.36)
Household income	3.18***	409.41	(0.09; 0.36)	Household income	3.77***	1024.33	(0.10; 0.31)
 Colombia				Household size	4.37***	1270.90	(0.12; 0.32)
Urban Households	9.38***	392.74	(0.59; 0.84)	Note: *** p-value < 0.001			
Years of Education	6.39***	467.49	(0.27; 0.52)				
Household income	7.80***	462.60	(0.36; 0.63)				

The results show that, for Bolivia, Colombia, Ecuador, El Salvador, Guatemala and Honduras, the percentage of urban households is significantly higher in those municipalities for which tariff data are available (p-value < 0.001). As depicted in Figure 2.1, the difference in the percentage of urban households ranges from 28% in Guatemala to 68% in Bolivia. These differences can be explained by the fact that access to water supply and sanitation services is usually more widespread in urban areas than in rural regions (JMP, 2021). With the exception of Bolivia, it can be stated that there are no significant differences in relation to the number of inhabitants per household between the tariff sample and the data used by LAPOP.

Figure 2.1. Averages and confidence intervals for urban households (0-1) included and not included in the tariff dataset, by country



The municipalities included and not included in the tariff dataset show significant differences in two other demographic variables that are positively related to the level of urbanization of a region: the level of household income and the mean number of years of education completed by household members. Figures 2.2 and 2.3 show the differences in average values between the municipalities included and not included in the dataset. Honduras, Colombia, Ecuador and Bolivia show significant differences in income level between the groups of municipalities, with higher-income municipalities being overrepresented in the tariff dataset, while in Colombia and Bolivia the same is true for the mean number of years of education.

Figure 2.2. Income ranges (0-15) in the LAPOP subset represented in the tariff dataset and the LAPOP subset not represented in the tariff dataset

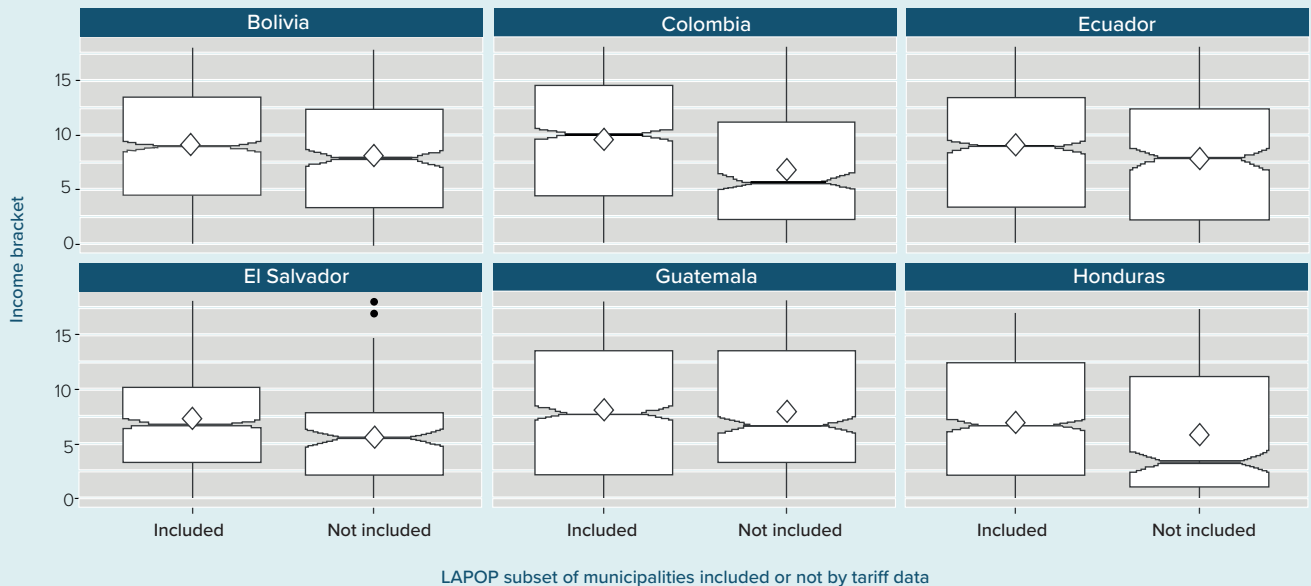
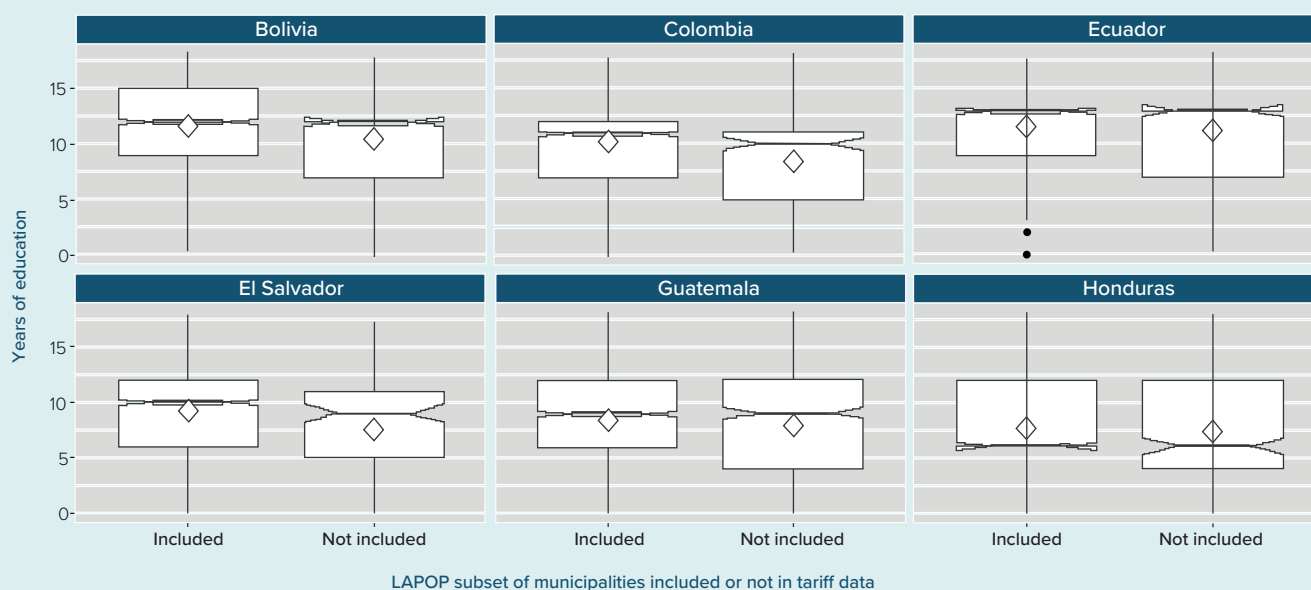


Figure 2.3. Years of education in the LAPOP subset represented in the tariff dataset and the LAPOP subset not represented in the tariff dataset



The results described above thus reveal a selection bias in favor of more urban municipalities in the countries where there is less tariff information available. Consequently, the data collected for these countries are less informative about the situation in rural areas. Although the data provided are useful for understanding the water supply and sanitation pricing in the region, they should be interpreted with caution given the possible selection bias towards more urban municipalities in countries with lower availability of tariff information. It suggests that the data collected for these countries may not be fully representative of the situation in rural areas, which limits the generalizability of the results to the national level. This limitation should therefore be taken into account when performing any analysis or comparison at the regional or national level.

As for the ownership of the water utility in the analyzed countries (Table 2.3), it can be seen that in six countries of the sample, all the municipalities provide this service through publicly owned operators. In the other countries, different forms of ownership are seen to coexist. In cases where there are only public and private operators, the share of private sector participation is markedly smaller. For example, in Ecuador and Mexico, more than 95% of the municipalities have public water utilities while the rest have private operators. On the other hand, mixed private and public ownership can be found in five countries, although the distribution varies significantly between countries. For example, in Brazil, mixed ownership operators are the most common, serving more than 70% of municipalities, while in Bolivia this type of ownership is minimally represented, serving only about 3% of municipalities.

It is important to note that private utilities play a limited role in the analyzed countries and municipalities, with Brazil and Bolivia being the only countries where they provide service to more than 15% of the municipalities. When carrying out an analysis at the regional level, most municipalities (84.57%) opt for public provision of services, followed by mixed ownership (10.52%), while private operators are in the minority (4.91%).

Table 2.3. Ownership of water utilities at regional and national level

Country	Mixed	Private	Public
Bolivia	3.57	25.00	71.43
Brazil	70.76	16.98	12.26
Colombia	42.86	8.57	48.57
Costa Rica	0.00	0.00	100.00
Ecuador	0.00	3.23	96.77
El Salvador	0.00	0.00	100.00
Guatemala	0.00	0.00	100.00
Honduras	9.09	3.03	87.88
Mexico	0.00	2.13	97.87
Panama	0.00	0.00	100.00
Paraguay	0.00	0.00	100.00
Uruguay	0.00	0.00	100.00
Region	10.52	4.91	84.57

Lastly, it is important to mention the year in which the currently applicable tariffs were set in the municipalities and countries analyzed. Table 2.4 reveals that in some countries, a significant proportion of municipalities have not updated their tariff documentation in the preceding 10 years, according to publicly available information.² This is the case for all the municipalities in El Salvador, where most have tariff documentation dating back to 2009. Similarly, in Honduras and Bolivia, about 57% and 45% of their municipalities, respectively, are found to have tariff documentation dating back more than 10 years. This is noteworthy because the database captures information on the tariffs and tariff documentation currently in force. Therefore, in cases where additional subsidies have been approved but have not been incorporated into the tariff documentation, there may be discrepancies between the approved water and/or sanitation tariffs and those that are actually available.

Table 2.4. Distribution of tariff designs by year of design (%)

Year	Bolivia	Brazil	Colombia	Costa Rica	Ecuador	El Salvador	Guatemala	Honduras	Mexico	Paraguay	Uruguay
1995	-	-	-	-	-	-	3.2	-	-	-	-
2000	-	-	-	-	2.9	-	-	-	-	-	-
2002	-	-	-	-	-	-	-	2.8	-	-	-
2004	-	-	-	-	-	2.2	-	2.8	-	-	-
2005	-	-	-	-	-	-	-	5.6	0.8	-	-
2006	-	-	-	-	2.9	-	3.2	-	-	-	-
2007	-	-	-	-	-	-	-	13.9	-	-	-
2008	-	-	-	-	-	-	-	2.8	-	-	-
2009	3.4	-	-	-	2.9	97.8	-	2.8	0.8	-	-
2010	41.4	-	-	-	2.9	-	3.2	5.6	-	-	-
2011	-	0.8	-	-	2.9	-	-	8.3	-	-	-
2012	-	-	-	-	5.9	-	3.2	8.3	1.6	-	-
2013	-	-	-	-	-	-	6.5	2.8	0.8	-	-
2014	-	0.8	-	-	5.9	-	3.2	2.8	-	-	-
2015	-	-	-	-	8.8	-	12.9	8.3	-	-	-
2016	-	3.4	-	-	14.7	-	3.2	2.8	0.8	-	-
2017	6.9	1.7	3.8	-	11.8	-	3.2	-	2.4	-	-
2018	3.4	0.8	3.8	-	2.9	-	3.2	5.6	4.0	-	-
2019	-	15.1	5.7	-	2.9	-	3.2	5.6	7.2	-	-
2020	-	7.6	11.3	-	2.9	-	9.7	2.8	6.4	-	-
2021	6.9	58.0	20.8	100.0	8.8	-	12.9	-	71.2	100.0	100.0
2022	37.9	11.8	50.9	-	17.6	-	25.8	13.9	4.0	-	-
2023	-	-	3.8	-	-	-	-	-	-	-	-
No Data	-	-	-	-	2.9	-	3.2	2.8	-	-	-

In the rest of the countries, most municipalities have tariff structures that were established later than 2017. In fact, in Brazil, Colombia, Costa Rica and Mexico, at least 60% of their municipalities approved tariff structures between 2021 and 2023, which means they came into effect after the COVID-19 pandemic.

It is interesting to observe two different trends in the region regarding the updating of water supply and sanitation tariffs. Whereas all or almost all of the municipalities in Costa Rica, El Salvador, Paraguay and Uruguay tend to update their tariffs at the same time, the process occurs more gradually in the rest of the countries.

² The fact that the tariff documentation is not publicly updated does not mean that the tariffs have not been revised to reflect inflation in some of the analyzed municipalities.

General characteristics of water supply and sanitation services in Latin America



General characteristics of water supply and sanitation services in Latin America

During the 1990s, major reforms were made to the water supply and sanitation sectors of most Latin American countries. These reforms, as Foster (2005) points out, centered on several different aspects, including the procedure for determining and reviewing price controls. Tariffs were envisaged as essential public policy tools aimed at ensuring the financial sustainability of the water utilities.

In Latin America, the main focus of tariff regulation has been the application of what are known as “tariff formulae”, which establish a mathematical relationship between the tariffs and the underlying costs. These tariff formulae represent a structure that determines how different categories of consumers are to be charged for their water consumption (Brocklehurst et al., 2002). Water supply and sanitation tariffs are designed to achieve various different objectives, including efficiency, equity, cost recovery and environmental protection. As such, the design of these tariff structures is a complex process involving a variety of factors associated with the intended goals.

Types of tariff structures

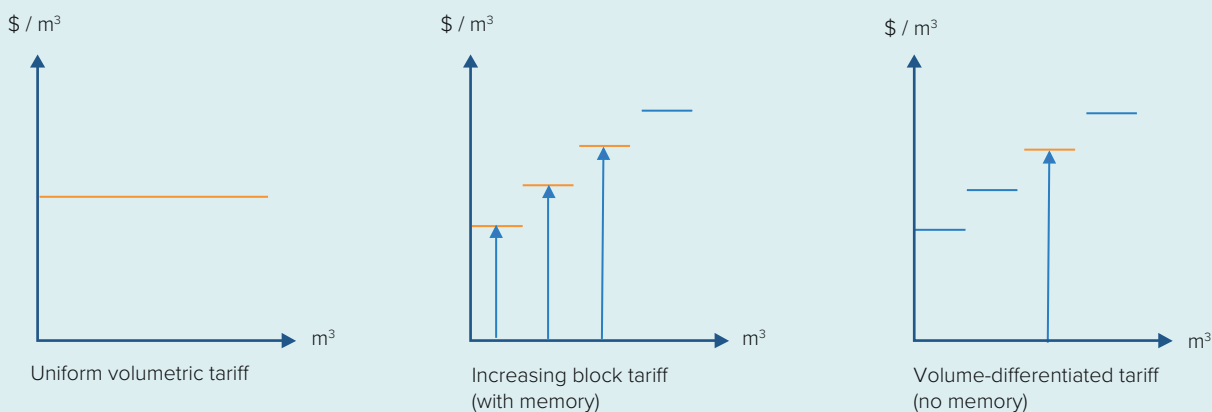
Around the world, water supply and sanitation services for domestic uses are billed on the basis of a wide variety of tariff structures (Pinto and Marques, 2015). However, the main tariff structures in the countries and municipalities analyzed in this document are as follows:

- Fixed fee tariff: With this type of tariff, the utility charges a fixed amount regardless of the number of units consumed.
- Uniform volumetric tariff: With this tariff, the unit price does not vary with changes in the volume consumed, so the amount of the bill increases by a constant per unit price.
- Increasing block tariff: This tariff divides consumption into different blocks. An increasing unit price is applied to each block in turn. It is important to note that this tariff has a “memory”, that is, the first units of consumption will always be charged at a lower rate than those in subsequent blocks.
- Volume-differentiated tariff: This type of tariff is similar to the previous one except that this one has “no memory”, meaning that all the consumed units are charged at the price established for the last block of consumption.

None of the countries in the sample use decreasing block tariff structures, where a smaller amount per cubic meter is charged at higher levels of consumption. Figure 3.1 shows how the unit price varies according to the different tariff structures (the fixed fee tariff is excluded since it is not based on volumetric consumption).

With the exception of the fixed fee tariff, the abovementioned structures do not allow service operators to accurately estimate their revenue, which exposes them to uncertainty as to expected income. On the other hand, the fixed fee tariff does not give the operator any control over the volume demanded, which can lead to operating cost overruns or supply deficits. However, all connections are considered to entail some cost due to the installation of permanent

Figure 3.1. Types of tariff structures with volumetric charges



infrastructure, such as meters or pipes, and related administrative costs. Based on this rationale, water supply and sanitation utilities that measure consumption typically include a fixed charge in the tariff structures described above. This is referred to as a two-part tariff since it includes a fixed component and a volumetric component:

$$\text{Tariff} = \text{fixed charge} + \text{volumetric charge}$$

The fixed charge included in the tariff helps to ensure the financial sustainability of the service, while the variable part contributes to meeting the objectives of efficiency and environmental sustainability. The variable charge sends price signals to consumers, prompting them to consider the scarcity of the resource and encouraging sustainable use, while reflecting the cost of increased consumption.³ These tariff structures are found for both water supply services and for sanitation services. However, at global level, sanitation (or sewerage) is usually charged as a fixed percentage of water consumption or through a fixed fee that does not take into account the specific characteristics of the household (OECD, 2009; Hoque and Wichelns, 2013). That said, it is worth noting that this simplification is increasingly falling out of favor. This is an especially relevant issue when sanitation tariffs include the costs associated with wastewater treatment, since wastewater treatment systems are expensive and require significant investments in infrastructure and maintenance. As a result, there are situations in which the actual cost of sanitation may exceed that of the water supply service.

Forms of provision of water supply and sanitation services

Figure 3.2 indicates whether the same utility simultaneously provides the drinking water and sanitation services in a given municipality. Where this is the case, the figure shows whether the provision of services is billed under a single tariff or if the services have different pricing.

The results reveal that in most of the municipalities in the sample water supply and sanitation services are provided by the same utility. One possible reason for this is the pursuit of the economies of scope that can arise when both services are jointly provided (Nauges and van den Berg, 2008; Barbosa et al., 2016). In four countries—Costa Rica, El Salvador, Panama and Paraguay⁴—this model is observed in all municipalities. Guatemala appears to be the exception in this region: in more than 56% of the municipalities, only tariffs for the water supply service were identified. This suggests that companies providing these public services offer sewerage in only 44% of the Guatemalan municipalities analyzed. Moreover, in municipalities where both services are provided by the same utility, the tariff information is usually broken down by service. This means consumers are given more information, as although they receive a single bill it contains separate information for each service.

Consumers usually receive information on water supply and sanitation tariffs broken down by type of service, despite the fact that both services are provided by the same utility in each municipality



There is a tendency in the region to establish separate tariffs for water supply and sanitation services, even if they are supplied by the same utility. That is, the tariff documentation separately indicates the price to be paid for the water supply service and for the sanitation service. Specifically, of all the municipalities in the sample, only 49 municipalities located across six countries opt for the joint provision and pricing of these services despite being supplied by the same utility.

When the analysis only includes municipalities where utilities report the water supply and sanitation service tariffs separately and taking the standard tariff for both services as a basis, most of these municipalities have tariff structures with different prices for the two services (Figure 3.2).

3 Furthermore, in Latin America, there are some cases of seasonal tariffs, where different unit prices are charged depending on the period of the year, although they are not widespread in this region. Such tariffs are applied in Chile, for example, although that country is not covered by this analysis. Under this tariff structure, the companies providing the service can charge a higher unit price during the peak demand season and a lower price during the low season. This type of tariff is thus useful in cases where there is seasonal variability in the availability of water resources.

4 It is noteworthy that the tariffs of Empresa de Servicios Sanitarios del Paraguay (ESSAP), which is responsible for water supply in all the municipalities of the Paraguayan sample, include a category for the sanitation service, which is calculated as 100% of the amount corresponding to water consumption. Nevertheless, it should be noted that sewerage services are not widely available in the country. Only 33% of the population is connected to the sewerage network (ESSAP, n.d.). It is therefore important not to conflate the type of services provided with the level of coverage of those services.

Figure 3.2. Type of service by country

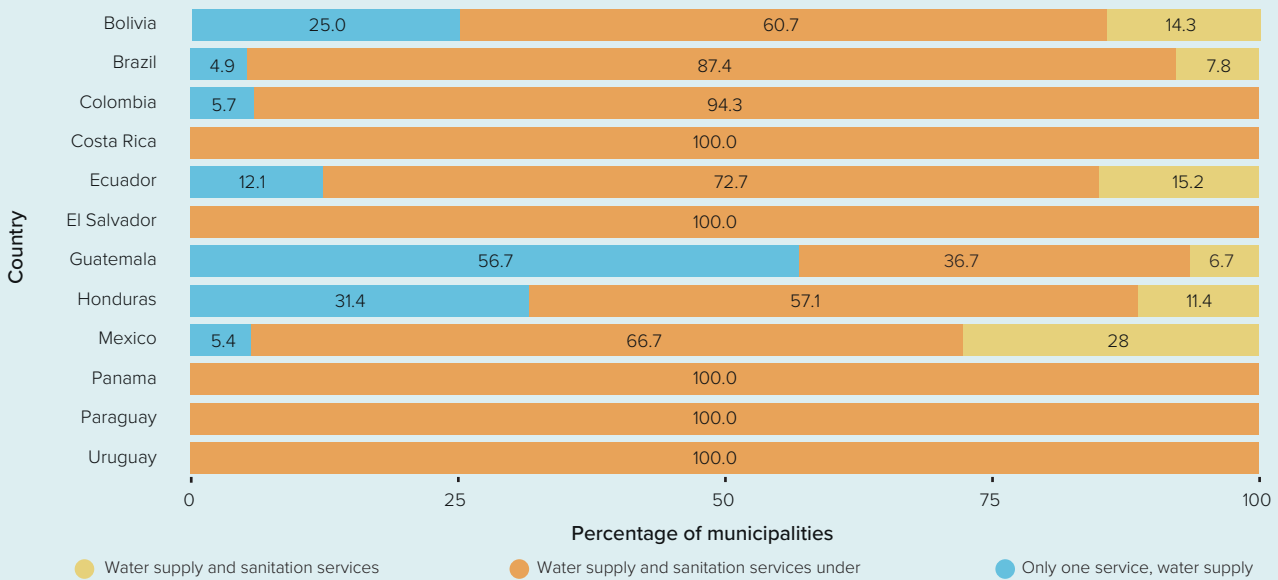
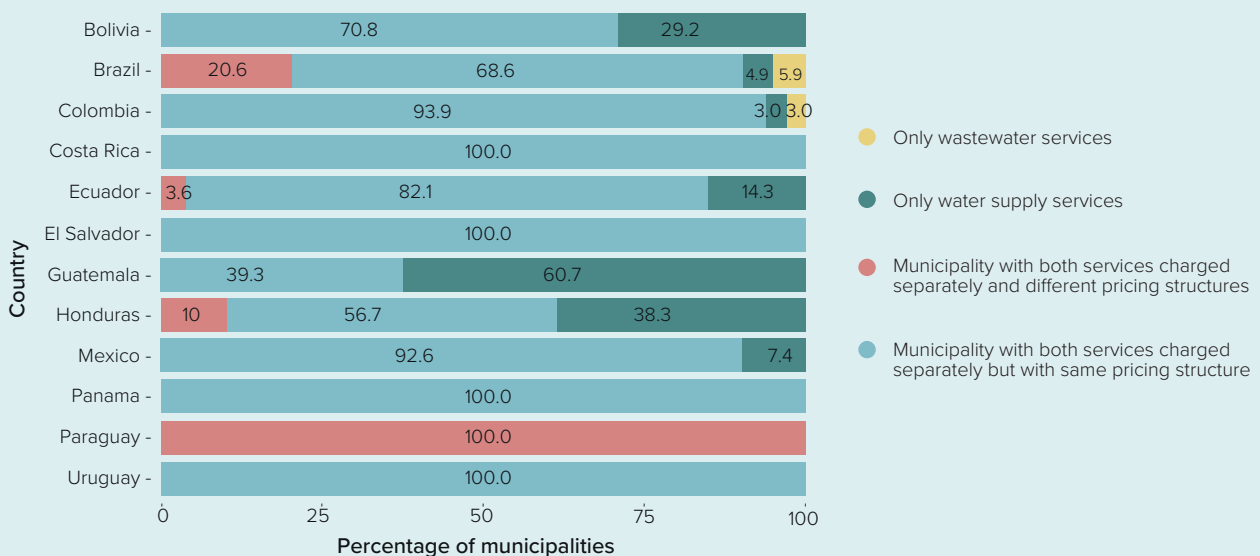


Figure 3.3 focuses on the municipalities in which services are not subject to a combined tariff, whether this is because the utility (i) only offers wastewater services, (ii) only offers water supply services, (iii) offers both, but prices them separately, applying the same tariff structure to both services, or (iv) offers both services and prices them separately, establishing specific tariff structures for each service.

In Figure 3.3, it can be seen that municipalities in only four countries apply an identical tariff to both services, despite charging for them separately. This practice is distributed unevenly across countries, with values ranging between 3.6% of municipalities in Ecuador and 100% in Paraguay.

In municipalities where the utility provides just one of the services, it tends to be drinking water services. That is, it is more common for utilities to only provide the water supply service, and as such, this service is the only one for which they set a tariff. This model of setting tariffs exclusively for the water supply service is found in seven countries of the sample—Bolivia, Brazil, Colombia, Ecuador, Guatemala, Honduras and Mexico—with a prevalence ranging between 62.2% of municipalities in Guatemala and 3% in Colombia. In contrast, the model of charging solely for the sanitation service, depicted in yellow in Figure 3.3, is found in two countries but applies to only 1.5% of the Brazilian municipalities and to 3% of the municipalities analyzed in Colombia. This situation is an indication of the levels of coverage of both services in the region (JMP, 2021).

Figure 3.3. Type of tariff structure by country for municipalities that do not charge a combined tariff for services.



Considering the municipalities that apply metered tariffs and focusing on the standard tariff, it is common for water supply and sanitation services to not only have the same provider, but also the same tariff structure. Figure 3.4 shows that in 62.4% of the municipalities in the region, both services are charged for under the same tariff structure. Note that this percentage varies significantly between countries: in nine countries, at least half of the municipalities apply this policy, whereas the practice is extremely limited in Guatemala.

At regional level, most of the analyzed municipalities use the same tariff structure for both services

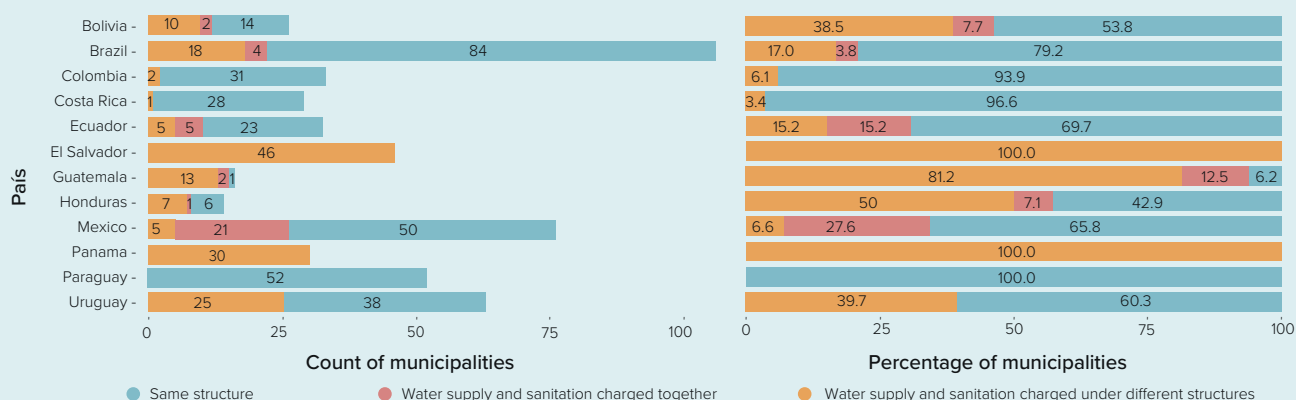


A substantial percentage of municipalities (30.92%) have chosen to design separate tariff structures for each service. Although this approach accounts for a small percentage at the regional level, it is the most common option in some countries. In eight countries, at least half of their municipalities have opted to charge for water supply and sanitation services under different tariff structures; this will be discussed in more detail in the following chapters.

Lastly, setting combined tariffs for water supply and sanitation services is a relatively uncommon practice observed in certain specific countries and municipalities. Only 6.68% of the municipalities analyzed apply a single tariff that covers the costs of both services. Moreover, this form of charging for services is found in only six countries of the sample, reflecting its limited application in the region. It is important to note that the concentration of the use of combined tariffs varies by country. In Brazil, for example, only 3.8% of municipalities use this practice, while the figure is significantly higher in Mexico, at 27.6%.

To better understand this phenomenon, it is important to analyze not only the percentages, but also the number of municipalities that employ this practice. In this regard, it can be seen that only 35 municipalities have adopted combined tariffs, and 21 of them (60% of the total) are in Mexico, indicating that this form of charging for services is very uncommon and geographically concentrated.

Figure 3.4. Distribution of the tariff structure for water supply and sanitation services



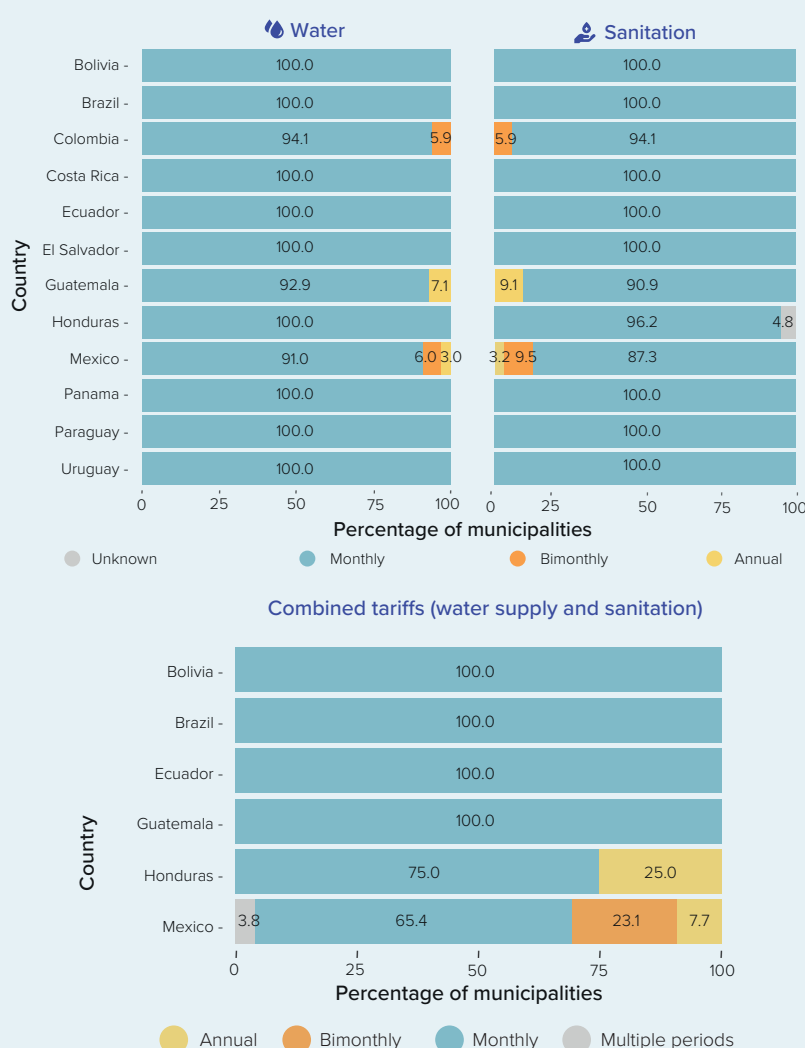
Tariff characteristics

The information provided in the bills and tariff documentation plays an essential role in empowering consumers to make informed decisions and adopt more efficient consumption habits. In line with the principles of economic theory, this information allows consumers to determine their optimal level of consumption. However, consumers evaluate and make their consumption decisions before they receive the bill, which is issued periodically after the initial consumption has occurred. In this sense, more frequent billing means consumers are given more information, allowing them to make better decisions (Wichman, 2017).

In the analyzed countries, when services are charged separately, the billing frequency is the same for both water supply and sanitation services. Therefore, most municipalities issue monthly bills for both services (Figure 3.5). In only a small percentage of municipalities in Mexico, Guatemala and Colombia, billing is annual or every two months. Specifically, water supply and sanitation services are billed monthly in approximately 98% and 97% of the municipalities, respectively. As for divergences in billing frequency between services, minimal differences are observed solely in Guatemala and Mexico.⁵

About 80% of the municipalities that jointly charge for water supply and sanitation services issue monthly bills. This confirms the widespread tendency to issue monthly bills for these services in Latin America, regardless of the type of service, the supply method or the tariff system used. The only countries with combined tariffs that do not have monthly billing in all municipalities are Honduras and Mexico. An interesting case to highlight is Honduras, where, even though monthly billing is used in all municipalities when services are priced separately, approximately a quarter of municipalities opt for annual billing when services are subject to a combined tariff. In Mexico, the coexistence of different billing frequencies is again observed, although in percentage terms there is a considerable increase in bimonthly billing, and to a lesser extent in annual billing.

Figure 3.5. Billing frequency for water supply and sanitation services



Note: The figure depicting the billing frequency for combined services only represents data from 49 municipalities. By country, the municipalities are distributed as follows: Bolivia, 4; Brazil, 8; Ecuador, 5; Guatemala, 2; Honduras, 4; Mexico, 26.

For consumers to have a clear perception of their water bill and tariff to guide their decision-making, it is important for them to receive this information frequently, and for their consumption to be measured. In this way, consumers can better determine how their consumption impacts the billing total.

⁵ For the water supply service, only 10 of the 530 municipalities have a billing frequency other than monthly. By country, these 10 municipalities are distributed as follows: Colombia (2), Guatemala (2) and Mexico (6). In relation to the sanitation service, it is observed that 13 of the 485 municipalities have a billing frequency other than monthly. By country, these 13 municipalities are distributed as follows: Colombia (2), Guatemala (1) and Mexico (10).

In Latin America, a significant portion of the population still lacks water meters, posing a major challenge for implementing effective tariff policies. The reality of this situation is reflected in the fact that many municipalities in the analyzed countries include unmetered tariffs for households (Figure 3.6). However, it is encouraging to see that in six countries of the sample, metered tariffs are applied in at least 75% of their municipalities for both services, although it is only in Panama and Uruguay that 100% of the analyzed municipalities have such tariffs. Furthermore, in most countries where there is not exclusive use of metered tariffs, there is a tendency for the two types of tariffs to be applied simultaneously in the various municipalities. The exception to this general trend is observed in Guatemala and Honduras, where the tariffs of more than half of their municipalities are not based on any metering of consumption.

When comparing the types of tariffs applied to services in the sample countries, different trends are observed. In half the countries, there are no differences between water supply services and sanitation services in terms of the percentage of municipalities applying metered/unmetered tariffs.

However, in countries with variations, such as Guatemala and Honduras, a slightly higher percentage of municipalities apply unmetered tariffs for sanitation services, with differences of 4.5 and 0.4 percentage points (pp), respectively. In contrast, the opposite trend is observed in Mexico, where fewer municipalities apply unmetered tariffs for sanitation, with a difference of 2.1pp. On the other hand, in a group of countries like Brazil, Ecuador, Honduras, and Mexico, the percentage of municipalities applying metered tariffs surpasses that for sanitation services. Nevertheless, the magnitude of this difference varies significantly between countries, ranging from 1pp in Honduras to 8.9pp in Ecuador. Furthermore, Guatemala and Bolivia register a higher percentage of municipalities that apply metered tariffs for sanitation than for the water supply service, by 0.9pp and 21.5pp, respectively.

Lastly, in Brazil and Guatemala, all municipalities that apply a combined tariff to water supply and sanitation services have tariffs based on metered consumption. However, when it comes to services charged together, it can be seen that in more than 20% of the municipalities of the regions at least part of the population has tariffs that are not based on metered consumption. In contrast, in the other countries analyzed, the distribution of tariff types by municipalities is similar for both pricing models.

Figure 3.6. Distribution of metered/unmetered water supply and sanitation tariff types by country (all strata)



For countries that mostly have metered tariffs, another important feature to analyze is the number of home connections that have a supply metering device, as homes without this equipment receive a monthly charge based on estimated consumption. According to data from regulatory agencies, El Salvador, Colombia and Panama have 94%, 89% and 70% coverage of meters, respectively.⁶ No publicly available data have been found for the coverage of meters in Uruguay.

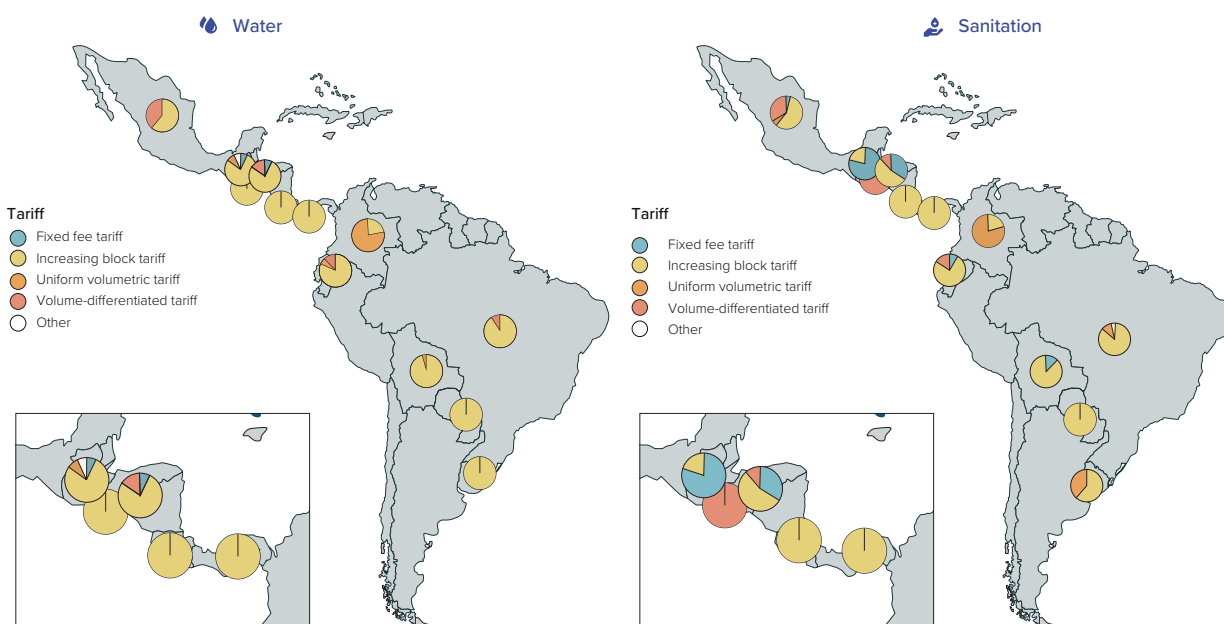


Consumers receive information about their bill on a regular basis, but their consumption is sometimes not metered

At regional level, there are also similarities in the type of tariff structure across countries and between services. In the case of municipalities without metered tariffs, and with the exception of Brazil where 60% of municipalities charge based on estimated consumption, households must pay a fixed fee for their water consumption. The vast majority of municipalities with metered tariffs have increasing block tariffs (Figure 3.7). For the water supply service, it is only in Colombia where a majority of municipalities (78%) has uniform volumetric tariffs. For sanitation services, an increasing block tariff is the predominant option in 9 of the 12 countries studied.⁷ The only countries where this trend is not observed are El Salvador, Guatemala and Colombia. In the first of these countries, 100% of the municipalities apply a volume-differentiated tariff. In the second, municipalities applying fixed fee tariffs predominate, while in the third, there are uniform volumetric tariffs, with a smaller percentage of municipalities that rely on increasing block tariffs with memory. Moreover, fixed-rate tariffs are more prevalent despite the availability of metered tariffs. Thus, while increasing block tariffs are predominant, slight variations in the type of tariff structure applied are observed among countries and services.

In the context of coexisting combined and separate pricing models, it is essential to highlight that the same trends persist, despite the limited sample sizes in the respective countries. The slight differences in the prevalence of tariff types can be attributed to the difference in the total number of municipalities analyzed per country. However, the case of Guatemala deserves special mention, since, although no municipality that prices services separately uses volumetric tariffs, one of the two municipalities that provides combined water supply and sanitation services does apply this type of tariff.

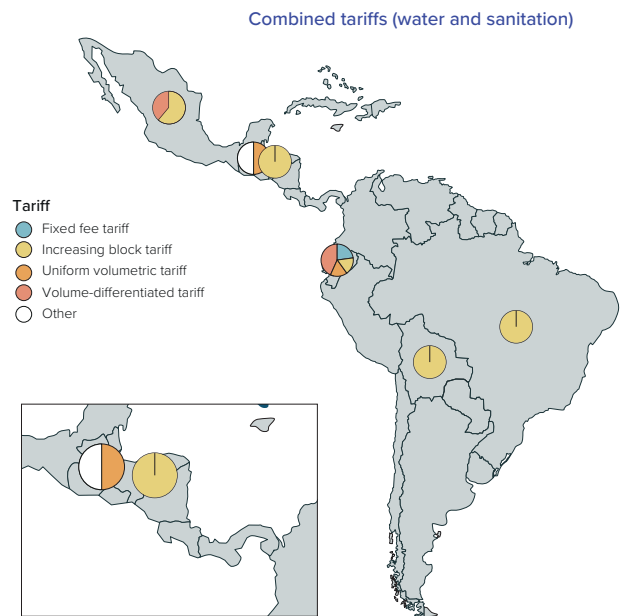
Figure 3.7. Prevalence of different types of tariff structures, by service.



6 National Administration of Aqueducts and Sewers - Statistical Bulletin 2020 (El Salvador), Superintendency of Residential Public Services – Annual Report 2016 (Colombia) and National Authority of Public Services – Breakdown of Tariffs 2022 (Panama). All values are national averages.

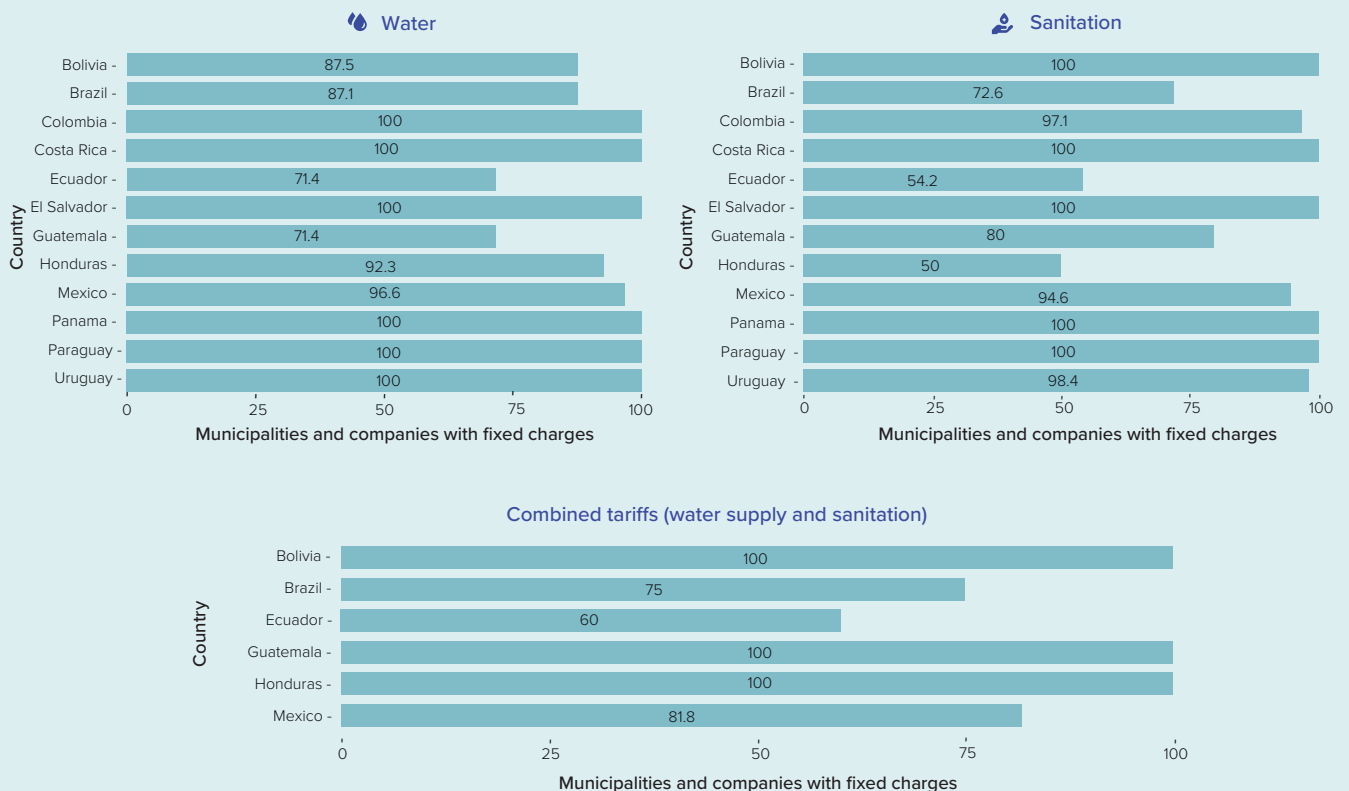
7 Only meter-based wastewater service tariffs are included in the analysis.

Another general feature of the tariffs for both services is the use of two-part tariffs in municipalities with metered tariffs (Figure 3.8). However, there are some differences between services: for the water supply service, it is only in Guatemala and Ecuador that the percentage of two-part tariffs is less than 75% (71.4% in each case), while two-part tariffs are less common for the sanitation service. Specifically, in Honduras and Ecuador, around 20% of the municipalities that use two-part tariffs for water supply services do not use them for sanitation. Fixed charges are also removed for sanitation services by about 10% of the municipalities in Brazil and Guatemala. Conversely, in Bolivia, all municipalities opt to apply a two-part tariff to the sanitation service, whereas the percentage for the water supply service is 87.5%.



When consumption is metered, municipalities generally apply two-part tariffs for billing both water supply and sanitation services. Moreover, the variable component is usually designed as increasing block rates

Figure 3.8. Percentage of metered two-part tariffs by country, for each service



Specific features of the sanitation service in Latin America

To finish the description of the general characteristics of the tariffs in the region, the focus is turned in this section to the wastewater management line items that are billed. Common management services are sewerage, drainage and/or wastewater treatment. As can be seen in Table 3.1, most of the countries in the region only charge for sewerage; or at least they do not specify if they are calculating charges for other services. This is why the generic term “sanitation” is used here.⁸

Only two countries, Brazil and Mexico, have opted to design tariffs that specifically charge for drainage and/or wastewater treatment in addition to sewerage.⁹ In Brazil, just over 20% of the municipalities apply this type of tariff, while in Mexico the percentage increases to around 40%.

The widespread lack of differentiation in the billing for wastewater collection and treatment in Latin America may be due to the low level of wastewater treatment recorded in the region (Saravia-Matus et al., 2022). It is worth pointing out that Mexico, the country with the highest percentage of municipalities that distinguish water treatment when billing sanitation services, is also home to the largest, highest-capacity wastewater treatment plant in the region (World Bank, 2018).

However, it is worth recalling that the data have been collected from publicly available online information. As such, it cannot be ruled out that there may be cases where charges are applied to the different stages of sanitation, but the information is not made public.

Table 3.1. Distribution of the type of sanitation tariffs applied by the municipalities, in relation to the line items billed.

Country	Sanitation	Drainage	Treatment
Bolivia	100	0	0
Brazil	77.7	22.3	22.3
Colombia	100	0	0
Costa Rica	100	0	0
Ecuador	100	0	0
El Salvador	100	0	0
Guatemala	100	0	0
Honduras	100	0	0
Mexico	55.6	44.4	44.4
Panama	100	0	0
Paraguay	100	0	0
Uruguay	100	0	0

8 Care should be taken when making generalizations about sanitation tariffs in the region, due to differences in the services that may be included. Therefore, the decision has been made in this report to use the term “standard tariff” to refer exclusively to municipalities that have metered tariffs and where drainage and/or wastewater treatment are not specifically included. When referring to the latter, it will be explicitly stated.

9 Nonetheless, it should be noted that in some countries, although the costs of drainage and wastewater treatment are not explicitly detailed in the tariff, they must be accounted for separately in the calculation of the reference costs. An example of this is Colombia, where both small (according to CRA Resolution No. 825 of 2017) and large utilities (according to CRA Resolution No. 688 of 2014) adopt this practice.

Water supply tariffs in Latin America



Water supply tariffs in Latin America

This chapter describes the water tariffs¹⁰ for residential users in the study sample. As seen above, there is a high degree of heterogeneity in the tariff systems, so we focus on the standard tariff.¹¹ This tariff applies to the bulk of consumers and generally tends to be the highest. The first subsection describes the tariff structure in each of the countries, noting the number of blocks and the size of the first and last consumption blocks; as well as whether a fixed charge is applied, and if so, its share in the billing amount for basic consumption levels. The second subsection compares the billing amounts and the differences in the billing amount between the standard tariff and fixed fee tariffs, referring to the distribution of the marginal prices of metered and unmetered tariffs for specific consumption levels. The comparison also focuses on differences in the monthly amount between basic consumption levels for fixed fee tariffs. Finally, as increasing block tariffs and volume-differentiated tariffs may penalize larger households more severely (Pérez-Urdiales & Baerenklau, 2019; Arbués & García-Valiñas, 2020), the impact of household size on the monthly bill is analyzed.

Description of the standard tariff

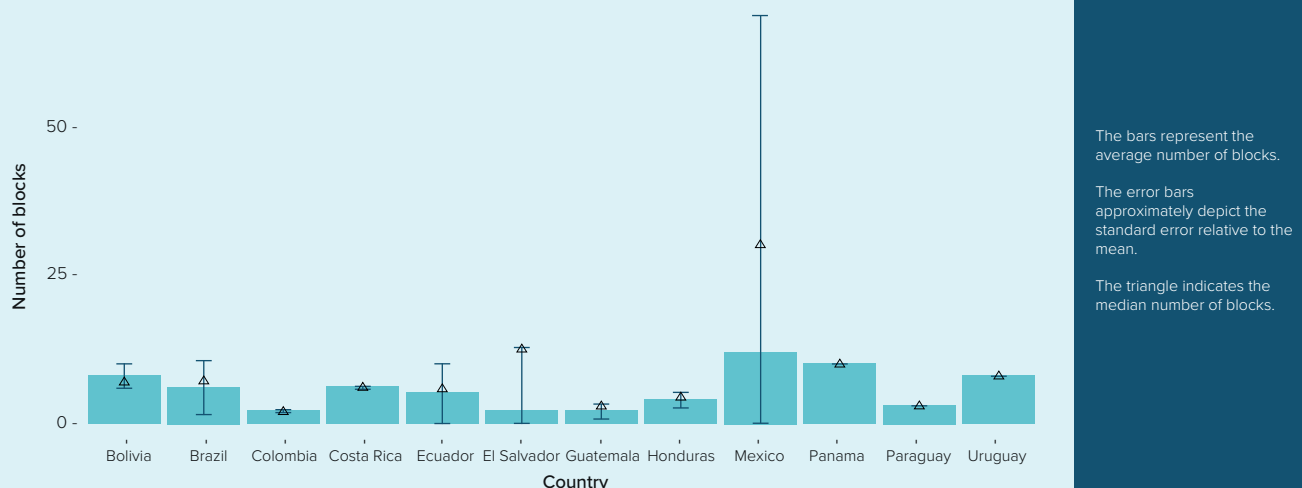
As noted in the previous chapter, in the case of metered tariffs, the standard tariff is typically structured as a two-part tariff. It includes a fixed charge and a variable component. In theory, the fixed charge is designed to cover the costs of being connected to the public network (Arbués & García-Valiñas, 2020), but it often depends on the diameter of the meter meaning it is associated with the flow of the contracted service. The variable component is usually defined by increasing block or volume-differentiated tariff structures.

Structure and characteristics of the standard tariff

For municipalities that apply increasing block tariffs and/or volume-differentiated tariffs, the number of blocks varies widely across the region (Figure 4.1). While in Colombia there are only two tariff blocks, in other countries in the region, such as Panama and El Salvador, there are more than 10 tariff blocks, on average. An extreme case is Mexico, where there are an average of 30 blocks.

Looking at the medians and the error bars, two clear trends can be seen in the region. In most countries, the number of blocks in the tariff structure is fairly homogeneous across municipalities. On the contrary, in countries such as Mexico and El Salvador, half of their municipalities have a number of blocks in the tariff structure that is significantly below the national average.

Figure 4.1. Number of blocks by country



The bars represent the average number of blocks.
The error bars approximately depict the standard error relative to the mean.
The triangle indicates the median number of blocks.

¹⁰ To allow a valid cross-country comparison of pricing, all prices in the dataset were converted to purchasing power parity (PPP). To do this, all monetary values were divided by their PPP conversion factor for the year 2021, as published by the World Bank. See <https://data.worldbank.org/indicator/PA.NUS.PPPC.RF?end=2021&start=2021>

¹¹ In the case of Colombia, the price corresponding to stratum 4 is used as the basis for the analyses because this stratum is not a beneficiary of subsidies, nor does it have to pay a surcharge. The tariff for users assigned to stratum 4 has a price that, in principle, corresponds to the cost of providing the service, as defined by the utility.

However, although these are the most common structures, there are major differences both between countries and within each country (Table 4.1). For example, the first block, usually intended for basic consumption, shows average values ranging from 5 in Uruguay, with little within-country variation, up to around 30m³ in Panama and Guatemala. Moreover, in the latter country, there is marked dispersion in the size of the blocks across municipalities.

The size of the first block, usually intended for basic consumption, is generally very heterogeneous both between and within countries

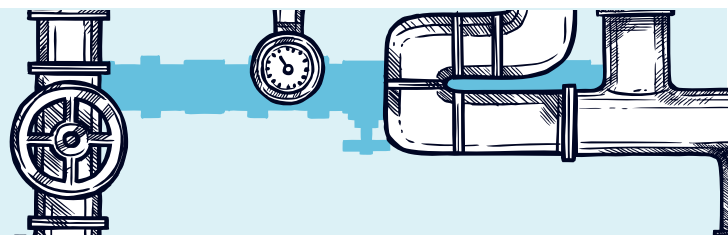


Table 4.1. Data on the tariff structure for the water supply service (standard tariff)

Country	Size of the first block (m ³)		Cut-off point last block (m ³)		Price of first block P ₁ (PPP dollars/m ³)		Price last block P _N (PPP dollars/m ³)		Ratio P _N /P ₁
	M	SD	M	SD	M	SD	M	SD	
Bolivia	13.3	6.3	134.1	99.8	0.19	0.39	1.90	1.26	10.0
Brazil	9.5	3.3	202.1	505.7	0.54	0.83	4.73	3.12	8.8
Colombia	14.9	3.3	14.9	3.3	1.64	0.69	1.64	0.69	1.0
Costa Rica	15.0	0.0	120.0	0.0	1.14	0.05	5.44	0.37	4.9
Ecuador	17.2	12.8	368.6	967.5	0.34	0.41	1.07	0.95	3.1
El Salvador	9.9	0.6	489.9	70.6	0.00	0.00	3.55	0.52	∞
Guatemala	27.3	13.7	51.8	26.0	0.16	0.41	0.72	0.82	4.5
Honduras	18.8	4.4	53.3	19.6	0.20	0.29	0.79	0.55	4.0
Mexico	8.8	6.1	154.7	141.9	0.00	0.02	14.32	14.11	∞
Panama	30.2	0.0	756.0	0.0	0.00	0.00	1.04	0.00	∞
Paraguay	15.0	0.0	40.0	0.0	0.67	0.00	0.87	0.00	1.3
Uruguay ¹²	5.0	0.0	50.0	0.0	0.00	0.00	4.42	0.26	∞

Note: M = mean; SD = standard deviation.

The cut-off point that defines the last block also shows very different average values when making a cross-country comparison (Table 4.1). These average values range from 14.9 m³ in Colombia up to 756 m³ in Panama, showing in both cases little dispersion in the cut-off level among municipalities. Other countries show greater dispersion at the municipal level; Brazil and Ecuador are the countries with the greatest internal variation in terms of the cut-off point of the last block.

There are also marked differences both between and within countries in terms of the pricing of the tariffs for the first and last blocks (Table 4.1). Regarding the prices of the first tariff block, in certain countries, such as Mexico, El Salvador, Panama, and Uruguay, there is a free allocation of some number of cubic meters when the fixed charge is paid. Among countries where there is a positive unit price in the first block, the average values range between 0.16 PPP dollars/m³¹³ in Guatemala and 1.64 PPP dollars/m³ in Colombia. As for the prices of the last block, Guatemala is the country with the lowest prices (0.72 PPP dollars/m³), while Mexico registers the highest values of the sample (14.32 PPP dollars/m³). Regarding the dispersion inside each country, Costa Rica shows the smallest differences in the price of the first tariff block, while Brazil is the country with the greatest variability between municipalities.

12 The tariff structure of Uruguay consists of a fixed charge and a variable component for increasing blocks. However, the first consumption block (0-5 m³) and the second consumption block (5-10m³) are subject to a monthly charge and not a price per cubic meter consumed.

13 To ensure a more reliable cross-country comparison, we convert the values of national currencies into Purchasing Power Parity (PPP) dollars. PPP is used to make international comparisons of price levels and to assess whether one currency is overvalued or undervalued relative to another. PPP is calculated using a representative basket of goods and services, the cost of which in different countries is compared using the exchange rates of their respective currencies. This report uses the conversion rate proposed by the World Bank for the year 2021.

Conversely, in the last block, it is Panama and Paraguay that register the least internal variation, while Mexico presents the most marked differences at the subnational level.

Despite the differences in the size and price of the blocks, the last column of Table 4.1 shows that the ratio between the price of the last block and the price of the first block is higher than 3 in most countries. This reflects the widespread application of a substantial surcharge for the highest consumption levels. Mexico is the country with the highest surcharge: the first block has a volume of water that is free when the fixed charge is paid, while the price of the last block rises to 14.32 PPP dollars/m³. The exceptions to this trend are Colombia and Paraguay, where the ratio is equal to or close to 1. Consequently, in these countries, there is little penalization when consumption reaches the last block.

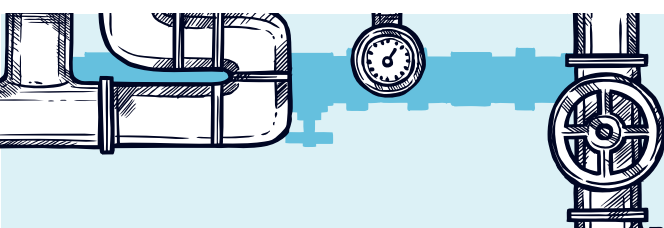
To better understand the impact of progressive pricing in two-part tariffs, we conduct a simulation in which we calculate the bills of hypothetical households. We apply the World Health Organization (WHO) standard (2018), which establishes that the minimum amount of drinking water a person needs to ensure decent living conditions (consumption and hygiene) and avoid health risks is between 50 and 100 liters per person per day (l/p/d). Bearing in mind that fixed charges introduce a regressive element into the tariff system (Suárez-Varela et al., 2015; Suárez-Varela and Martínez-Espiñeira, 2018), Tables 4.2 and 4.3 present the average bills for a family of four according to the different consumption levels described above as standard by the WHO (50 and 100 l/p/d), in cases where two-part tariffs are in effect. The relative weight of the fixed charge in the final billing amount can thus be calculated.

Table 4.2. Monthly amount charged (PPP dollars) for a family of four (50 l/p/d) broken down into the fixed charge and the variable charge

Country	Consumption of 50 l/p/d						
	Fixed part		Variable part		Total charge		% Fixed charge
	M	SD	M	SD	M	SD	M
Bolivia	28.11	21.56	1.50	2.18	29.61	21.07	94.9%
Brazil	12.02	6.40	3.53	5.18	15.55	6.14	77.3%
Colombia	4.41	1.12	7.52	3.13	11.93	3.74	37.0%
Costa Rica	5.50	0.41	6.83	0.29	12.33	0.70	44.6%
Ecuador	5.21	3.36	2.93	2.90	8.14	3.65	64.0%
El Salvador	4.67	0.27	0.00	0.00	4.67	0.27	100.0%
Guatemala	24.22	37.23	3.22	4.41	27.45	41.53	88.2%
Honduras	7.43	4.95	2.57	3.61	10.00	5.96	74.3%
Mexico	7.46	5.36	0.66	1.67	8.12	5.10	91.9%
Panama	12.56	0.59	0.00	0.00	12.56	0.59	100.0%
Paraguay	3.15	0.00	4.19	0.00	7.34	0.00	42.9%
Uruguay	8.35	2.14	8.74	0.53	17.09	2.53	48.9%

Note: M = mean; SD = standard deviation.

Regarding the amount of the fixed charge, it is seen to range from 3.15 PPP dollars in Paraguay to 28.11 PPP dollars in Bolivia. It is important to note that, with the exception of Paraguay, there is some variability at the subnational level in the amount of the fixed charge and, therefore, in the final billing amount. It is especially apparent in countries such as Guatemala and Bolivia.



In most countries, the fixed charges associated with the water service account for more than half of the billing amount for basic consumption levels

Regarding the share of the fixed charge in the total, it can generally be said to represent the bulk of the billing amount (Figure 4.2). For a consumption of 50 l/p/d, in six countries it represents about 75% of the final amount, while it represents less than 50% in only four countries: Colombia, Costa Rica, Paraguay and Uruguay. It is noteworthy that in four countries—Bolivia, El Salvador, Mexico and Panama—the fixed charge represents more than 90% of the total billing amount. The situation is similar for household consumption of 100 l/p/d. However, for this level of consumption, the average amount of the fixed charge represents more than 90% of the bill in only two countries (Panama and Bolivia), while the countries where it represents less than 50% are the same as for 50 l/p/d, but this time with the addition of Ecuador. It is important to note that, in the tariffs of Panama and El Salvador, the fixed component includes the right to a minimum consumption amount. That is, the first cubic meters consumed in these countries involve a variable component equal to 0 PPP dollars.

Figure 4.2. Distribution of fixed and variable charges in monthly bills for the consumption of 50 and 100 l/p/d



Table 4.3. Monthly amount charged (PPP dollars) for a family of four (100 l/p/d) broken down into the fixed charge and the variable charge

Country	Consumption of 100 l/p/d						
	Fixed part		Variable part		Total charge		% Fixed charge
	M	SD	M	SD	M	SD	M
Bolivia	28.11	21.56	2.94	4.38	31.05	19.79	90.5%
Brazil	12.02	6.40	10.61	9.32	22.63	8.49	53.1%
Colombia	4.41	1.12	15.04	6.27	19.45	6.80	22.7%
Costa Rica	5.50	0.41	13.66	0.58	19.16	0.99	28.7%
Ecuador	5.21	3.36	6.02	5.29	11.23	5.38	46.4%
El Salvador	4.67	0.27	0.91	0.29	5.58	0.02	83.7%
Guatemala	24.22	37.23	3.54	4.57	27.76	41.4	87.3%
Honduras	7.43	4.95	2.98	4.24	10.82	6.07	68.7%
Mexico	7.46	5.36	2.98	3.42	10.44	5.97	71.5%
Panama	12.56	0.59	0.00	0.00	12.56	0.59	100.0%
Paraguay	3.15	0.00	8.32	0.00	11.47	0.00	27.5%
Uruguay	8.35	2.14	10.49	0.63	18.84	2.61	44.3%

Note: M = mean; SD = standard deviation.

These results indicate that tariff structures in most countries exhibit regressive elements when applied to the analyzed consumption levels, which in turn may discourage water savings in these consumption ranges (Hoque and Wichelns, 2013). Consumers in these households have limited capacity and incentives to make efficient use of water or to monitor their water bills, since the bulk of the billing amount corresponds to fixed charges and is not connected to their consumption.¹⁴ Conversely, in Colombia, Costa Rica and Paraguay, it is the variable component that has the greatest impact on the total billing amount, which gives consumers more control over their monthly spending. In the case of Uruguay, although the fixed charge carries relatively little weight for both consumption levels studied, it should be noted that a monthly charge is applied for consumption of up to five cubic meters, even if no consumption is recorded. Furthermore, the second consumption block in this country, going from 5 m³ to 10 m³, is also a monthly charge, regardless of whether the recorded consumption is 6 m³ or 9 m³.

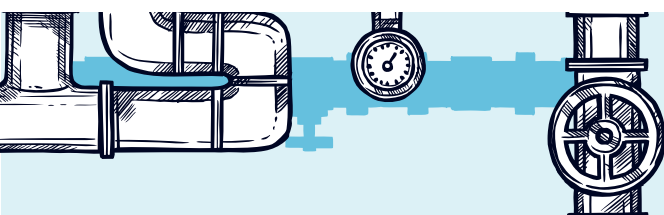
Comparison of the standard tariff by consumption level and in comparison with a fixed fee tariff

In relation to the two-part tariff structure, while the volumetric part represents a small percentage in most countries, there is significant variation when comparing the variable component associated with each level of consumption (50 and 100 l/p/d). A comparison of the variable part for the two consumption levels reveals that it is only in Guatemala and Honduras that the amount does not double; indeed, in Mexico it increases fourfold. The case of Panama deserves special mention, because a volumetric component is not charged in any of the scenarios.

To further explore the impact of the progressive pricing, Table 4.4 repeats the previous exercise for increasing block tariffs and volume-differentiated tariffs. In addition, the comparison includes the billing amount for unmetered tariffs, where a fixed fee tariff charged is regardless of the level of consumption. The aim of this exercise is to examine which type of tariff is most affordable for families that consume basic quantities of water. However, it is important to note that the results do not necessarily apply to the typical household in each municipality, since the basic quantities used in the hypothetical scenarios of this study may not coincide with average household or individual consumption. For monthly bills, measured in PPP dollars, there is marked variation in the final prices paid by consumers in different countries for both types of tariff. Families with a fixed fee tariff are charged amounts ranging from 0.7 dollars in Colombia to 59.1 dollars in Mexico. For families whose consumption is metered, significant differences are observed both for a consumption of 50 l/p/d and for 100 l/p/d. The extremes in both cases are marked by El Salvador, with the lowest billing amount (4.6 and 5.6 PPP dollars, respectively) and Bolivia, with the highest billing amount (26.5 and 28.5 PPP dollars, respectively).

In the countries that apply fixed fee tariffs, the resulting bills are higher on average than those calculated on the basis of metered consumption. There are, however, exceptions. For example, in Colombia, the bill from a fixed fee tariff is significantly lower than the bill calculated on the basis of a metered tariff for the consumption levels considered in this analysis. Similarly, in Guatemala, the fixed fee tariff is also more affordable for both levels of consumption.

In the case of Brazil, the billing amount for the fixed fee tariff is 29% lower than the bill for consumption of 100 l/p/d, but 15% higher than the bill for a consumption of 50 l/p/d.



The water bill for a family of four consuming 50-100 l/p/d is generally more affordable under metered tariffs

The results also show that there are countries in which there are no substantive differences in monthly charges between the two consumption levels when a metered tariff is applied. This is the case with Panama, where the billing amount for a consumption of 50 l/p/d is equal to the billing amount for a consumption of 100 l/p/d, or Bolivia, where the bill for a consumption of 100 l/p/d is 7% higher than that of 50 l/p/d. It is worth noting that Bolivia is the country with the highest monthly bills (in PPP dollars) for a daily consumption of both 50 l/p/d and 100 l/p/d in four-person households. In other cases, minor changes within the margins of the minimum daily water requirements lead to marked relative changes in billing amounts. In countries such as Costa Rica, Brazil, Colombia and Ecuador, the differences between the metered consumption bills exceed 30%. Of these countries, Colombia is the one that shows the widest divergence, as families with an average consumption of 100 l/p/d per day pay 39% more than those with an average consumption of 50 l/p/d.

¹⁴ For example, an average daily water consumption of 370 l/p/d is observed in Panama; this amount is double the global average consumption (IDAAN, 2017). It may be the case that a tariff structure that includes a fixed charge covering the right to consume 30 m³/month was not sending enough price signals to encourage water saving.

Furthermore, Table 4.4 suggests that, within countries, billing amounts are more homogeneous among municipalities that have metered tariffs than those with fixed fee tariffs. Bolivia and Guatemala are the countries where bills based on metered tariffs show the greatest heterogeneity among municipalities.

Table 4.4. Monthly charge (PPP dollars)¹⁵

Country	100 l/p/d		50 l/p/d		Fixed charge		% Change Fixed Charge – 50 l/p/d	% Change Fixed Charge – 100 l/p/d	% Change 100 l/p/d – 50 l/p/d
	M	SD	M	SD	M	SD			
Bolivia	28.5	19.7	26.5	21.3	55.3	28.5	-52%	-48%	-7%
Brazil	22.1	9.3	14.6	6.6	17.1	4.6	-15%	29%	-34%
Colombia*	19.4	6.8	11.9	3.7	0.7	-	1700%	2771%	-39%
Costa Rica	19.2	1.0	12.3	0.7	31.3	0.7	-61%	-39%	-36%
Ecuador	10.4	5.3	6.9	3.7	26.0	40.6	-73%	-60%	-34%
El Salvador*	5.6	0.0	4.7	0.3	8.2	-	-43%	-32%	-16%
Guatemala	13.3	11.8	11.9	12.1	14.3	22.6	-17%	-7%	-11%
Honduras	10.2	6.2	9.2	6.6	17.0	28.0	-46%	-40%	-10%
Mexico	11.3	7.3	8.3	5.0	59.1	76.8	-86%	-81%	-27%
Panama	12.6	0.6	12.6	0.6	-	-	-	-	0%
Paraguay	11.5	0.0	7.3	0.0	-	-	-	-	-37%
Uruguay	18.8	2.6	17.1	2.5	-	-	-	-	-9%

Note: M=mean; SD=standard deviation.

*Insufficient sample of fixed fee tariffs

It should be noted that with unmetered tariffs, if we were to calculate the unit price associated with different levels of consumption by taking the fixed charge and dividing it by said consumption, the first consumption units would have higher unit prices, which would then decrease as consumption increases. In such a context, there is no incentive to save water. Conversely, with increasing block and/or volumetric tariffs, the unit price increases as more of the resource is consumed.

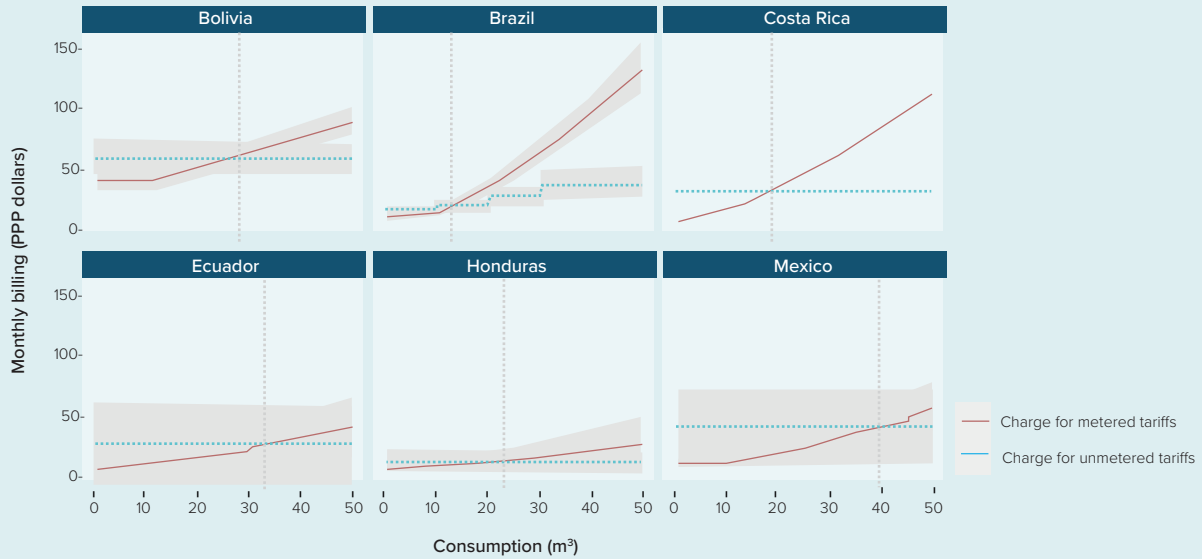
Furthermore, as mentioned in Chapter 3, there are many municipalities in Latin America where both metered and unmetered tariffs are in effect. In these municipalities, different households are paying very different prices for the same service. A case in point is unmetered tariffs based on a fixed fee: users receive regular bills for the same amount, whereas the billing amount for users with metered tariffs will vary depending on the units they consume and the block structure applied in their municipality to record consumption.

The data collected allow us to assess this situation by comparing the billing amounts that households subject to unmetered tariffs and those subject to metered tariffs would pay for different levels of consumption. To simplify the analysis, it only includes the municipalities where both types of billing are in effect. Similarly, due to the heterogeneity of tariff structures in the region, the analysis is based on the standard tariff for both types of billing. Figure 4.3 shows the average values and the deviation of the aforementioned bills for each country in the sample. The graphs show the cut-off point at which the marginal prices of the two types of tariffs are equal.

The cut-off point between the two types of billing lies, on average, at a low level of consumption for Brazil (13 m³), a point associated with a relatively small billing amount. From that level of consumption up, the bills from metered tariffs are more expensive than unmetered bills. In Bolivia, Ecuador and Mexico, the cut-off point between bills lies at a high level of consumption (28, 33, 39.5 m³ respectively), also resulting in a higher billing amount. This situation means that households subject to unmetered tariffs pay a substantially high unit price for the first consumption units, which are intended to cover basic needs. Households where the cut-off point between types of bills lies at relatively high levels of consumption would be less incentivized to conserve water. Nevertheless, this result should be taken together with the comments on the percentage that the fixed charge represents in metered bills for basic consumption levels.

¹⁵ The billing amounts of the volume-differentiated tariffs do not coincide with the values presented in Tables 4.2 and 4.3 because they refer to different observations. Tables 4.2 and 4.3 include all the tariffs that contain a fixed charge and a volumetric charge (two-part tariff), while Table 4.4 presents only the observations with increasing block and volumetric tariff structures, regardless of whether or not they have a fixed charge.

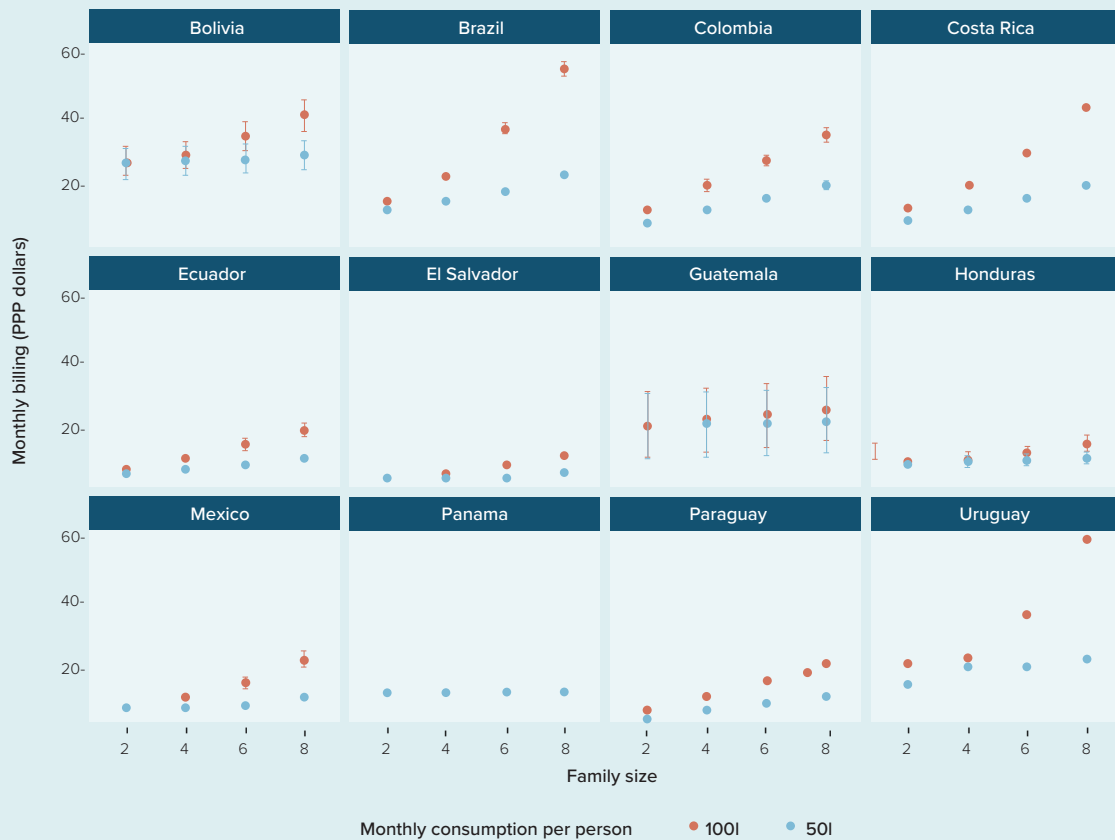
Figure 4.3: Monthly charge for tariffs with and without metering¹⁶



The impact of household size on the monthly bill

In line with the previous point, the main objective of increasing block or volume-differentiated tariffs is to discourage excessive water consumption. However, since household water consumption is influenced by the number of people in the household (Arbués et al., 2003), these tariff structures may penalize larger households more severely (Pérez-Urdiales & Baerenklau, 2019; Arbués & García-Valiñas, 2020). Figure 4.4 shows monthly bills of hypothetical households with an increasing number of members (from 2 to 8 people) and basic water consumption per person (50 l/p/d versus 100 l/p/d).

Figure 4.4. Impact of household size on monthly bill for two levels of consumption



16 The figure shows the municipalities where there are both metered and unmetered standard tariffs in effect, as a result of which four countries have been omitted for different reasons. In Uruguay and Panama, only metered tariffs have been identified, while in Guatemala, although both types of tariffs are found, they are not simultaneously in effect in the same municipalities. In Paraguay, all fixed fee tariffs correspond to subsidized rather than general tariffs, for which reason it has also been omitted from the analysis. Finally, El Salvador and Colombia are omitted because the sample size of unmetered tariffs was too small to be representative.

The data show two clear trends in the region: while in certain countries such as Guatemala, Bolivia and Panama there are no substantive differences in the monthly charge for families with different levels of consumption, in other countries such as Uruguay, Costa Rica and Brazil, the monthly charge increases as the number of household members and average daily consumption grow. The case of Uruguay is illustrative of this trend: while household size does not lead to any substantial differences in the monthly charge according to consumption when there are four household members or fewer, as the number of members grows the differences in the monthly charge become significant, with differences exceeding 30 PPP dollars for eight-person households.

In a within-country analysis, the data again show two clear trends. On the one hand, there are countries such as El Salvador, Panama and Paraguay where hardly any internal variation is observed for any level of consumption. On the other hand, in countries such as Brazil, Guatemala and Mexico, there is considerable variation. In Brazil and Mexico, the variation is especially high for a consumption level of 100 l/p/d in households with four or more members, while Guatemala has high standard deviation values for all sizes and consumption levels. Accordingly, in the latter country, the differences in the total billing amount depend less on the number of household members than on the municipality where they live.

Sanitation tariffs in Latin America

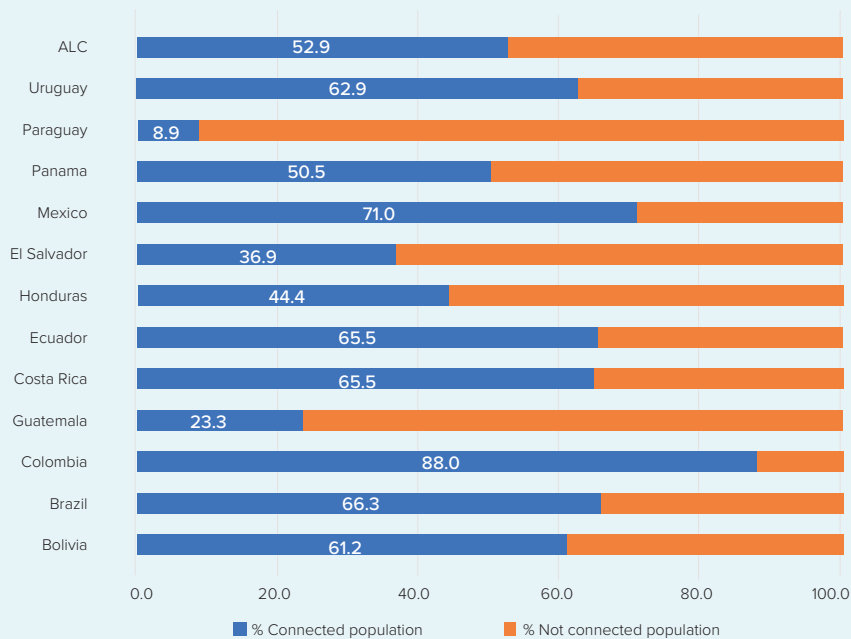


Sanitation tariffs in Latin America

Latin America is making progress, albeit unevenly, towards achieving the target of universal access to improved sanitation.¹⁷ In the region, about 89% of the population has access to some form of basic sanitation, although as with the water supply service, there is a significant gap between rural and urban areas, with values of 73% and 93%, respectively (WHO and UNICEF, 2021). It is also estimated that only about 66% of the population is connected to a sewage system (18% in rural areas and 77% in urban areas). As shown in Figure 5.1, the percentage of the population connected to the sewage system in the sample countries ranges from 88.03% in Colombia to 8.87% in Paraguay.

Currently, the main sanitation problem in the region is related to wastewater treatment: only 30-40% of the wastewater collected in the region is treated (FAO, 2017; Saravia-Matus et al., 2022). These figures are low, given the high level of urban concentration in the region. However, the levels of wastewater management and treatment vary significantly both between and within countries (Rodríguez et al., 2020; Lentini, 2015).

Figure 5.1. Percentage of the population connected to sewage system in the sample countries¹⁸



Source: Author's elaboration based on data from UN-Habitat and WHO (2021).

Greater financial commitment is needed to achieve the SDG targets relating to the quality and coverage of the sanitation service, and the safe management of wastewater. The estimated investment needed for the region to achieve sanitation-related SDGs is over USD 126 billion between 2016 and 2030, about three-quarters of which would be allocated to urban areas and the rest to rural areas (Martín-Hurtado and Nolasco, 2017).

In a context of growing financial pressure, sanitation tariffs represent an important tool for supporting public programs and ensuring the financial sustainability of sanitation services. If sanitation tariffs are properly designed and transparent, they can help the consumer understand the importance of sanitation and the need to invest in and maintain systems in good condition to protect public health and the environment (Leflaive and Hjort, 2020).

However, sanitation tariffs in Latin America are often designed in a way that does not reflect the actual cost structure of the service (Arbués and García-Valiñas, 2021), giving the consumer the mistaken impression that sanitation is an inexpensive service of little importance. This can result in a lack of investment in sanitation, making it difficult to meet important targets, such as SDGs 6.2 and 6.3. For example, in some municipalities in Brazil, sanitation tariffs are a percentage of the drinking water bill (Donoso and Sanin, 2020), based on an understanding that only part of the total water consumed reaches the sewer system. Nevertheless, the consumer may interpret the fact that it is only a percentage as an indication that this service costs less.

17 The level of coverage in urban areas is estimated at 90%, with a gap of nine percentage points compared to the level of coverage in rural areas.

18 The data were collected in different years: Bolivia, Brazil and Panama in 2019; Colombia, Costa Rica and Paraguay in 2018; Honduras in 2015; Ecuador and El Salvador in 2012; Guatemala in 2011; Mexico in 2010. The data for Uruguay were extracted from La Diaria (2018), because there are no official data.

This chapter describes the sanitation tariffs in the 12 Latin American countries covered by this report. The first section compares the water supply and sanitation tariffs in these countries. The second section presents a comparison of the cost of the sanitation service for a four-person household based on two levels of monthly consumption: 50 and 100 l/p/d. This comparison accounts for different types of tariffs. In the first scenario, the cost of the sanitation service for a four-person household is examined, considering monthly consumption levels of 50 and 100 l/p/d. The financial burden on households is analyzed in two situations: under joint pricing for water supply and sanitation services and under separate pricing, which makes it possible to isolate the specific tariff for the sanitation service. In the second scenario, metered tariffs and unmetered fixed fee tariffs are compared.

Comparison between sanitation tariffs and water supply tariffs

In the previous chapter, water supply tariffs in the region were analyzed in detail. The aim of this section is to provide a comparison of water supply and sanitation services. To do so, the same classification is used, dividing the tariffs into two types: those based on metered consumption and fixed fee tariffs. This allows a comparative analysis of the two services and their relationship with the type of tariff applied.

As mentioned in Chapter 3, care should be taken when making generalizations given the significant differences between countries and municipalities in terms of the degree of clarity about the line items charged in the sanitation tariffs. In this chapter, the standard tariff for the sanitation service¹⁹ has been chosen as the basis for the comparison of metered tariffs. On the other hand, in the section comparing the billing amounts under fixed fee tariffs for water supply and sanitation services, the analysis is based on the sanitation tariffs that do specifically include drainage and/or wastewater treatment.

It should be noted that in both scenarios the analysis is limited to municipalities where both services are subject to the same type of tariff.

Metered tariffs: volume-differentiated and/or increasing block tariffs

As described in Chapter 3, for residential users, the metered tariff for the sanitation service typically includes a fixed charge and a variable component, as is the case with water supply services. According to Arbués and García-Valiñas (2020), the fixed charge is set to cover the costs of connection to the sewer network, but the criteria used to establish the amount to be charged vary throughout the region. For some utilities, the fixed charge includes a basic consumption volume at no additional charge, known as “minimum” consumption. This is the case for all the Panamanian municipalities analyzed. In other cases, the fixed charge is based on the provision of the service and does not entitle the user to any level of consumption. In the latter category, some utilities establish the amount of the fixed charge on the basis of the diameter of the sewer connection.

Table 5.1 shows the ratio between the average fixed charges of the water supply service and of the sanitation service for monthly bills. It reveals a clear trend of lower fixed charges for the sanitation service. Paraguay is the only country where the amount of the fixed charge is the same for both services. Users pay a lesser amount for the sanitation service fixed charge in 8 of the 12 countries studied (ratio greater than 1). Particularly noteworthy among these countries are Mexico and Panama, with ratios showing that the fixed charges for the water supply service that are at least three times as much as those associated with the sanitation service. In contrast, Costa Rica is the only country where the fixed charge for the sanitation service costs more than for the water supply service, although the difference between the two amounts is small (ratio close to 1).

These results seem to defy conventional economic logic (García-Valiñas and Arbués 2021). Generally speaking, the sanitation service tends to be more expensive than water supply when it involves adequate wastewater treatment and disposal. The specific infrastructure and technology required for these processes can result in higher costs than the costs entailed in the production and distribution of potable water. However, the situation seems to be different in Latin America. This apparent discrepancy may be due to the fact that the fixed charges included in the standard sanitation tariff do not specifically cover the costs associated with the transportation and treatment of wastewater. There is also a possibility that sanitation tariffs do not include the costs of infrastructure repair.

This raises questions about the structure of costs and tariffs in the region, and points to the need for a more detailed analysis to understand why this difference exists and what the implications are for users and the sustainability of sanitation services.

19 A standard sanitation tariff is understood to be one that specifies a charge for sewer services, but does not indicate whether a charge is applied for the collection or treatment of wastewater.

Table 5.1. Ratio of the average fixed charge in the water supply tariff/average fixed charge in the sanitation tariff

Country	Water Supply PPP dollars	Sanitation PPP dollars	Water supply /sanitation ratio
Bolivia	29.18	15.28	1.91
Brazil	12.02	10.55	1.14
Colombia	5.32	3.08	1.73
Costa Rica	5.50	6.53	0.84
Equador	5.21	2.83	1.84
El Salvador ²⁰	4.67	0.00	∞
Guatemala ²¹	14.29	NA	NA
Honduras	7.01	3.61	1.94
Mexico	8.37	2.59	3.23
Panama	12.56	3.29	3.82
Paraguay	3.15	3.15	1.00
Uruguay	8.35	3.21	2.60

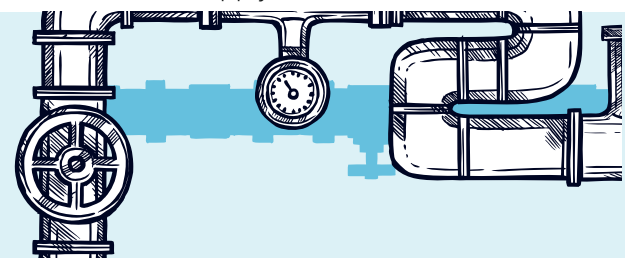
While there exists a weak correlation between volumetric flows and capital costs for wastewater (Renzetti, 1999), and despite the non-direct association between wastewater service costs and water supply costs (Beecher and Gould, 2018), a predominant global practice among utilities providing wastewater services involves defining the variable component of the tariff as a volumetric charge per cubic meter of water supplied to individual households. The reason for doing so is that they assume that residential wastewater use can be most accurately estimated by means of the water measured by the meters. In general, no adjustments are made based on the quality and quantity of wastewater returned to the network. For example, in Uruguay, the tariff only includes a fixed charge corresponding to administration and business expenses, along with a variable charge related to metered water consumption applied per cubic meter of water consumed, intended solely to

cover the costs of operation, maintenance and development of the sanitation system. However, in other countries such as Colombia, environmental taxes are applied to pay for the discharge of wastewater from the sewers into water sources.

Table 5.2 compares the number of tariff blocks in the standard tariff for water supply and for sanitation services in municipalities that have increasing block and volume-differentiated tariff structures. Regarding consumption block tariff structures, two predominant trends are observed in the region: establishing the same number of blocks on average for both services, or establishing more blocks for the water supply service. Among the countries that apply the first option are Colombia, Costa Rica, Ecuador, Paraguay and Uruguay. On the other hand, Brazil, El Salvador, Honduras, Mexico and Panama are examples of countries that adopt the strategy of having more blocks for the water supply service.

In countries that opt for simpler structures for the sanitation service, the differences between services are not always pronounced. For example, in Brazil and Honduras, the difference in the number of blocks between water supply and sanitation services is minimal. In contrast, in the rest of the countries, the number of blocks for sanitation is about half that of the water supply service. Bolivia and Guatemala stand out as the only countries that have a higher number of blocks for sanitation services than for water supply.

The differences between water supply and sanitation tariff structures are greater in terms of the price of the blocks than in number or size



An analysis of the number of consumption blocks reveals greater within-country homogeneity in the sanitation service than in the water supply service. Countries such as Colombia, Costa Rica, El Salvador, Panama and Paraguay show a total absence of variation in the number of consumption blocks for the sanitation service. Even in Mexico, where there is a high within-country variation in sanitation, it is significantly lower than the variation in water supply tariffs.

20 In El Salvador, metered sanitation tariffs have fixed charges from 0 PPP dollars.

21 Note that data for Guatemala are not included because uniform volumetric tariffs and increasing block tariffs are not typically applied for the sanitation service in this country.

Table 5.2. Comparison of the number of blocks in the sanitation and water tariff structures

Country	Number of blocks Sanitation		Number of blocks Water Supply		Comparison
	Mean	SD	Mean	SD	Sanitation- Water Supply
Bolivia	7.5	1.9	5.7	2.9	1.8
Brazil	6	1.5	7.2	4.6	-1.2
Colombia	2	0	2	0	0
Costa Rica	6	0	6	0.2	0
Ecuador	5.9	5.5	5.9	5.4	0
El Salvador	11	0	22.6	3.1	-11.6
Guatemala	5	NA	3.4	1.3	1.6
Honduras	4	1.3	4.2	1.1	-0.2
Mexico	27.9	54.1	45.6	70.9	-17.7
Panama	4	0	10	0	-6
Paraguay	3	0	3	0	0
Uruguay	8	0	8	0	0

Table 5.3 provides a comparison of the average size and price of the first consumption block and the cut-off point for the last block for sanitation and water supply services in the countries of the region. In terms of the size of the consumption blocks, it can be seen that in four countries (Colombia, Costa Rica, Paraguay and Uruguay) the cut-off point for the last block and the size of the first are the same in both services (ratios equal to 1). This might indicate that the initial levels of consumption in water supply and sanitation are considered to be equally essential for users. In addition, this similarity in the size of the first block may reflect the importance of guaranteeing all households have basic access to water supply and sanitation services, regardless of consumption. In other countries such as Brazil and El Salvador, the difference between services in terms of the size of the first block is negligible. However, in Bolivia, Ecuador and Guatemala, the size of the first block is larger for the water supply service (ratios above 1), while Honduras and Mexico opt for the opposite strategy. The difference in the size of the first block can be attributed to various factors: one possible reason is that not all of the water consumed goes to sanitation, which justifies a smaller block being established for sanitation services.

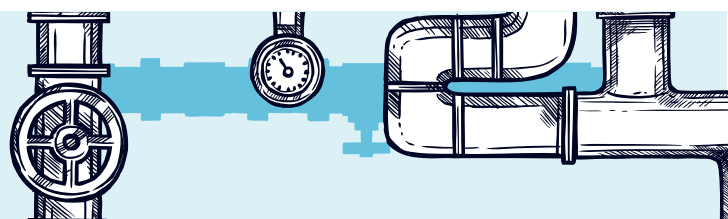
The cut-off point for the last block refers to the level of consumption of water or sanitation after which point the highest tariff applies. In this regard, in countries where the cut-off point for the last block is not the same for both services, the most common practice at regional level is to set higher cut-off points for sanitation (ratio below 1). This happens in Ecuador, El Salvador, Bolivia, Guatemala and Mexico. However, there are differences between these countries; whereas in Ecuador and El Salvador the differences are not substantial, in Guatemala the value of the cut-off point for sanitation is approximately twice that established for water supply. In the three countries where the last block has a lower cut-off point for sanitation services, the differences between services are much more noticeable. In Honduras, the difference is not particularly marked, while in Brazil the cut-off point for the water supply service is set, on average, at a value almost three times higher than for the sanitation service. The difference is greater still in Panama, where the ratio reaches a value of over 13, demonstrating a clear discrepancy between tariff policies for the two services.

It is interesting to analyze the information related to the size of the first and last blocks (the first two columns of Table 5.3) together with the number of blocks (Table 5.2). A notable case is that of El Salvador, where the sanitation service has, on average, half the number of consumption blocks of the water supply service. However, it is noteworthy that both services have a very similar cut-off point and similar size of the first block, with ratios very close to 1. As a result, the intermediate blocks for sanitation in this country are considerably larger than those of the water supply service.

Moreover, the differences in the tariff structures for the two services are more substantial in terms of the price of the blocks than their size. In some countries such as El Salvador, Panama and Uruguay, there is a free allocation of a certain number of cubic meters on payment of the fixed charge, which covers the consumption in the first block. Aside from this situation, in all the countries and for both blocks the price per cubic meter is lower for the sanitation service. However, the price difference between services is not homogeneous across countries. In Colombia and Costa Rica, there is only a very slight difference in both blocks.

On the contrary, in Mexico, despite the larger size of the first block for sanitation, the price per cubic meter of the first block is half that of water; and in the last block the ratio reaches the value of 34.93. There are also substantial price differences between services in Bolivia, where the price of the first block of the water supply service is three times that of sanitation, and almost double in the last block. Also noteworthy is the case of Panama: not only is the cut-off point for the last block markedly lower for sanitation, but the price for that level of consumption is significantly lower than the corresponding price for the water supply service.

The price per cubic meter in the first and last consumption block is, generally speaking, lower for the sanitation service



There are some exceptions to this trend. For example, in Paraguay and Uruguay, the same tariff structure is applied to both services, at least in terms of size and average price of the first and last consumption block. In El Salvador, while the sizes of the blocks are very similar (ratios close to 1), the price for sanitation cannot be compared with the water supply service because wastewater is priced by means of a fixed charge for water consumption blocks with no memory.

Table 5.3. Comparison of the size and price of the first and last block of the sanitation and water supply tariff structures

Country	Water Supply/sanitation ratio Size of the first block	Water Supply/Sanitation ratio of cut-off point for the last block	Water Supply/sanitation Price of the first block	Water supply/sanitation ratio Price of last block
Bolivia	1.13	0.83	3,7	1.84
Brazil	1.01	2.95	1.70	1.10
Colombia	1.00	1.00	1.09	1.09
Costa Rica	1.00	1.00	1.07	1.07
Ecuador	1.13	0.97	1.94	1.84
El Salvador	0.99	0.98	NA	NA
Guatemala	1.36	0.43	1.78	1.95
Honduras	0.84	1,6	1.16	1.76
Mexico	0.83	0.88	2.00	34.93
Panama	1.00	13.33	NA	4.73
Paraguay	1.00	1.00	1.00	1.00
Uruguay	1.00	1.00	NA ²²	1

Note: Values indicated as NA for Panama and Uruguay are due to the fact that the price of the first block is 0 PPA dollars for water supply and sanitation. NA values for El Salvador are due to the fact that the sanitation tariff structure is based on fixed charges by block with no memory.

The data indicate that in the Latin American region, users subject to two-part tariffs based on metered consumption of potable water incur a lower cost for the sanitation service than for the water supply service. The lower cost is the result of a combination of smaller fixed charges and lower prices for two key consumption blocks: the first, where the size of the block is generally established to ensure it covers basic consumption; and the last block, where the most expensive price for the volumetric part of the tariff is recorded (with increasing block tariffs and uniform volumetric tariffs).

Unmetered fixed fee tariff

The use of the fixed fee tariff as a billing method for sanitation services in municipalities where consumption is not metered is not a very widespread strategy in the region. Although this tariff structure is found in nine countries of the sample, it is used by only 6.22% of the municipalities analyzed.

From an economic perspective, the sanitation service would be expected to be priced higher than water in order to cover the associated expenses, because advanced wastewater treatment usually entails higher costs (García-Valiñas & Arbués, 2021).

²² Note that Uruguay's tariff structure for sanitation, like its water supply tariff structure, is composed of a fixed charge and a variable component based on increasing blocks. The first two blocks of 10 m³ are billed through monthly charges rather than by m³. For the purposes of this study, these charges are considered as part of the fixed charge. However, it is worth pointing out that the billing amount for these two blocks is the same for the water supply service and for the sanitation service.

However, in six of the nine countries in this study where this type of tariff structure is found for both services, users pay less for sanitation than for water (ratio greater than 1). Therefore, these results may suggest that the tariff structures are not incorporating the cost of applying advanced wastewater treatment methods.

Table 5.4 shows the monthly cost to households of water supply and sanitation tariffs in municipalities that opt for unmetered billing for services by means of a fixed fee tariff. A high degree of heterogeneity can be seen in terms of the ratio between the cost of fixed fee tariffs for water supply and for sanitation. Brazil registers the smallest percentage difference of the entire sample, with a ratio of 1.53. This indicates that the price of the water supply is approximately 53% higher than the price of sanitation in that country. In other countries the differences are much more pronounced; for example, Ecuador has a ratio of 5.26, indicating that water supply is five times more expensive than sanitation. In Colombia, Costa Rica and Guatemala, sanitation is more costly for users when it is billed through a fixed charge. Specifically, in Guatemala, the percentage difference between sanitation and water supply is 59.29%, in Colombia it is 131.43%, and in Costa Rica it is 70.29%.

In some municipalities in Brazil and Mexico, the sanitation tariff includes different line items, such as drainage and/or wastewater treatment, which affects the cost of the fixed fee tariff. In the case of Brazil, when drainage is specifically covered, the average value of the fixed fee tariff for sanitation is 9.88 PPP dollars, which is about 6 PPP dollars cheaper than for wastewater treatment. However, in both cases, the ratios between these tariffs and the water supply tariffs are slightly higher than 1, meaning that, in all the scenarios analyzed for this country, users face a higher cost for the water supply service. In Mexico, the water supply service also has a higher cost, regardless of the line items included in the sanitation tariffs. However, the differences between types of tariffs for sanitation and water supply are more notable. The sanitation tariff that does not include drainage and/or treatment costs over eight times less than the tariff for water. The difference is half as big when the sanitation service explicitly includes drainage costs, while the amount paid is almost the same when the sanitation service charges for wastewater treatment.

As with the water supply service, it is worth noting the cross-country differences in the amount to be paid by users subject to unmetered tariffs. The cost per month ranges from 1.62 PPP dollars in Colombia to 53.32 PPP dollars in Costa Rica. However, this wide variation conceals other trends: four of the countries in the sample have average monthly tariffs of less than 5 PPP dollars, and in three countries it ranges from 8-12 PPP dollars. It is important to mention that even when drainage is included as a specific line item in the fixed fee tariff, the amounts paid rarely exceed these values. Therefore, although there are significant variations between countries, most users in the region face monthly costs for the sanitation service below 15 PPP dollars when the service is billed through a fixed charge.

Table 5.4. Unmetered monthly fixed fee tariffs for water and sanitation (PPP dollars)

Country	Water Supply	Sanitation	Drainage	Treatment	Ratio Water Supply/Sanitation	Ratio Water Supply/Drainage	Ratio Water Supply/Treatment
	Mean fixed fee tariff	Mean fixed fee tariff	Mean fixed fee tariff	Mean fixed fee tariff	Mean fixed fee tariff	Mean fixed fee tariff	Mean fixed fee tariff
Bolivia	9.61	3.15			3.05		
Brazil	17.0	11.09	9.88*	15.81*	1.53	1.72	1.07
Colombia	0.70*	1.62*			0.43		
Costa Rica	31.32	53.32			0.59		
Ecuador	26.54	5.05*			5.26		
El Salvador	8.23*	1.96*			4.21		
Guatemala	13.34	15.59			0.86		
Honduras	16.55	9.69			1.71		
Mexico	53.66	6.29	11.31	51.99	8.53	4.74	1.03

* Fewer than 6 tariffs in the sample

Financial burden on users of the standard sanitation tariff

Combined vs. separate pricing of services

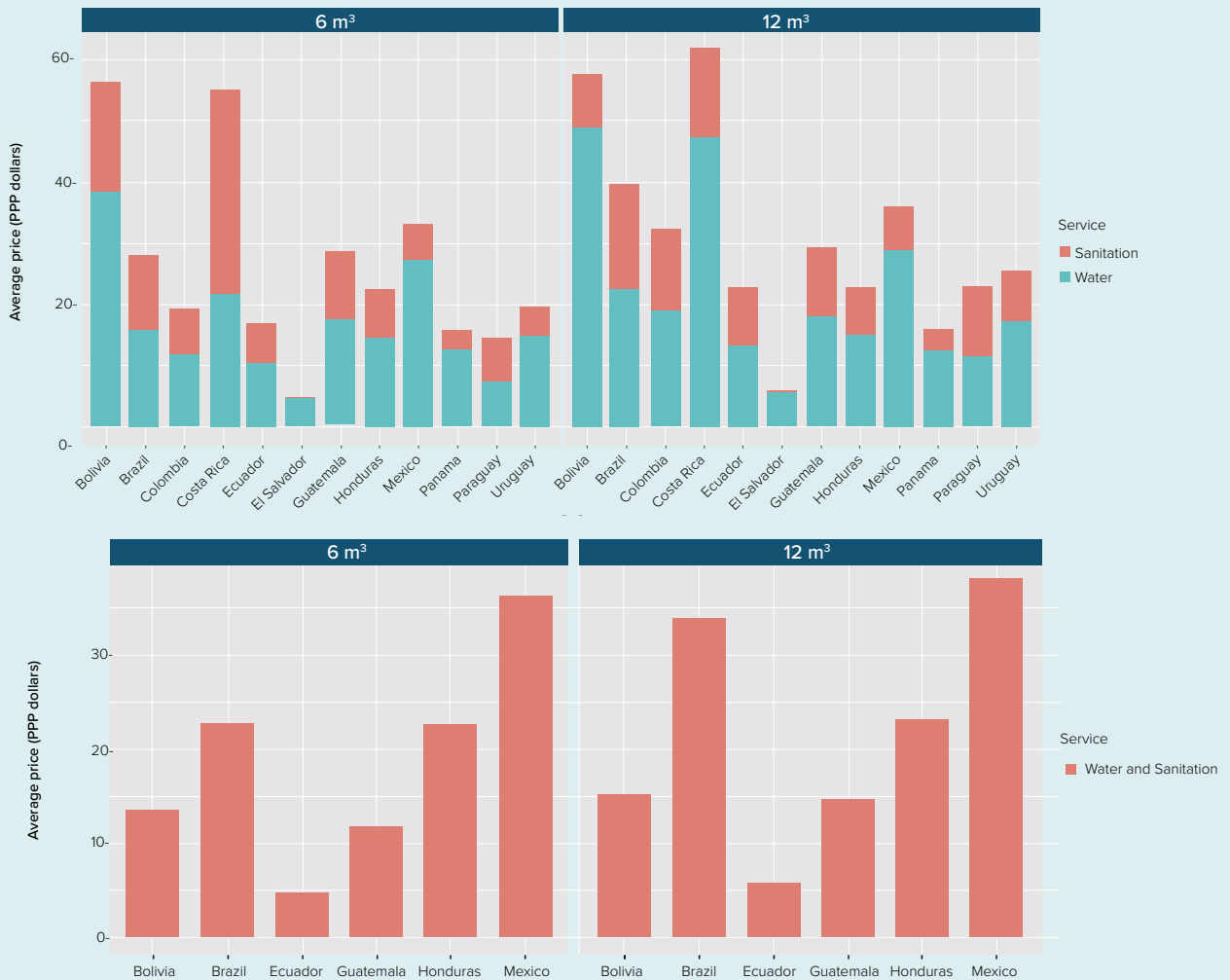
In some Latin American countries, users are still not provided with separate information on the water supply and sanitation service in their bill. Although it may not be a widespread practice, it is interesting to compare the average bill in each country when the services are priced together and when they are priced separately. To better address how the tariffs paid by households are influenced by the way the information is communicated to users, a simulation is carried out to calculate bills for hypothetical households. As was done in the previous chapter to explore the impact of progressive pricing in metered tariffs, the simulation involves calculating bills for hypothetical households using the same standard consumption values (50 and 100 l/p/d). Taking these values as a reference, Figure 5.2 shows the average billing amount for a family of four, according to different levels of consumption (50 and 100 l/p/d) and the way in which the information is communicated to users.

A comparison of these figures reveals that four-person households that receive bills where the costs of the water supply service are separated from those of the sanitation service generally tend to pay more for the same volume of consumption. For example, for a family of four consuming 50 l/p/d (total consumption of 6 m³ per month), the maximum mean billing amount is about 58 dollars under separate pricing and about 37 dollars under combined pricing. For consumption levels of 100 l/p/d, there are again significant differences when comparing the highest billing amounts for the service: 62 dollars for separate pricing and 41 dollars for combined pricing. However, for both forms of pricing, there are only small differences in monthly charges between the two levels of consumption. In Bolivia, Guatemala and Honduras, there are no differences in billing amounts for sanitation under separate pricing. The same is true for Panama, for both water supply and sanitation: the bill for consumption of 50 l/p/d is the same as the bill for consumption of 100 l/p/d.

Water supply and sanitation services are 10 dollars more expensive on average when priced separately



Figure 5.2. Comparison of tariffs that apply separate vs. combined pricing



In the six countries where both forms of pricing are used, significant differences are observed between separate and combined pricing, for both levels of consumption. The only countries where no significant differences are found are Honduras and Mexico. In the rest of the countries, the bills are at least 10 dollars more expensive when services are listed separately. The most striking case is Bolivia, where, for both levels of consumption, the billing amounts based on separate pricing are over 50 dollars, while the combined bill is around 15 dollars.

Billing of the standard tariff

Over the course of this chapter, the diversity of tariff structures used in Latin America for billing sanitation services has been examined. While it is important to take into account the complexity of these structures, the data suggest that the predominant tariff types in the region are metered two-part tariffs that do not include specific line items such as drainage and treatment when setting the cost. To provide a more detailed analysis, this section focuses on examining the monthly charge (in PPP dollars) paid by users with these types of tariff in the different countries analyzed.

As in the previous chapter on the water supply service, we perform a simulation in which we calculate the billing amounts for hypothetical households. Bearing in mind that the tariff structures for sanitation refer to the amount of water consumed, the WHO standard is applied, which holds that the minimum amount of potable water that a person needs to avoid health risks and to have a decent amount for consumption and hygiene is between 50 and 100 l/p/d. Taking these values as a reference, Tables 5.5 and 5.6 show the average billing amounts for a family of four according to different consumption levels (50 and 100 l/p/d). In this first exercise, the monthly charge is broken down to examine the proportion of the water bill that the fixed charge represents. Although it has been noted above that the cost of the fixed charge and the price per m³ of the first block of consumption is generally less expensive for the sanitation service, knowing its share in the total amount can offer a better understanding of the level of progressivity of the tariff, since fixed charges incorporate a regressive element into the tariff system (Suárez-Varela et al., 2015; Suárez-Varela and Martínez-Espiñeira, 2018).

Regarding the amount of the fixed charge, it varies widely across countries, ranging from 2.28 PPP dollars in Mexico to 13.91 PPP dollars in Bolivia. However, of the countries studied, only three (Bolivia, Brazil and Costa Rica) have fixed charges higher than 5 PPP dollars. Furthermore, it is worth noting that there is a fair degree of variation at the subnational level when setting the amount of this component, as shown by the standard deviation. The exceptions are Panama and Paraguay, where the amount of the fixed charge is the same for all municipalities.

Table 5.5. Monthly amount charged (PPP dollars) for a family of four (50 l/p/d) broken down into the fixed charge and the variable part

Consumption of 50 l/p/d							
Country	Total amount		Fixed charge		Variable part		% Fixed charge
	M	SD	M	SD	M	SD	
Bolivia	14.54	7.34	13.91	7.71	0.62	0.77	95.7%
Brazil	12.19	6.33	10.88	7.17	1.31	2.63	89.3%
Colombia	8.27	3.21	2.49	0.92	5.78	2.74	30.1%
Costa Rica	12.97	1.48	6.53	0.93	6.45	0.55	50.3%
Ecuador	4.02	2.85	2.91	2.13	1.11	1.51	72.4%
El Salvador ²³	0	0	0	0	0	0	-
Guatemala	4.92	7.62	4.39	6.81	0.53	0.82	89.2%
Honduras	5.49	2.61	4.73	3.76	0.77	1.53	86.2%
Mexico	3.33	4.43	2.28	3.95	1.05	1.14	68.5%
Panama	3.29	0	3.29	0	0	0	100.0%
Paraguay	7.34	0	3.15	0	4.91	0	42.9%
Urugua	5.37	2.66	2.71	0.61	2.67	3.27	50.5%

Nota: M = mean; SD = standard deviation.

Table 5.6. Monthly amount charged (PPP dollars) for a family of four (100 l/p/d) broken down into the fixed charge and the variable part

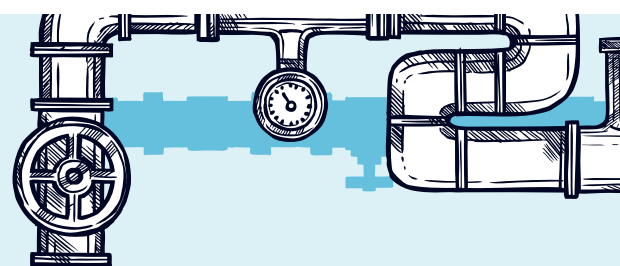
Country	Consumption of 100 l/p/d						% Fixed charge
	Total amount		Fixed charge		Variable part		
	M	SD	M	SD	M	SD	
Bolivia	15.04	6.78	13.91	7.71	1.13	1.71	92.5%
Brazil	16.63	6.02	10.88	7.17	5.74	5.35	65.4%
Colombia	14.05	5.89	2.49	0.92	11.56	5.48	17.7%
Costa Rica	19.42	2.03	6.53	0.93	12.89	1.1	33.6%
Ecuador	5.47	4	2.91	2.13	2.56	3.01	53.2%
El Salvador	0.21	0	0	0	0.21	0	0.0%
Guatemala	4.92	7.62	4.39	6.81	0.53	0.82	89.2%
Honduras	5.49	2.61	4.73	3.76	0.77	1.53	86.2%
Mexico	4.02	4.62	2.28	3.95	1.74	1.62	56.7%
Panama	3.29	0	3.29	0	0	0	100.0%
Paraguay	11.47	0	3.15	0	8.32	0	27.5%
Uruguay	9.02	5.04	2.71	0.61	6.31	5.65	30.0%

Note: M = mean; SD = standard deviation.

The fixed charge accounts for the bulk of the bill. In five countries, the share of the fixed charge in the total amount billed for the service is similar to that found for water supply services. These countries are Guatemala, Panama, Paraguay, Uruguay and Bolivia. However, other countries have opted to apply a markedly different structure to the two services. While Brazil and Ecuador increase the relative weight of the fixed charge, Mexico opts to reduce its relative importance. Specifically, the fixed charge represents less than 70% of the bill for a consumption of 50 l/p/d, whereas for the water supply service it represents 90%.

Focusing only on the sanitation service, some specific cases stand out. In Brazil and Guatemala, the fixed charge represents about 90% of the total amount, with this figure even reaching 95% in Bolivia. These percentages are striking given the strong dependence between the fixed charge and the total cost of the service. On the other hand, Panama is an interesting case because of the implications that its tariff structure may have for the sustainability of the service and water conservation. In this country, the payment of the fixed charge grants the user the right to consume the m³ covered by the first block (30.2 m³). Therefore, the only economic return from users who do not exceed that level of consumption is the price of the fixed charge, 3.29 PPP dollars. Sewerage tariffs in Panama were set in 2010 to cover only the operating costs of the service, and they have not been changed in any way since then, not even to adjust for inflation (Fernández, Saravia Matus and Gil, 2021). In addition, they do not refer to the treatment of wastewater, only to the collection of wastewater via the sewers (without treatment).

In Brazil, Guatemala and Honduras the fixed charge represents approximately 90% of the total sanitation billing amount for a hypothetical four-person household that consumes 100 l/p/dw



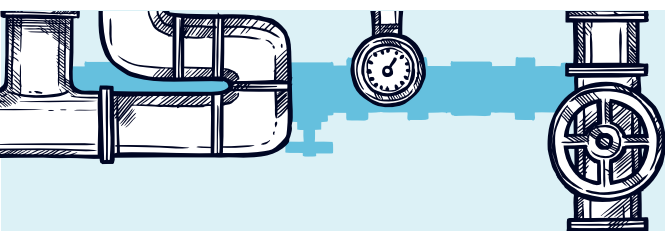
The situation is similar for a four-person household that registers a consumption of 100 l/p/d. In Guatemala, Honduras and Panama, due to the high minimum consumption thresholds established in their tariff structures, the fixed charge represents the same percentage of the total amount as for 50 l/p/d. This suggests that, as far as the sanitation service is concerned, the tariff structures of these countries do not penalize users in relation to the levels analyzed.

Bolivia is a very different case. Although the amount of the fixed charge still represents more than 90% of the total amount, the amount of the variable component doubles.

This points to a strikingly high fixed charge, and can have major implications in terms of the regressivity of the tariff. The opposite is observed in countries such as Brazil, where for a consumption level of 50 l/p/d the fixed charge was around 90% of the tariff, and for a consumption level of 100 l/p/d it drops to 65%. Also noteworthy are the substantial differences between countries: in four countries, the amount of this component still exceeds 85% of the final bill for a consumption of 100 l/p/d, but in four others, the share of the fixed charge in the total bill is less than 35%. In summary, regardless of the billing amount, users in these first four countries have tariff structures for sanitation services with a high degree of regressivity in consumption. These types of structures can disincentivize water saving (Hoque and Wilcheln, 2013): despite receiving information about metered consumption, users can do little to reduce their bill if, for basic levels of consumption, around 80% of the total corresponds to the payment of the fixed charge.

Regarding the variable component of the two-part tariff, while the volumetric part represents a small percentage in most countries, significant variation among countries is observed when comparing the variable component associated with each level of consumption (50 and 100 l/p/d). When comparing the variable part for the two consumption levels, it is only in Guatemala and Honduras that the billing amount does not change, while in the rest of the countries it is generally two times higher for a consumption of 100 l/p/d, or even four times higher in the case of Brazil.

To explore this issue in more depth, and examine the differences that households may experience based on their level of consumption, Table 5.7 presents the billing amount or total charge for increasing block and volume-differentiated tariffs. In addition, the comparison includes the billing amount under fixed fee tariffs to analyze which are more affordable at basic consumption levels.



There is significant variation across countries in the the sanitation monthly bill, regardless of the type of tariff

For monthly bills, measured in PPP dollars, there is marked variation in the final prices paid by consumers in different countries for both types of tariff. For families whose consumption is metered, significant cross-country differences are observed both for a consumption of 50 l/p/d and for a consumption of 100 l/p/d. The lower extreme is marked by El Salvador, with the cheapest bill in both cases (0 and 0.21 PPP dollars, respectively), while Bolivia marks the upper limit for a consumption level of 50 l/p/d (15.97 PPP dollars) and Costa Rica has the highest bill for a daily consumption of 100 l/p/d (19.41 PPP dollars).

The results show that there are countries with no substantial differences in monthly charges between consumption levels for metered tariffs. For example, in Panama, the billing amount for a consumption of 50 l/p/d is equal to the billing amount for a consumption of 100 l/p/d, and in Bolivia the bill for a consumption of 100 l/p/d is 4% more expensive than that of 50 l/p/d. Conversely, Guatemala and Uruguay are the countries showing the greatest relative differences between consumption levels, with the bill increasing by 100%, and 68%, respectively. In the other countries, these values range between 36% in Honduras and 58% in Ecuador.

Furthermore, the data presented in Table 5.7 point to the same pattern as in water supply tariffs: within countries, the billing amount is more heterogeneous across municipalities that have fixed fee tariffs. For fixed fee tariffs, Ecuador stands out as the country with the greatest within-country variation, followed by Guatemala and Honduras. On the other hand, Mexico, followed by Brazil, is the country with the highest within-country variation for basic consumption levels when the service is billed using metered tariffs. In contrast, the municipalities in Panama, Paraguay and El Salvador do not show any differences in the cost of the sanitation service when it is billed using metered tariffs.

Table 5.7. Monthly charge (PPP dollars)²⁴

Country	Total amount		Total amount		Total amount		% Change Fixed fee – 50 l/p/d	% Change Fixed fee – 100 l/p/d	% Change 50 l/p/d - 100 l/p/d
	100 l/p/d		50 l/p/d		Fixed fee tariff				
	M	SD	M	SD	M	SD			
Bolivia	16.55	5.65	15.97	6.53	20.18	12.86	-21%	-18%	4%
Brazil	16.20	8.35	10.75	6.42	13.85	7.52	-22%	17%	51%
Colombia	13.77	6.00	8.09	3.31	-	-	-	-	-
Costa Rica	19.42	2.03	12.97	1.48	53.32	6.82	-76%	-64%	50%
Ecuador	4.47	3.68	2.82	2.63	23.90	44.60	-88%	-81%	58%
El Salvador	0.21	0.00	0.00	0.00	1.96	-	-100%	-89%	∞
Guatemala	1.26	-	0.63	-	12.44	27.93	-95%	-90%	100%
Honduras	3.66	1.97	2.69	2.36	9.30	12.95	-71%	-61%	36%
Mexico	7.10	11.75	4.77	6.63	7.02	9.03	-32%	1%	49%
Panama	3.29	0.00	3.29	0.00	-	-	-	-	0%
Paraguay	11.47	0.00	7.34	0.00	-	-	-	-	56%
Uruguay	11.01	6.15	6.55	3.24	-	-	-	-	68%

Note: M = mean; SD = standard deviation.

Note: No value is recorded for the standard deviation for the fixed fee tariff in El Salvador as only one municipality in the sample uses a fixed fee tariff. In Guatemala, no value is recorded for the standard deviation in volumetric charges, since only one municipality uses metered tariffs for sanitation. In Panama, there are no municipalities that use fixed fee tariffs for sanitation. In Paraguay and Uruguay, the standard sanitation tariffs are not based on a fixed fee tariff system. It is important to note that, in the specific case of Paraguay, only subsidized household tariffs are calculated using a fixed fee for sanitation. The amount for the fixed fee tariff in Colombia has not been included as only one case has been found of an unmetered tariff based on a fixed fee, and the results are not representative.

When analyzing Table 5.7, it can also be observed that in most countries that implement fixed fee tariffs, the average billing amount is higher compared to those that base tariffs on metered consumption. This result makes sense when taking into account the fact that fixed fee tariffs represent the main source of income for the utilities that use them. Therefore, they are set so as to cover fixed costs, as well as operational and maintenance costs. To do so, the costs associated with the average consumption in the municipality in question are usually estimated, rather than focusing only on basic consumption levels, such as those included in the analysis of hypothetical scenarios for metered tariffs. However, it is important to note some exceptions. In Brazil, taking the specific example of a consumption of 12 m³/month, bills based on a fixed fee tariff were found to be 17% cheaper than those based on increasing block and/or volumetric tariffs. This also occurs in Mexico, although the difference is minimal.

Among the countries where fixed fee tariffs are more expensive than metered tariffs, notable differences are observed. For example, for consumption levels of 6 m³/month, in Bolivia, Brazil and Mexico the differences with the billing amounts based on metered tariffs are around 20%, while in Ecuador and El Salvador they are 88% and 100%, respectively. Looking at consumption levels of 12 m³/month, a similar trend is evident in several countries. For example, in Ecuador, El Salvador and Guatemala, differences range between 80% and 90%, while in Bolivia these differences are less than 20%.

Similarly, in most countries, the amount for metered tariffs registers a notable percentage increase, of at least 50%, when the number of liters consumed doubles. This is a significant finding given that both levels are considered basic. It confirms that both consumption levels are generally charged in the same tariff block, as otherwise the change would be more pronounced. Another possibility is that there is not much variation in price per cubic meter between blocks. However, when comparing only the columns that show the differences between the fixed fee tariff and the metered tariffs, a very small percentage change is observed between consumption levels. An example of this is Bolivia, where the difference between the fixed fee tariff and 50 l/p/d is 21%, while between the fixed fee tariff and 100 l/p/d it is 18%.

²⁴ It is worth noting that the billing amounts for the volume-differentiated tariffs do not coincide with the values presented in Tables 5.5 and 5.6 because they refer to different observations. Tables 5.5 and 5.6 include all the tariffs that contain a fixed charge and a volumetric charge (two-part tariff), while Table 5.7 presents only the observations with increasing block and volumetric tariff structures, regardless of whether or not they have a fixed charge.

Based on the above, it can be inferred that, for the analyzed consumption levels, either metered tariffs do not allow cost recovery or users with a fixed fee tariff are paying more than the actual cost of the service. The lack of significant differences when comparing fixed fee tariffs with metered tariffs for different levels of consumption, as well as the significant percentage differences in the billing amount depending on the level of consumption, all points to an opportunity for improvement in the design of prices and tariff structures in the region. Although in most countries the bill increases by at least 50% for four-person households when going from a monthly consumption of 6 m³ to 12 m³, in many cases households still face more expensive bills when they are on a fixed fee tariff. This raises the possibility that metered tariffs may not be enough to cover the costs of the service if a significant proportion of the population does not exceed monthly consumption levels of 100 l/p/d, or that fixed fee tariffs impose an additional cost on users who only consume basic amounts of the resource. Nevertheless, it is worth recalling that the comparison between tariff types is based on hypothetical scenarios and not the consumption that serves as the basis for setting the fixed charge. This point affects the conclusions drawn about the affordability of different tariff types, especially since the average consumption in the countries under study is generally higher than the levels defined here as basic. For example, in Bolivia, average consumption varies between 85 l/p/d in the western part of the country and 300 l/p/d in the eastern part. In Paraguay, the average water consumption in areas where there is a potable water distribution system ranges between 140 and 180 l/p/d (Leguizamón, 2012). In contrast, in Mexico City, the average personal consumption is 380 liters per day (Congreso Ciudad de México, 2022). Consequently, the conclusions presented here based on the comparison of tariff types are only applicable to basic levels of consumption.



In general, sanitation metered tariffs are more affordable for basic consumption levels than fixed fee tariffs

Subsidy systems in Latin America



Subsidy systems in Latin America

Subsidies are transfers of economic resources between governments, service providers and customers, aimed at providing financial support to promote development or mitigate possible negative impacts on certain sectors or activities. In practice, they are a form of financing in which a user or customer pays less for a product or service than it actually costs the supplier. In this situation, the difference between the actual cost and the price paid is covered by a third party, such as the government, other users or even future generations (Andrés et al., 2019).

Over recent decades, subsidy systems have been widely implemented in the water supply and sanitation sectors of all countries, irrespective of their level of income or the region they are in (Andrés et al., 2019, 2020). The implementation of these systems is justified by the desire to guarantee access to basic drinking water and sanitation services to all households, especially those living in conditions of vulnerability.²⁵ However, the accounting and analysis of water supply and sanitation subsidies at global and regional level poses a challenge due to data limitations. Subsidies can be classified into different categories (Andrés et al. 2019): there are supply-side and demand-side subsidies, depending on the financing mechanism. In the first category, the funds are channeled through the service provider or another third party, which, in theory, passes on the funds to the consumer in the form of lower prices. Demand-side subsidies involve a direct transfer from the provider of the fund to the subsidized user to pay for the service.

Subsidies can also be classified in terms of what is being subsidized—consumption or access to the service. In the case of water supply and sanitation services delivered through distribution and sewer networks, consumption subsidies are provided to users already connected to the network by reducing unit prices below their actual cost. The aim of these subsidies is to guarantee a minimum level of consumption, and they require a constant flow of funds to cover the regular difference between the price paid by users and the cost per unit consumed. On the other hand, access subsidies are aimed at expanding the user base. These subsidies, which lie beyond the scope of this study, usually involve discounts in the costs of connection to the network, with the connection charges and/or the initial installation costs being subsidized.

This chapter analyzes the role of subsidies²⁶ in the structure and pricing of water supply and sanitation tariffs, focusing on consumption subsidies for users connected to the distribution and sewer network. In this respect, the study does not seek to contribute to the debate on the level of subsidies and the issue of cost recovery; rather, it describes the conditions for receiving discounted bills and the impact of subsidies on the amount paid by users subject to the standard tariff. Recognizing the importance of understanding the implementation of subsidies in the region and evaluating their impact on water supply and sanitation service users, the study explores various aspects. The nature of the subsidies is examined, as well as their geographical and sectoral scope, and the criteria used to allocate them. A detailed analysis of each of the 12 countries under study is thus provided, in order to expand on the information available at the regional level and offer a more country-specific perspective. This yields a more comprehensive view of the situation in the region regarding subsidies, and can facilitate the identification of good practices and lessons learned in each national context. However, it should be noted that, despite their usefulness in reducing inequalities and helping the most vulnerable groups, subsidies aimed at increasing the number of connections and facilitating access for new users lie beyond the scope of this study, as do supply-side subsidies.

Subsidies in the water supply and sanitation sector in Latin America

Latin American water supply and sanitation sectors are heavily subsidized. It is estimated that subsidies to the sector represent approximately 1.96–2.40% of regional gross domestic product (GDP) (Andrés et al., 2020). Most of the subsidies in this region are targeted at services provided through the water supply and sanitation network. This allocation of subsidies is partly due to the high capital and investment costs associated with the sector.

Although many countries stipulate that tariffs should be set so as to allow cost recovery, water supply and sanitation tariffs in the region often fail to completely cover costs. This may be due to several factors, including the lack of regular tariff adjustments to reflect actual costs and the application of subsidies that reduce the amount users have to pay (Donoso and Sanin, 2020).

25 For more information on studies that attempt to empirically determine the incidence of subsidies in the water supply and sanitation sector, see Table A1 in Appendix A in Whittington et al. (2015).

26 Specifically, we focus on discounts in bills—whether as a result of changes in prices or the size of consumption blocks—applied on the basis of certain eligibility criteria, regardless of whether the tariffs fall below the actual cost of providing the service.

Thus, in addition to supply-side subsidies, there is also a marked prevalence of subsidies that involve the indirect transfer of funds to service users, with the aim of reducing their bill and making services more accessible. While all the countries in the region have subsidies to ensure the affordability of the potable water supply service (Donoso and Sanin, 2020), not all countries apply the same type of subsidy.

In general, there are two types of subsidies in Latin America (Donoso and Sanin, 2020). One of these mechanisms, used in most countries in the region, is cross-subsidization. It entails setting higher tariffs for certain categories of users with larger incomes, and using the additional income generated to subsidize other, lower-income consumers. Cross-subsidies can take different forms, with the increasing block tariff structure being one of the most common. As defined in Chapter 3, in this tariff structure, water consumption is divided into different levels with different unit prices. The lowest consumption blocks usually have lower unit prices, and may even be free, in an effort to promote equity. On the other hand, the highest consumption blocks have higher prices to incentivize water-saving. The lowest consumption blocks in increasing block tariffs with memory involve strongly indiscriminate subsidies, since all users benefit from a unit price significantly below cost without having to meet any other criteria. Consequently, this type of subsidy only fulfills the objective of benefiting economically vulnerable users when low-income households' consumption lies entirely within the subsidized block and the consumption of higher-income households reaches the upper blocks. However, the correlation between consumption and income is usually weak (Nauges and Whittington, 2017; Fuente and Bartram, 2018); as such, the literature indicates that, in most situations, increasing block tariffs do not work well in terms of targeting subsidies (Barde and Lehmann, 2014; Whittington et al., 2015; Whittington and Nauges, 2020).

The second type is the direct subsidy, which entails the direct transfer of funds to low-income consumers to help them pay for services. This approach is used when cross-subsidization is not enough to ensure the affordability of services for the most vulnerable groups, although they are not mutually exclusive. In the Latin American region, Chile—a country not covered by this analysis—stands out as a paradigmatic example of the use of direct subsidies in the water supply and sanitation sector (Gómez-Lobo and Contreras, 2003; Donoso and Sanin, 2020).

Regardless of the type applied, subsidies in the water supply and sanitation sector in Latin America face challenges in terms of targeting.²⁷ The effectiveness of subsidies in reaching and distributing resources to the poorest people has been the subject of extensive debate (Komives et al., 2006; Wodon, 2006; Cook et al., 2020). The lack of accurate information on the income and socio-economic situation of potential beneficiaries can make it difficult to correctly target subsidies, and limits their impact on reducing poverty and inequality. For this reason, different strategies have been developed in the region to ensure that subsidies go to the households that need them the most (Gómez-Lobo and Contreras, 2003).²⁸

On the one hand, the method used in countries such as Chile and Uruguay involves an individual assessment of households' financial means to determine whether they are eligible to receive subsidies for water supply and sanitation. Under this model, the financial situation of each household is evaluated on an individual basis to determine whether it meets the requirements established for receipt of the subsidy. In Chile, the total cost of the subsidy is financed by taxes, and the regulator is not involved in determining the level of the subsidy or in the operational aspects of the scheme.

On the other hand, countries such as Colombia, Ecuador and Bolivia apply a geographic targeting system. Under this model, instead of evaluating each household individually, a geographical location-based approach is used. Specific areas are identified that are considered low-income or are deemed to have greater needs in terms of access to water supply and sanitation services, and subsidies are granted to households in those designated areas.

Gómez-Lobo and Contreras (2003) compare the distributive effect of the two models using the specific cases of Chile (individual targeting) and Colombia (geographical targeting). The authors find that the two models generally yield comparable results in terms of effectiveness in reaching economically vulnerable households, although individual means-testing models are more efficient in identifying poor households.

27 The problems of targeting refer to the difficulty of identifying the population groups in greatest need, and ensuring subsidies reach them.

28 Note that these models are not the only ones in place in the region. There are countries that use alternative or concurrent methods or systems. A case in point is Brazil, where a mixed targeting system is applied: the geographical area is the predominant criterion, but social status is also taken into account in some cases (Donoso and Sanin, 2020). Conversely, Argentina applies a geographical criterion for tariff subsidies (Resolution 183/2022, Art. 2 and 3), but an individual system for granting the social tariff (Government of Argentina, n.d.)

However, because the Colombian model is more progressive, providing larger transfers of funds to the poorest households, the two programs have a very similar overall impact on poverty, at least for the poorest 30% of households.²⁹ Thus, an interesting conclusion of the study is that individual targeting models may incur greater errors of exclusion, while geographic targeting models run a greater risk of incurring errors of inclusion.

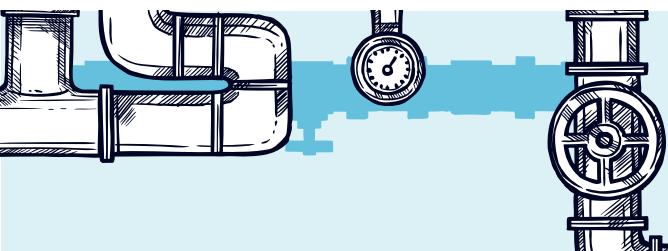
Furthermore, problems with targeting can raise the cost of subsidies. For example, in systems with high levels of errors of exclusion, the fiscal burden of direct subsidies would be unnecessarily high, and higher surcharges would in theory be needed in the case of cross-subsidies to recover costs. Similarly, there is a general lack of transparency surrounding the magnitude of subsidies, due to the information asymmetry between government institutions, utilities and users (Andrés et al., 2019). According to Pérez-Urdiales et al. (2022), consumers tend to have little information or knowledge about their water bill, suggesting that they also have a limited understanding of how to access subsidies and the level of benefits that applies to them.

Eligibility criteria and simplicity of subsidy systems

Eligibility criteria for subsidies in Latin America

Subsidies for water supply and sanitation services vary in relation to two key aspects (Mejía et al., 2012): how beneficiaries are identified and the size of the subsidy. These aspects are closely related to the policy and approach adopted by each country to ensure access to these essential services.

The criteria used to identify the beneficiaries—that is, to determine which individuals or groups are entitled to receive the subsidy—can vary widely depending on factors such as financial status, geographical location of the residence, and the presence of vulnerable groups. Some countries choose to establish more inclusive and comprehensive criteria, with the aim of reaching a greater number of people in need of assistance. Other countries implement more specific, restrictive criteria, limiting access to the subsidy to more vulnerable groups or communities.



The financial eligibility criterion is widely used in the region; however, there are notable cross-country differences in the implementation of subsidies

Based on the analysis of the available tariff documentation, we identify six main categories of eligibility criteria for receiving water supply and sanitation subsidies aimed at guaranteeing more affordable tariffs (Table 6.1). However, the distribution of these criteria varies significantly across Latin American countries, and to a lesser extent between services. This reflects the diversity of approaches adopted by each country to address the specific needs of its population and ensure equitable access to water supply and sanitation services.

Table 6.1 shows the percentage of municipalities where subsidies are granted based on the identified categories of criteria. For ease of reading, the table indicates with a hyphen the cases where there are no municipalities that apply the criterion in question. It can thus be seen that most Latin American countries implement similar criteria for water supply and sanitation services. This observation applies to seven of the twelve countries analyzed.

In the few instances where the subsidies are not applied in the same way for both services, there are no cases in which criteria are applied for the sanitation service that are not applied for water supply. This discrepancy occurs in five countries, in specific categories of subsidies. In Bolivia, users who meet disability criteria can enjoy discounts for the water supply service, but not for sanitation. A similar situation occurs in Costa Rica and El Salvador, but in relation to financial criteria for subsidies. In Ecuador and Guatemala, we see the same situation, but with regard to subsidies based on housing location criteria.

Furthermore, some kind of subsidy is offered for both services in all countries except Costa Rica and El Salvador, where there are no subsidies of any kind for sanitation. It should also be noted that in countries where the criteria are applied to both services, the percentage of municipalities differs between services. In Colombia, Panama, Paraguay and Uruguay, there is no difference in coverage between services. In the rest of the countries, depending on the criterion, the percentages vary in one direction or another.

29 Note that in public policy analysis there is a difference between effectiveness (when the goal is achieved, regardless of the amount of resources used) and efficiency (maximizing results based on the use of available resources). Consequently, although both achieve the goal of providing subsidies to low-income users, the key difference between the two models lies in the management of resources.

Table 6.1. Eligibility criteria for subsidies by sector and country (%)

Country	Eligibility criteria for subsidy (%)											
	Water Supply						Sanitation					
	Age	Rural	Location	Financial	Disability	Single -parent family	Age	Rural	Location	Financial	Disability	Single -parent family
Bolivia	100	-	-	65.9	2.4	-	-	-	-	81.3	-	-
Brazil	-	-	-	80	-	-	-	-	-	83.2	-	-
Colombia	-	-	100	100	-	-	-	-	100	100	-	-
Costa Rica	-	-	-	77	-	-	-	-	-	-	-	-
Ecuador	37.5	5	2.5	17.5	22.5	-	40.6	3.1	-	15.6	25.0	-
El Salvador	-	-	-	95.7	-	-	-	-	-	-	-	-
Guatemala	-	-	16.1	19.4	-	-	-	-	-	9.1	-	-
Honduras	2.6	-	12.8	35.9	-	-	4.0	-	12.0	40	-	-
Mexico	19.6	2.9	18.1	43.5	18.1	4.3	18.3	1.5	15.3	48.9	13.0	2.3
Panama	-	-	-	100	-	-	100	100	-	100	-	-
Paraguay	-	-	-	100	-	-	-	-	-	100	-	-
Uruguay	100	100	-	100	-	-	100	100	-	100	-	-

Note: percentages refer to municipalities in which at least one stratum receives a subsidy based on the following criteria: A) Age - over 60, retired or pensioner; B) Rural - households located in rural area; C) Location - households located in specific area/region in the municipality; D) Financial - households in financial difficulties; E) Disability - households in which one member has a physical and/or cognitive disability; F) Single-parent families - households headed by a single mother or single father.

Due to its importance at the regional level, the financial criterion merits special emphasis: in Bolivia, Brazil, Honduras and Mexico, there are more municipalities that apply these types of subsidies for sanitation services than for water, while in Ecuador and Guatemala the opposite is true.

Looking at the number of criteria that allow access to a subsidy, Mexico is the only country where all six identified eligibility criteria have been observed. However, Latin American countries typically set a single eligibility criterion for access to subsidized tariffs, regardless of the service analyzed (Table 6.2). Furthermore, in five countries this sole criterion to be fulfilled is related to financial conditions.³⁰

In the rest of the countries where more than one eligibility criterion for tariff subsidies can be observed, these criteria are combined in various way. For water supply services, there are two eligibility criteria in effect in Bolivia, Colombia and Guatemala, while Honduras and Uruguay set three different criteria for both services. Meanwhile, in Ecuador, there are five criteria for the water supply service and four for the sanitation service.

Thus, all the countries analyzed offer subsidies based on financial criteria to help users pay for the water supply and sanitation service, except Costa Rica and El Salvador, which only offer them for the water supply service. However, the subsidies are unevenly distributed. At one extreme, five countries offer this type of subsidy for the water supply service in more than 90% of the municipalities, while the same is true of just four countries in the case of sanitation services. At the other extreme, less than 20% of municipalities in Guatemala and Ecuador apply financial criteria for users to qualify for subsidies, for both water supply and sanitation services. There are disparities both between and within countries in the implementation of household location-based subsidies for water supply and sanitation services. For the water supply service, five countries in the sample (Colombia, Ecuador, Guatemala, Honduras and Mexico) apply this criterion, whereas only three do for sanitation (Colombia, Honduras and Mexico). In Colombia, all municipalities apply this criterion, regardless of the service, while in Ecuador only 2.5% apply it for the water supply service, and in Honduras 12% apply it for sanitation.

Subsidies related to age and disability also have a medium level of pervasiveness in the region. However, although they have been observed, they are not universal. With regard to water supply services, individuals over the age of 60 have the possibility of receiving discounts on water consumption in all Bolivian and Uruguayan municipalities, while such discounts are less common in Ecuador and Mexico, with values of 37.5% and 19.6% of municipalities, respectively. These subsidies can also be found in Honduras, but only in a very small percentage of municipalities (2.6%). For the sanitation service, the percentage of municipalities where age is set as a criterion for accessing tariff subsidies is very similar to the figure reported for water. The exception is Bolivia, where age does not open up access to discounts on sanitation, in contrast to the situation for the potable water supply service. Subsidies for people with disabilities are available in Mexico, Ecuador and Bolivia for water supply services, but only in the first two of these countries for sanitation services.

30 The countries that establish financial status as the sole criterion for accessing water supply subsidies are Brazil, Costa Rica, El Salvador, Panama and Paraguay; and it is the sole criterion for sanitation subsidies in Bolivia, Brazil, Guatemala, Panama and Paraguay.

There are no major differences between services in the percentage of municipalities in each country that apply this criterion.

Eligibility for subsidies based on the household's location in a rural area of the municipality is a criterion found in Ecuador, Mexico and Uruguay. All three countries establish this kind of criterion for both services. However, it is only significantly pervasive in Uruguay. For example, in Mexico, only 2.9% of municipalities offer this criterion in relation to water supply services, and 1.5% for sanitation services. In Uruguay, 100% of the municipalities apply it for both water supply and sanitation. The only country in the sample where single-parent family status qualifies users for access to subsidized water supply and sanitation tariffs is Mexico. However, although this possibility applies to both services, it is available in a small percentage of municipalities.

Simplicity of subsidy systems

People face administrative barriers when trying to sign up for social programs, such as lengthy application forms to fill out, and numerous or complex eligibility criteria (Herd and Moynihan, 2019). These barriers not only exclude some people from accessing said programs, but also impose a significant time cost and psychological burden on them (Thaler 2018; Finkelstein and Notowidigdo, 2019). Furthermore, ignorance of how the system works can also result in the exclusion of potential beneficiaries.

Analysis of Table 6.1 reveals the disparities in the number and focus of eligibility criteria in the countries studied. However, the presence of multiple diverse criteria at the national level is not necessarily replicated at the municipal level. Table 6.2 provides an overview of the simplicity of subsidy systems. As can be seen in this table, there are countries where a sizeable percentage of municipalities offer no subsidies of any kind, for either service. Specifically in relation to the water supply service, this situation is observed in at least half of the municipalities of Ecuador, Costa Rica, Guatemala and Honduras. With regard to the sanitation service, El Salvador joins this list. In addition to the aforementioned examples of Costa Rica and El Salvador for the sanitation service, the information on Guatemala is noteworthy. Only three in every ten municipalities offer access to discounts on the water supply tariff, and only one in ten do so for the sanitation service.

In countries where municipalities do offer subsidies for water supply and sanitation services, most choose to establish a single eligibility criterion. This strategy makes it easier to provide users with information about the subsidy system and help them understand it. An notable example is Colombia: although the table shows two criteria in effect, they actually work together, which simplifies the model for users. What is more, in Colombia it is the institutions that take on the administrative and time costs associated with the design of the dual system, rather than directly transferring these costs to citizens.

Therefore, although the presence of numerous categories of eligibility criteria at the national level could point to an overly complex subsidy system, a municipal-level analysis confirms that most countries, when offering subsidies, opt to target them solely at one type of user, regardless of the service analyzed. It is only in Bolivia where a significant percentage of municipalities have a subsidy system based on two different criteria, and only for the water supply service. Furthermore, Uruguay is the only country where a majority of municipalities (in this case all of them) combine three types of criteria. Although this does occur in Mexico and Ecuador, it is only in a small percentage of municipalities. Thus, at least in relation to targeting, the data suggest that subsidy systems in Latin America are simple in terms of the type of eligibility criteria, meaning these systems are not likely to be overly difficult for users to understand.

Table 6.2. Simplicity of subsidy systems

Country	Water Supply				Sanitation			
	0 criteria	1 criterion	2 criteria	3 or more criteria	0 criterion	1 criterios	2 criteria	3 or more criteria
Bolivia	-	31.7	68.3	-	18.8	81.3	-	-
Brazil	20	80	-	-	16.8	83.2	-	-
Colombia	-	-	100	-	-	-	100	-
Costa Rica	92.3	7.7	-	-	100	-	-	-
Ecuador	47.5	25	22.5	5	46.9	25	25	3.1
El Salvador	4.3	95.7	-	-	100	-	-	-
Guatemala	71.0	22.6	6.5	-	90.9	9.1	-	-
Honduras	53.8	41	5.1	-	52	40	8	-
Mexico	31.2	42	16.7	10.1	39.7	32.1	20.6	7.6
Panama	-	100	-	-	-	100	-	-
Paraguay	-	100	-	-	-	100	-	-
Uruguay	-	-	-	100	-	-	-	100

Country-level analysis of eligibility criteria and simplicity of subsidy systems

Provided below is a description of the availability and distribution of subsidy eligibility criteria by country.

Bolivia

In Bolivia, users have the possibility of receiving subsidies for water supply tariffs, provided they meet criteria relating to their financial status, disability status, or age.

Under Law N°1.886 of August 14, 1998, any citizen over the age of 60 who is the account holder for the water supply service is eligible for a 20% discount on the monthly bill for the first 15 m³ of water supply.

Subsidies based on financial criteria are in effect in 65.9% of the country's municipalities, while only 2.4% of the municipalities offer subsidies for households that have at least one member with a physical and/or cognitive disability.

The operator SEMAPA offers its users what is known as a “solidarity tariff”, provided they have been classified as low-income and use their residence for non-commercial purposes (RAR 383/2019). In this context, users who live in homes with no more than two rooms and have a single connection are considered low-income. In 2014, Bolivia's Authority for Supervision and Social Control of Drinking Water and Sanitation (AAPS),³¹ drew attention to the importance of applying this type of tariff to a maximum consumption level of 10 m³/month for residential users with a meter. Although it is not shown in the table, SEMAPA also establishes an implicit discount for commercial premises whose economic activity is classified as “subsistence-level” as they are subject to the residential tariff rather than the commercial one. In municipalities that have a different operator, the size and/or characteristics of the residence are used as specific eligibility criteria. However, this other operator does not offer subsidies for sanitation.

With respect to sanitation services, the percentage of municipalities that offer subsidies for financial reasons increases by more than 15% compared to the water supply service, with such subsidies offered in 80% of the municipalities. It is also worth mentioning the new national approach based on the user category assigned and the associated tariff depending on the amount of water used (Bolivia Empeña, 2020; EPSAS, 2023).

These subsidy policies in Bolivia reflect a concern about guaranteeing access to water services for households with elderly and/or economically vulnerable members and, to a lesser extent, for people with disabilities. However, when analyzing Tables 6.1 and 6.2 together, it can be seen that about 30% of municipalities only offer discounted water tariffs for people aged over 60. Moreover, the fact that no municipalities apply two criteria simultaneously indicates that the municipalities which provide subsidies to disabled users do not offer subsidies based on financial status.

Brazil

In Brazil, subsidies are granted solely for financial reasons, regardless of the type of service. It is worth pointing out that more than 80% of the municipalities in the country offer these types of benefits, without any notable distinction between services.

Most tariff structures divide residential customers into two categories: regular residential and social residential. As a result, social tariffs, both fixed and volumetric, are lower than regular tariffs, which implies a cross-subsidy that benefits the poorest families. However, no specific standards on subsidies have been established for water supply and sanitation services, especially with regard to the financial aspects of regulation. The responsibility for developing more precise standards on tariffs, subsidies and regulatory accounting lies with the regulatory agencies (Galvão and Paganini, 2008).

The predominant criterion to qualify for subsidies for both services is that the household income must not be more than three times higher than the national minimum wage. A small number of municipalities establish the floor size of the home as a criterion, along with the requirement that the house does not have a garden. In the specific case of sanitation subsidies, the criteria are more heterogeneous across municipalities. For this service, there are municipalities that impose a tighter financial criterion, stipulating a household income that is 2, 1, or even 0.5 times the national minimum wage. In some municipalities, it is not enough to comply with a strictly financial criterion. A maximum electricity consumption is established as an additional requirement; normally the limit is 80 kWh (Narzetti and Cunha-Marques, 2020). There are also municipalities where the applicant must first have registered with CadÚnico - an instrument of the Federal Government that identifies and characterizes low-income households. Furthermore, in Rio de Janeiro, a distinct criterion is established for favelas. Users in this specific area are eligible for subsidies on sanitation tariffs as long as their household income is not five times higher than the national minimum wage.

This exclusive orientation towards financial criteria implies that the subsidies are aimed at economically vulnerable households and users, although the specific requirements vary among municipalities. Since they cover the vast majority of municipalities, these subsidies have a significant reach throughout the country and, without analyzing the level of subsidy, they can be expected to contribute to reducing disparities in access to these essential services. In addition, in most cases the same type of criteria is set for both services, simplifying the subsidy system.

Colombia

In Colombia, two types of eligibility criteria are established for access to water supply and sanitation tariff subsidies: the location and financial status of households. Moreover, they are available throughout the entire country. However, the analysis of the national context shows that in practice the two criteria work as one, since the authorities classify households according to said criteria, and it is on the basis of that classification that the decision is made on whether to grant subsidies.

In Colombia, metered tariffs are often closely related to the strata system, which is a socio-economic classification system used to determine the price households pay for public services. In this regard, Law 142 of 1994, known as the "Public Services Law", establishes the legal framework for water supply and sanitation services, and includes provisions on the strata system and the subsidy mechanism to support lower-income households.

A series of socio-economic criteria are applied to establish a classification of residential properties that serves to define the six strata of households around which water supply and sanitation tariffs and subsidies are organized. Under this approach, users are classified according to the physical characteristics of their homes and the neighboring area, on the understanding that these characteristics are a reflection of their income level. Therefore, it is not an individualized system; on the contrary, it classifies residential areas according to the value of the land, based on the assumption that a dwelling and its location are an indication of social status (Directorate of Geostatistics, 2015). Thus, the two criteria used to select subsidy recipients are closely linked to the country's tariff structure, as these criteria define the different strata into which residential users of services are classified.

Each municipality is responsible for classifying the households in its jurisdiction, such that stratum 1 corresponds to the lowest income households and stratum 6 to the highest income.³² However, the municipalities apply the methods set out by the national government to carry out the stratification. These methods, which differ depending on whether they apply to urban or rural land, are updated by the National Planning Department at least every five years (DANE, 2023).

The strata serve to define which households are eligible for subsidies, as a cross-subsidization system is applied in Colombia. This system restricts the eligibility of beneficiary households to strata 1-3,³³ and includes a surcharge of up to 60% on the value of the actual tariff for households in strata 5 and 6. It is assumed that the stratum 4 tariff represents the actual cost of services, and subsidies and surcharges are established on the basis of the value of the tariff in this stratum. The surcharges and subsidies are progressive, depending on which stratum the user is in. Specifically, stratum 1 users can receive discounts of up to 70% off the tariff for the same level of consumption in stratum 4, while the discount in stratum 2 is up to 40%, and up to 15% in stratum 3.

Nonetheless, it is important to note that, although users are classified into strata by applying criteria based on the value of the residence and the place where it has been built, any person or group of people may submit a written request to the municipal council for a review of the urban or rural stratum assigned, pursuant to Article 6 of Law 732 of 2002. This is a good thing, since the criteria work in two stages, and it is the economic component of the area that is used to geographically categorize, for example, slum neighborhoods. In this respect, the law would allow errors of exclusion to be resolved, since there may be some low-income people living in areas classified as high strata. However, there do not seem to be any mechanisms to manage errors of inclusion involving people who could afford to live in areas classified as strata 1 to 3.

Furthermore, some cities in Colombia have implemented programs that guarantee citizens a subsistence level of potable water supply (*mínimo vital de agua potable*, MVAP). The Medellín city council was a pioneer in the implementation of the free MVAP program in Colombia (Table 6.3). In 2009, this provision was part of an existing program called "Medellín Solidaria", aimed at improving the conditions of families living in extreme poverty. The MVAP was later separated out from this social program and was formalized as the MVAP program through Agreement 06 of 2011, regulated in Decree 1889 of 2011. As such, it was no longer a program exclusively applicable to the

32 For more information on the strata system see Gómez-Lobo and Contreras (2003) and Cunial and Pérez-Urdiales (forthcoming).

33 Users in strata 1 and 2 are considered eligible for subsidies, although if at the time of assigning the subsidy the effective coverage of the service exceeds 95% in the district where the support is provided, subsidies may be allocated to stratum 3 (Regulatory Committee on Potable Water and Basic Sanitation, 2023)

administrative period underway at that time (2008-2011). It is currently overseen by the Public Services Management Office of the city council.

The program supports individuals enrolled in the Identification System for Potential Beneficiaries of Social Programs (SISBEN). By means of a public survey of people living in poverty, SISBEN produces a classification that is used as a basis for allocating subsidies by local and national authorities responsible for social policy. The beneficiaries must not exceed the points limit established by the administration of the Medellín city council depending on the funds available for the subsidies. In addition, people in situations of displacement can also be beneficiaries.

Elsewhere, in Bogotá, the District's public policy on water (Agreement 347 of 2008) established guidelines for guaranteeing the MVAP to residents living in conditions of vulnerability and with unmet basic needs. In this respect, the District Water Plan was adopted through Decree 485 of 2011, which established the conditions for implementing the MVAP, modified by Decree 064 of 2012.

Unlike in Medellín, the program in Bogotá was intended to provide the MVAP progressively to strata 1, 2 and 3. To date, however, the program has been implemented only for registered users³⁴ classified in strata 1 and 2. In both cases, the program has been provided to users through a recognized water service provider, and the large public utilities of both cities have played a notable role in the decision-making processes related to the implementation of the programs.

Table 6.3. Main differences between the minimum subsistence level models in Colombia

	Bogota	Medellín
Program beneficiary	Registered users classified as strata 1 and 2	Individuals classified in SISBEN who do not exceed the points limit established by the city council and those in situations of displacement
Volume of water subsidized	6m ³ /household/month = 50 l/p/d (4-person household)	2.5m ³ /person/month =83 l/p/d
Service included in the program	Water supply service	Water supply and sanitation service
Access procedure or mechanism	Automatic registration	Need to apply for it in municipal offices
Other benefits related to the program	-	Financing campaigns for users disconnected due to payment default

Costa Rica

In Costa Rica, municipalities apply financial criteria to determine the eligibility of users to access subsidized water supply and sanitation tariffs. More specifically, these subsidies seem to be available only for the water supply service, as no established criteria for sanitation have been identified. In addition, eligibility criteria have only been found in 7.69% of the municipalities.

However, Costa Rica is working to build a nationwide subsidy program. As it stands, Executive Decrees N.39.757-MINAE of 2016³⁵ and N.40711-MINAE of 2017³⁶ regulate a national system of cross-subsidies targeted at the supply of drinking water and related services, as well as the sanitation service. This program, the results of which are not yet captured in our database, is primarily aimed at providing financial support to low-income people so that they can access these essential services. The technical definition of the eligibility criteria for potential program beneficiaries is established by the State bodies responsible for social policies and programs aimed at poverty relief. The specific criteria set by the program are related to income level, household size and geographical location.³⁷

There are various reasons why our database does not capture the application of the nationwide subsidy program. One possibility is that it has not yet been implemented in all municipalities. Considering that 100% of the municipalities analyzed updated their tariff documentation in 2021 (Table 2.7, Chapter 2), it could also be the case that the utilities have not updated the information available on their website about the subsidies available and the requirements for becoming a beneficiary. In this second scenario, operators should make an extra effort to provide users with updated information.

34 Users can enroll in the SISBEN database by requesting the administration of the survey. To qualify for the SISBEN survey, individuals must meet specified conditions, including residing in a private household and possessing valid and current documents.

35 Accessible at <https://faolex.fao.org/docs/pdf/cos163078.pdf>

36 Accessible at <https://faolex.fao.org/docs/pdf/cos176525.pdf>

37 If users obtain the status of program beneficiaries, they are subsidized for 100% of the tariff up to 15m³ per registered user per month. The targeted cross-subsidization system must be financed by users who are not classified as either poor or in extreme poverty. Moreover, in order to ensure transparency, the water supply and sanitation bill should explicitly indicate the amount of the subsidy that beneficiaries receive, or the amount of the surcharge that contributing users pay.

At any rate, the existence of this national plan suggests that the data collected for Costa Rica may not be entirely representative of the subsidy situation in this country, which limits the generalizability of the results at the national level. Accordingly, this limitation should be taken into account when performing any analysis by service and at the national level.

Ecuador

In Ecuador, the wide range of criteria that allow access to subsidized water supply and sanitation tariffs reflects the aim of addressing different needs and population groups. Of the six criteria analyzed in this study, the only one that is not applied in Ecuador is the “single-parent family” criterion. However, it is important to note that there are significant differences in the extent to which the various criteria are implemented throughout the country.

The age criterion stands out as the most commonly applied in the country’s municipalities, regardless of the service. Our database indicates that around 40% of the Ecuadorian municipalities offer subsidies for people aged over 65. However, in 2019, the Organic Law of the Elderly came into force, pursuant to which people aged over 65 who are account holders of the water supply and/or sanitation service can access a discount of 50% of the value of a maximum monthly consumption of 34 m³, without having to meet any additional criteria³⁸. Therefore, given that 66.60% of the Ecuadorian municipalities analyzed have tariff documentation dating back to before 2019 (Table 2.7, chapter 2), it is possible that this criterion is underrepresented in our database, and in practice actually applies to all municipalities in the country.

Among Ecuadorian municipalities, another widespread eligibility criterion for access to subsidies applicable to both services is having a legally recognized degree of disability. This reflects an approach focused on the inclusion of people with disabilities and the need to provide them with equitable access to basic services, especially since this criterion is unrelated to additional financial requirements. However, it could be because the unaffordability of services has been identified as a barrier to improving services in households where there are people living with disabilities (Wilbur, 2022).

To a lesser extent, municipalities also extend discounts predicated on financial criteria. As shown in table 6.1, the proportion of municipalities that provide such assistance ranges between 15-17%, contingent on the nature of the service. Among the specific financial criteria, it should be noted that some municipalities distinguish between household income levels, while others differentiate based on the material from which the dwelling is constructed. Additionally, certain municipalities have specific categories for users who can provide documentary evidence of their precarious living conditions. To this end, users are generally classified into economic strata, the number of which varies across municipalities. For example, in Machala there are six strata, while in Quito there are nine.

The location of the household in rural areas of the municipality is another eligibility criterion for accessing subsidized water supply and sanitation services. However, this criterion is limited to a small percentage of municipalities. Around 5% of Ecuadorian municipalities apply this eligibility criterion for subsidies on the water supply service, while about 3% of municipalities apply it for the sanitation service. A similar situation is observed for the criterion based on the geographical location of the dwelling, although the subsidy is only available for water.

In summary, although attention is paid to the elderly and people with disabilities, it seems surprising that financial criteria are not as widely applied. Moreover, almost half of the country’s municipalities do not provide any type of subsidy, for either of the services (Table 6.2). Among the municipalities that do offer subsidies, the number of eligibility criteria tends to vary between one and two. However, a small percentage of municipalities have established subsidy systems that are accessible on the basis of three or more different criteria.

El Salvador

In El Salvador, almost all of the municipalities analyzed (95.7%) offer subsidies for water services. In contrast, no subsidies are found for the sanitation service. Furthermore, when such subsidies can be accessed, they are granted on the condition that certain financial requirements are met.

The users who are eligible to apply for discounted water tariffs are those who live in developing settlements deemed of social interest, and those who live in marginal settlements.

However, there are differences in the discount levels applied to each group. The first group receives a smaller discount than the second, but it should be noted that the final billing amount cannot be less than the minimum non-residential tariff for social interest projects or the minimum residential tariff for marginal settlements (ANDA, n.d.). This is to ensure sustainability and equity in the provision of the service, by avoiding excessively subsidized costs.

38 The full text of the law can be found at https://www.gob.ec/sites/default/files/regulations/2019-06/Documento_%20LEY%20ORGANICA%20DE%20LAS%20PERSONAS%20ADULTAS%20MAYORES.pdf

Guatemala

In Guatemala, there are differences in eligibility criteria between water supply and sanitation services. It is possible to receive a discounted water tariff if the household is located in a specific geographical area and/or meets certain financial criteria, although it should be noted that there is no single criterion that is offered in more than 20% of municipalities. For the sanitation service, only 9% of the municipalities provide some kind of subsidy. In addition, the applicable criterion in these cases is financial, and is always associated with the existence of a social tariff.

Regarding the geographical criteria, eligibility usually depends on the village or settlement in which the user lives. On the other hand, in municipalities that apply financial criteria, a very small percentage establish a social tariff for which they do not specify eligibility criteria. Instead, there is a selection system based on a case-by-case analysis that must be conducted by social services or the authority designated by the mayor (Municipality of San Juan Sacatepérez, 2021). In contrast, some municipalities opt to specifically emphasize strict socio-economic criteria, distinguishing themselves from those that offer subsidies to residential users, as opposed to other user categories.

However, the implementation of these eligibility criteria is limited, since 71% of municipalities do not have a subsidy system. In the municipalities where subsidies are offered, it is common for a single criterion to be established, while a small number of municipalities opt to simultaneously apply two criteria for access to water supply subsidies.

Honduras

In Honduras, about 45% of municipalities offer users the possibility of accessing discounts on water supply and sanitation tariffs if they meet at least one of the three established criteria related to age, the location of the dwelling or the household's financial circumstances.

Around 36% of Honduran municipalities provide subsidies for households facing financial adversity. Nevertheless, not all municipalities take the same approach to the specific requirements. Some choose to classify households into a varying number of strata³⁹ depending on household income, while in others a household's economic status is determined by the value of the dwelling. At least one in ten municipalities considers the geographical area where the dwelling is located as an eligibility criterion for subsidized water tariffs. This implies that geographical location can influence the availability and scope of subsidies for users. Except in very specific cases, in Honduras the location-based criteria are linked to the financial ones, since the municipalities establish categories of users based on the cadastral value of the dwelling or the neighborhood where it is located. The number of categories varies depending on the municipality.

In addition, a small percentage of municipalities take age into account as an eligibility criterion for subsidies, for both services.

However, most municipalities establish a single criterion for accessing subsidies; only about 10% of Honduran municipalities set two criteria simultaneously (Table 6.2). Moreover, it is striking that the percentage of municipalities that establish two eligibility criteria is slightly larger for the sanitation service than the water supply service.

Mexico

In Mexico, there is a wide range of criteria for selecting the beneficiaries of subsidized water supply and sanitation services, which are applied to both services. In general, subsidy coverage does not differ significantly between services. The most relevant difference lies in the percentage of municipalities that offer subsidies based on financial criteria, which is 5.4% higher for the sanitation service.

Despite the multiple criteria available in Mexico, they are not applied uniformly throughout the country. None of the criteria is applied in more than half of the country's municipalities. In addition to the differences in the broadly defined categories of criteria, there are also significant variations in specific cases within the country.

In terms of general categories, about 50% of municipalities apply financial criteria for sanitation, while criteria related to whether the dwelling is on rural land are observed in just over 3% of municipalities for water services. With regard to specific financial criteria, there are municipalities that set the value of the property as an eligibility criterion, while others use household income level. In some specific cases, in order to provide support to the low-income population, the operator reserves the right to grant subsidies on an exceptional basis after having carried out a socio-economic assessment. In these cases, an additional requirement is having a water meter installed.

³⁹ For example, in Distrito Central, households are segmented into five strata according to income, while in Catamas the segmentation is simpler, including only three strata

On the other hand, households in Mexico City (CDMX) are classified according to the Neighborhood Development index, which determines their value taking into account the cadastral value of the dwelling and household income. Therefore, in this area, allocation is based on the classification of the neighborhood where the dwelling is located, with the percentage of the subsidy determined by four neighborhood types: (i) worker; (ii) low; (iii) medium; and (iv) high (Soto Montes de Oca, 2015). The level of the subsidy is higher for the working-class neighborhoods and gradually decreases when moving towards the higher socio-economic status neighborhoods. However, all neighborhoods benefit in some way from subsidies (Morales-Novelo et al., 2018).

Mexico is the only country in the sample that has subsidies available for single-parent families. However, they are not widespread among municipalities: these subsidies are only available in about 4% of municipalities for the water supply service and 2% of municipalities for the sanitation service. Moreover, explicit criteria for this criterion are defined, requiring the presence of children under the age of 18 who can provide evidence of enrollment in a legally recognized public school and residence in the household (Congreso del Estado de Guerrero, 2020: 11). Furthermore, all the municipalities where this criterion is observed also apply a disability-based criterion (found in just over 18% of the municipalities for the water supply service). This could be a reflection of efforts to protect groups generally considered vulnerable, going beyond material economic difficulties. However, municipalities such as Colima and Villa de Álvarez in the State of Colima set conditions on the subsidies allocated to people with disabilities and also on age-based subsidies, placing limits on the level of monthly consumption.⁴⁰ In all cases, in order to receive the discount, documentary evidence must be provided that the requirements established under the relevant regulations are met. In addition, with the exception of disability subsidies, it must be the account holder that meets the established criteria.

To access the disability-related subsidies, the only requirement is proof of disability status, with no need to meet any additional financial criteria. The same applies in some municipalities as regards the age-related subsidies. Conversely, in other municipalities, users meeting the age requirement must also be in a situation of economic vulnerability. However, it should be noted that in cases based on age, it is an essential requirement that the person aged over 60 is the account holder.

Furthermore, subsidies based on geographical area are observed in approximately 18% of the municipalities for both services. Within this category there are municipalities that differentiate by area of the city and only offer subsidies to households that do not have a water meter, while others discriminate according to the city block where the property is located. Therefore, regardless of how restrictive the geographical criterion may be, in these cases, depending on the prevailing conditions in the area where the property in question is located.

It should be noted that there are municipalities which stipulate that users must be up to date on their payments in order to access any type of discount, regardless of whether the specific criteria described above are met. What is more, since Mexico is a federation of states, operators often refer to state laws to set the criteria for economic and social vulnerability. Therefore, even if the requirements appear to be similar, the specific details may vary depending on the applicable legislation.

As for the simplicity of the subsidy system, there are significant differences between the services, as can be seen in Table 6.2. Mexico stands out as one of the few countries where a considerable percentage of municipalities (more than 10%) apply three or more criteria to select the beneficiaries of discounts on water supply and sanitation tariffs. Although in most cases a single criterion is established for both services, it is striking that, when comparing the subsidy systems for the different services, the percentage of municipalities that establish two simultaneous criteria is higher for sanitation, while for the water supply a higher percentage of municipalities apply a single criterion.

Panama

In Panama, both services require financial criteria to be met in order to access subsidized tariffs. Moreover, subsidies are found in all the municipalities analyzed. The aim is to ensure equitable access to water supply and sanitation services, providing financial support to those users who need it.

As part of the National Public Services Authority (ASEP), the National Directorate of Electricity, Drinking Water and Sewerage sets a discounted tariffs for users living in the interior of the country and in marginal areas of the cities of Panama and Colon. Similarly, homes with tenancy and lease agreements in which the rent exceeds an established threshold can also benefit from this more affordable tariff (ASEP, n.d.).

⁴⁰ In these specific municipalities, retired people, pensioners, the elderly and people with disabilities get a 50% discount on their bimonthly or annual payment in advance or periodically, applicable to drinking water, sewerage and sanitation services, as long as their level of consumption does not exceed 25 m³ per month. If their consumption lies between 25-50 m³, the discount is reduced.

Beneficiaries are classified as special residential users. However, when examining the document that details the new tariff structure for the sanitation service, it can be seen that users from the interior of the country are billed the same prices as users in the general category. This lack of differentiation in sanitation tariffs raises questions about the effectiveness and consistency of subsidies granted to special residential users in relation to this particular service. There is a need for a more detailed analysis of the implementation of subsidies and their implications for equitable access to basic services in order to assess the effectiveness of these measures in promoting equal opportunities. The only users who are classified as having a “special” tariff are those that receive subsidies for basic consumption levels on the basis of their socio-economic characteristics. They are the ones who get discounts on both the fixed charge and in the first consumption block of the sanitation tariff (ASEP, n.d.)

Paraguay

In Paraguay, the situation is the same as in Panama. All municipalities offer subsidies based on financial criteria, without any other requirements in effect. This implies that all Paraguayan households have the possibility of accessing these subsidies for both services if they meet certain income requirements or are in a situation of economic vulnerability.

The state-run water utility Empresa de Servicios Sanitarios del Paraguay (ESSAP) has a subsidized residential category for dwellings in social-interest settlements, with the level of the subsidy varying depending on whether or not the dwelling has a micrometer (Government of Paraguay, 2022). There is also a settlement unit under the Greater Asunción Commercial Management, which establishes direct communication with the representatives and leaders of the most vulnerable communities to improve the targeting of the subsidy system.

Uruguay

In Uruguay, users of water supply and sanitation services are eligible for discounted tariffs if they meet different criteria. All municipalities provide subsidies if users meet up to three different types of requirement: age, the location of the household in a rural area, and financial circumstances.

In Uruguay, Obras Sanitarias del Estado (OSE), the state-owned water utility responsible for providing drinking water and sanitation throughout the country, created a more economical tariff aimed at the people who struggle to access drinking water and sanitation services. To be a beneficiary of the discounted tariffs, a series of specific requirements are established (OSE, n.d.). Those who are included in programs of the Ministry of Social Development (MIDES) are eligible. Among the most noteworthy programs of this ministry is the assistance for the elderly (age). The retiree or pensioner who is the account holder must prove that the household income comes exclusively from retirement and pension payments and that all these payments combined do not exceed the smallest amount on the retirement or pension scale of the Banco de Previsión Social (the Uruguayan social security institute). Specifically, these users will get a 100% discount on the water supply and sanitation bill, as long as their monthly consumption does not exceed 10 m³.

Also eligible are households that the National Directorate of Housing—part of the Ministry of Housing, Territorial Planning and the Environment (Ministerio de Vivienda, Ordenamiento Territorial y Medio Ambiente, MVOTMA)—deems to be in a situation of socio-economic vulnerability, as well as inhabitants of settlements with drinking water and sanitation networks regularized by the OSE with prior approval from the National Directorate of Territorial Planning or municipal authorities, or through MVOTMA’s Irregular Settlement Integration Program. In addition, the OSE established a special social tariff that applies only to rural villages in the interior of the country that are under participatory management (OSE, 2021). In any case, the discounts only apply to levels of consumptions below 15 m³.

In order to qualify for the collective rural tariff subsidies, the water supply service must be provided by means of water fountains installed with a standard meter, and used for residential purposes corresponding to a rural village. Furthermore, the tariff documentation applicable throughout the country specifies that the water supply service in these villages must be under participatory community management (OSE, 2021). In these cases, as with the financial criteria, the discount only applies for a maximum monthly consumption of 15 m³, with the excess per individual meter being billed according to the prices of the consumption blocks in the residential tariff for Montevideo and the Interior. In the Montevideo Department, in addition to the OSE social tariff, there is another subsidy program with specific criteria that applies only to the sanitation service. The departmental authority of Montevideo assumes the cost of a direct subsidy provided to users of the sanitation service depending on the taxable value of the property where they reside and the scales in force.⁴¹ Under these subsidized tariffs, the departmental authority pays for 35% of the variable charge for the first 10 m³, but the fixed charge is never discounted. In cases where the applicants reside in a multi-dwelling unit, the total taxable value of the property is divided by the number of occupational units it contains.

41 Decree N° 409/021 updated the calculation of the real value of property for the year 2021 by applying a ratio of 1.0741 to the real values of 2020, unless the National Directorate of the Cadastre had set a different value. Interested parties may also request a review of the real value/cadastral value of their homes.

Therefore, although there may be minor differences among municipalities regarding the specific criteria applicable, the system in Uruguay is very homogeneous across municipalities and services. That is, in all municipalities and for both services, the same type of eligibility criteria are set. Uruguay is an unusual case in the Latin American region. According to our sample data, it is not very common for the same municipality to offer subsidies on the basis of three or more criteria applied simultaneously; however, this situation occurs in all the Uruguayan municipalities. It would be interesting to further explore the question of whether this situation makes it more difficult for users to understand the subsidy system.

Availability of subsidies by tariff type

Table 6.4 allows an analysis of the availability of subsidies at the national level, differentiating between municipalities that have metered tariffs and those that do not. To facilitate the comparison between tariff types, the calculation of the percentage in each column only includes municipalities with the tariff type in question.

Table 6.4. Percentage of municipalities in each country that offer subsidies, by service and tariff type

Country	Water Supply			Sanitation			Water supply and sanitation			Availability of water supply or sanitation subsidy
	Metered	Unmetered	Total municipalities	Metered	Unmetered	Total municipalities	Metered	Unmetered	Total municipalities	Total municipalities
Bolivia	100	100	100	76.5	86.7	81.3	100	100	100	92.4
Brazil	88	48.1	80	90.2	52.2	83.2	90	0	90	81.9
Colombia	100	100	100	100	100	100				100
Costa Rica	7.7	7.7	7.7	No subsidies						4.8
Ecuador	58.8	16.7	52.5	55.2	33.3	53.1	40	50.0	42.9	48.8
El Salvador ⁴²	97.8	0	95.7	No subsidies						48.4
Guatemala	25	33.3	29	0	16.7	9.1				22.7
Honduras	30.8	53.8	46.2	50	47.1	48	100	33.3	50	47.1
Mexico	59.5	79.7	68.8	50.7	71.7		65.4	70.8	68	65.2
Panama	100	0	100	100	0	100				100
Paraguay	100	100	100	100	100	100				100
Uruguay	100	0	100	100	0	100				100
Region	77.7	60.4	72.3	71.1	62.7	68.6	68.1	68.8	68.4	70.2

When no distinction is made between services or type of tariffs (last column), it can be seen that at least seven out of ten municipalities in Latin America offer subsidies. However, there are very significant differences between countries. On the one side, there is a group of countries with widespread availability of subsidies among municipalities: in Bolivia, Brazil, Colombia, Panama, Paraguay and Uruguay, at least 80% of the municipalities offer some kind of subsidy. What is more, with the exception of Brazil, subsidies are available in 100% of the municipalities in these countries. On the other side, in Costa Rica, Ecuador, El Salvador, Guatemala and Honduras, more than half of the municipalities do not have any kind of discount on water supply and/or sanitation tariffs. The differences in the availability of subsidies in these latter countries are more significant. For example, if the search is restricted to the information available on the operators' websites, in Costa Rica we were only able to collect information on subsidies for 4.8% of the municipalities in the sample, whereas in Ecuador this figure was 48.8%.

When comparing services, irrespective of the type of tariff, three groups of countries can be identified in relation to the percentage of municipalities that subsidize each service. First, there are the countries where both services are subsidized by the same number of municipalities; namely, Colombia, Panama, Paraguay and Uruguay. Second, there are the countries where sanitation is subsidized in a higher percentage of municipalities, such as Brazil and Honduras. Third, there are the countries where the subsidies primarily apply to the water supply service, such as Costa Rica and El Salvador.

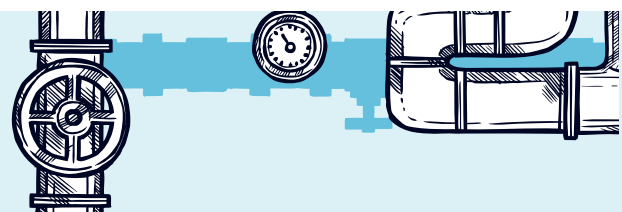
When comparing the availability of subsidies for metered and unmetered tariffs in Latin America, it can be seen that the municipalities with metered tariffs offer more access to subsidies, regardless of the service analyzed. This situation arises in five countries for each service, but there are significant differences between countries. In Colombia, Costa Rica and Paraguay, the availability of subsidies does not depend on the type of tariff, for either service.⁴³

42 Note that El Salvador only offers subsidies for the water supply service, and when tariffs are metered. However, the small percentage of municipalities that have metered tariffs for the water supply service make it difficult to provide categorical statements about the relationship between the availability of subsidies and the type of tariff.

43 Note that there are 12 countries that offer subsidies for the water supply service, and 10 countries for the sanitation service.

Among the countries where differences between tariff types are observed, there are two main groups. On the one hand, in Brazil and Ecuador there is a greater availability of subsidies in municipalities with metered tariffs, registering differences of around 40 percentage points. On the other hand, the opposite trend is observed in countries such as Mexico and Guatemala.

The availability of subsidies varies according to the type of tariff; it is more common to find subsidies in municipalities with metered tariffs



There is another group of countries consisting of those in which differences are observed relating to both the type of tariff and the service; namely, Bolivia and Honduras. In Bolivia, there are no differences in subsidy coverage between tariff types for water, while the percentage of municipalities offering subsidies for sanitation is higher among those with unmetered tariffs. In Honduras, a greater proportion of municipalities with unmetered tariffs offer subsidies for water supply services compared to those with metered tariffs, but the opposite is true for sanitation services.⁴⁴

Lastly, mention must be made of the availability of subsidies in countries where, in addition to having different types of tariffs for each service, there is combined billing of services. In these countries, the differences between the tariff types are smaller. In Brazil, the most significant differences are observed, as no municipality with unmetered tariffs offers subsidies, in contrast to 90% of municipalities with metered tariffs. Additionally, Honduras is noteworthy, with only 33.3% of municipalities with unmetered tariffs offering subsidies, compared to 100% of municipalities with metered tariffs.

Level of the subsidy

The widespread implementation of subsidies in the water supply and sanitation sector is directly related to the objective of ensuring access to these services, especially for the most vulnerable populations. These subsidies are based on and justified by solid economic foundations, as they seek to correct inequalities and guarantee that everyone is able to access essential services.

However, the effective pricing of the provision of these services is fundamental to their long-term sustainability. Establishing a fair and efficient price is critical in order to foster responsible water use, generate sufficient income for the maintenance of existing infrastructure and ensure the availability of capital to expand services to those who do not yet have access (Andres et al., 2019). It is therefore necessary to design subsidies effectively, ensuring that they reach those who really need it and avoiding distortions in the market and in the financial sustainability of the sector. As such, from an economic and social perspective, there is no reason to indiscriminately subsidize water consumption. Such subsidies should thus be targeted at basic consumption levels to avoid subsidizing water for recreational uses.

Since the 2000s, various studies have revealed flaws in the targeting of water consumption subsidies at low-income sectors in low- and middle-income countries. These flaws are related to factors such as lack of access to distribution networks and the weak correlation between water use and income (Fuente et al., 2016; Morales-Novelo, 2018). Despite this evidence, there is still a need for accurate knowledge about the scope of these subsidies and the level of consumption.

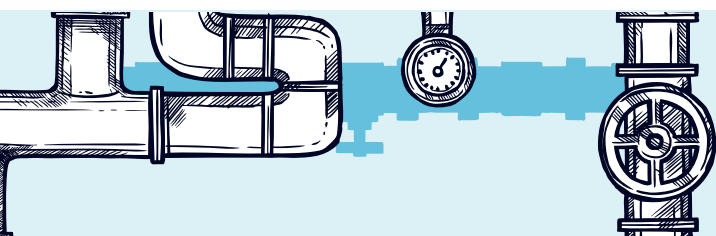
Percentage savings from subsidies relative to the standard tariff, by country

Table 6.5 presents the median values of the percentage change in water supply and sanitation bills relative to the base tariff, distinguishing between two types of tariffs: metered and unmetered. Each column of the table shows the median values corresponding to the metered and unmetered tariffs for each service, broken down by country. Within each country, a distinction is made between categories of users, such as subsidized users and those that pay a surcharge relative to the base tariff. Also shown is the percentage change relative to the base tariff taking an average bill for a family of four, using the WHO standard consumption levels, i.e. 50 and 100 l/p/d.

⁴⁴ Some countries have not been discussed in the text; this is because they only have metered tariffs and they also offer subsidies in all the municipalities analyzed.

Table 6.5. Median monthly bill discounts for representative families by stratum and country, based on basic consumption levels of 50 and 100 l/p/d

Country	Stratum	Consumption	Water Supply		Sanitation	
			Median percentage change in the bill relative to the base tariff (metered service)	Median percentage change in the bill relative to the base tariff (unmetered service)	Median percentage change in the bill relative to the base tariff (metered service)	Median percentage change in the bill relative to the base tariff (unmetered service)
Bolivia	Subsidized tariff	50 l/p/d	-68.0	-75.2	-68.0	-75.2
		100 l/p/d	-68.0	-75.2	-68.0	-75.2
	Tariff with surcharge	50 l/p/d				
		100 l/p/d				
Brazil	Subsidized tariff	50 l/p/d	-54.8	-55.2	-59.6	-81.3
		100 l/p/d	-51.5	-55.2	-59.6	-81.3
	Tariff with surcharge	50 l/p/d				
		100 l/p/d				
Colombia	Subsidized tariff	50 l/p/d	-33.2	-29.5	-34.5	-27.0
		100 l/p/d	-33.5	-29.5	-35.0	-27.0
	Tariff with surcharge	50 l/p/d	60.0	52.9	60.0	0.0
		100 l/p/d	59.3	52.9	60.0	0.0
Costa Rica	Subsidized tariff	50 l/p/d	-14.6	-16.3		
		100 l/p/d	-15.1	-16.3		
	Tariff with surcharge	50 l/p/d				
		100 l/p/d				
Ecuador	Subsidized tariff	50 l/p/d	-30.0	-90.0	-50.0	-82.5
		100 l/p/d	-25.5	-90.0	-27.7	-82.5
	Tariff with surcharge	50 l/p/d	47.1		148.3	
		100 l/p/d	5.9		148.3	
El Salvador	Subsidized tariff	50 l/p/d	0.0	0.0		0.0
		100 l/p/d	-8.1	0.0		0.0
	Tariff with surcharge	50 l/p/d				
		100 l/p/d				
Guatemala	Subsidized tariff	50 l/p/d	-48.0	-59.1		-53.3
		100 l/p/d	-47.2	-59.1		-53.3
	Tariff with surcharge	50 l/p/d				
		100 l/p/d				
Honduras	Subsidized tariff	50 l/p/d	-40.0	-52.5	-39.8	-42.9
		100 l/p/d	-40.0	-52.5	-39.8	-42.9
	Tariff with surcharge	50 l/p/d				
		100 l/p/d				
Mexico	Subsidized tariff	50 l/p/d	-47.0	-64.4	-50.5	-67.3
		100 l/p/d	-43.8	-64.4	-50.0	-67.3
	Tariff with surcharge	50 l/p/d		109.4		
		100 l/p/d				
Panama	Subsidized tariff	50 l/p/d	-44.8		-65.5	
		100 l/p/d	-44.8		-65.5	
	Tariff with surcharge	50 l/p/d				
		100 l/p/d				
Paraguay	Subsidized tariff	50 l/p/d	-35.6		-35.6	
		100 l/p/d	-33.6		-33.6	
	Tariff with surcharge	50 l/p/d				
		100 l/p/d				
Uruguay	Subsidized tariff	50 l/p/d	-53.7		-20.5	
		100 l/p/d	-43.8		-13.3	
	Tariff with surcharge	50 l/p/d				
		100 l/p/d				



Generally speaking, the level of consumption does not influence the percentage change relative to the base tariff in metered services

Users of unmetered water supply services usually receive a higher level of subsidy than those with metered tariffs. For example, in Costa Rica and Brazil, the difference between metered and unmetered services is less than 5%, while in Guatemala it is 10% and in Ecuador it is more than 40%. This trend is observed in all the countries analyzed, except El Salvador, where the difference is only recorded at consumption levels of 12 m³, since for 6 m³ the median value for the change in the tariff is 0%. On the other hand, in countries such as Panama, Paraguay and Uruguay, changes in the base tariff are only registered for metered services.

Users of unmetered water services usually receive a higher level of subsidy than users of metered services, with significant differences observed across countries



Users of unmetered sanitation services usually receive a higher level of subsidy than users with metered tariffs, but compared to the water supply service, there are more countries where this trend is reversed. In addition to Panama, Paraguay and Uruguay, where changes in the base tariff are recorded only for metered services, this situation is also observed for Honduras and Colombia. As for the differences in the level of subsidy depending on the metering of consumption, there are no significant changes in most countries. Only in Ecuador are the differences particularly striking: users with a metered service receive a bill 50% lower than the base tariff, while the subsidy relative to the base tariff is 82.5% for users of an unmetered service.

With regard to unmetered services, there are notable disparities between countries in terms of the level of subsidy, although there are no significant differences between water and sanitation services. When comparing the level of the subsidy for unmetered services in the same country, it can be seen that higher subsidies are always applied to the water supply service. The difference between water supply and sanitation services is generally less than 10%. The only exceptions are Bolivia, where there is no difference between these services, and Brazil, where the difference is about 30% for a consumption of 6 m³. Furthermore, most countries present median subsidy values of about 50% to 65% compared to the base tariff. Some values lie outside this range; for example, in Ecuador, the value reaches 90%. For sanitation, this occurs in Ecuador (>80%) and Colombia (<35%).

In municipalities with metered tariffs, for the water supply service and in the category of subsidized users, the median percentage change in the bill with respect to the base tariff ranges from 30% to 68%, regardless of the level of consumption. Only in Costa Rica and El Salvador is there a smaller change—of about 15% and 8%, respectively. In contrast, for sanitation, the median percentage change in the bill with respect to the base tariff ranges from 30% to 68%. The only exception is Uruguay, where this percentage ranges between 13% and 20%, depending on the level of consumption.

In contrast to the situation with unmetered tariffs, when metered tariffs are used the differences in the changes relative to the base tariff are greater for the sanitation service. This is the case with Colombia, Ecuador, Honduras, Mexico and Panama. In Panama, for example, the difference is 65.5% for sanitation, while for water supply it is 44.8%. The only exception is seen in Uruguay, where the difference with respect to the base tariff for metered services is greater for water.

Some countries apply surcharges to specific categories of users, while others do not apply any surcharges at all



Furthermore, the percentage change relative to the base tariff is very similar for the two consumption levels considered. In some countries, there is no difference at all, while in those where there are differences, they are usually fairly small, especially for the sanitation service. For example, in Colombia and Costa Rica, the level of the subsidy relative to the standard tariff is 1% higher for a monthly consumption of 12 m³ than for 6 m³, while in El Salvador the difference is 8%. On the other hand, in Brazil, Ecuador, Guatemala, Paraguay and Uruguay, the differences relative to the base tariff decrease as consumption increases. In some countries, this difference is very small—for example, in Mexico, where the difference is 0.5 percentage point—while in others, such as Ecuador, the median percentage change is about 23 points higher for a consumption of 50 l/p/d.

As for the surcharges relative to the base tariff for the water supply service, they are only registered in Colombia, Ecuador and Mexico. Ecuador registers the greatest difference between the base tariff and the tariff applied to this category of user for the sanitation service, while for the water supply service, the greatest difference is observed in Mexico. In the case of Ecuador, it is interesting to note that the surcharge on the water service is comparatively more substantial for users with a consumption of 50 l/p/d. In Colombia, water supply tariffs can be higher than the base tariff for both users of a metered service and users of an unmetered service. It is also worth pointing out that whereas in Colombia and Mexico the surcharge is applied after the service has been delivered, in Ecuador the surcharge is only applied in the event that the user opts for a prepaid service.

Finally, it is important to note that a considerable number of countries in the sample do not apply any type of surcharge, regardless of the service or whether consumption is metered or unmetered. This is the case with Bolivia, Brazil, Guatemala, Honduras, Panama, Paraguay, Uruguay, El Salvador and Costa Rica.

Conclusions



Conclusions

This document presents an initial comprehensive comparative exploration of the tariff structures for water supply and sanitation services in Latin America, using data on 577 municipalities in 12 countries in the region. The data presented in the previous chapters reveal that, although **countries in the region may seem similar in terms of their tariff systems**, a more detailed analysis of the tariffs uncovers **substantive cross-country differences**. The description of these differences is a critical first step for informing decision-making and guiding the design of policies that seek to balance objectives such as efficiency, equity, cost recovery and environmental conservation, while accounting for the high degree of heterogeneity in determinants of water supply and sanitation pricing in the region (Pérez-Urdiales et al., 2023).

The key conclusions and public policy recommendations are outlined below:

- For the 12 countries analyzed, **the data used in this document cover more than 90% of the municipalities included in the LAPOP survey** (representative at both the national level and also the urban and rural level) **in Brazil, Costa Rica, Mexico, Panama, Paraguay and Uruguay; more than 70% in Colombia, Salvador and Honduras; and less than 70% in Bolivia, Ecuador and Guatemala**. In the countries where fewer than 90% of the municipalities are represented in the analysis, the sample **tends to over-represent urban areas, where higher income and more highly educated individuals live**. In this respect, **greater effort needs to be made to provide information about the tariffs that apply to rural populations with lower incomes and lower educational level**.
- In most of the municipalities of the countries analyzed in this document, **water supply and sanitation services are jointly provided by the same utility, and billing is on a monthly basis**.
- **Most municipalities implement tariffs based on the metering of consumption. These tariffs are usually structured in two parts, with a fixed charge and a volumetric component**. The fixed charge associated with the water supply service represents at least 50% of the billing amount for basic consumption levels in seven countries of the sample. For billing the volumetric part, the prevalent structure used in the region is an increasing block tariff. However, despite the predominance of metered tariffs, there is still a significant proportion of the population whose consumption is not metered, making it difficult to implement tariff policies. In municipalities where tariffs are not based on metered consumption, if the unit price paid by households for the water supply service were calculated for different levels of consumption, we would observe a remarkably high price for the first consumption units, which are usually intended to cover basic needs. Furthermore, in municipalities where both metered and unmetered tariffs are in effect, the former tend to be higher on average. **Against this backdrop, progress needs to be made in terms of the percentage of the population whose consumption is metered, which will enable a more effective implementation of tariffs and a more mindful and efficient use of water**.
- **The number of blocks in the increasing block tariffs applied to metered water supply services varies widely across countries and within countries**. Mexico is the country with the highest average number of blocks as well as the greatest variability between municipalities. There is also substantial variation in terms of block size and the price per m³. These differences, together with the share of the fixed charges in the total bill, give rise to tariff structures with different levels of regressivity. While in some countries there are no significant differences in the price paid by households relative to their consumption, in other cases—such as Uruguay—billing amounts clearly rise as consumption increases. In the absence of subsidies, this penalizes households with more people. **In this regard, it would be advisable to simplify or homogenize the number and size of consumption blocks in these tariffs. This would make it easier for users to understand and calculate their tariffs, avoiding any unnecessary complexity**.
- **For metered sanitation tariffs, both the fixed charge and the unit price are usually significantly lower than those for the water supply service**. In 8 of the 12 countries studied, users pay less for the fixed charge of the sanitation service, while it is only in Costa Rica that the fixed charge is higher for the sanitation service than the water supply service. In addition, sanitation tariffs commonly have a similar number or fewer blocks than water supply tariffs. However, the extent of this simplification varies between countries. While fairly little difference is observed in Honduras, in Mexico and El Salvador the average number of blocks is reduced by half. Furthermore, most countries keep the first consumption block the same size, although there are more differences between countries and services in relation to the last block, underscoring the wide variation in tariff structures across countries. The differences in the block structures for the two services tend to be more noticeable in terms of

price than size. In all the cases studied, the price per cubic meter is lower for the sanitation service, except in Uruguay for the last consumption block. In this respect, it is important for sanitation tariffs to reflect the cost of this service, which is usually higher than the cost of the water supply service. **This would not only provide the consumer with clearer information about the service, but would also drive progress in the sanitation coverage agenda in the region.**

- **The water supply service is usually more expensive than the sanitation service when both are billed through a fixed fee tariff (unmetered tariff), regardless of whether the sanitation tariffs include drainage and/or wastewater treatment.** Only in Ecuador, El Salvador and Guatemala is the cost of sanitation lower. Among the countries where water supply is more expensive, the ratio between the fixed fee tariffs for the two services varies significantly by country. For example, in Brazil, the water supply service is generally more expensive, while in Mexico sanitation is eight times cheaper than water. Bills that specify the amount corresponding to each service are 10 PPP dollars more expensive on average than when the bill does not distinguish between services. Moreover, with the exception of Costa Rica, the sanitation service accounts for a smaller share of the bill than water supply. As stated above, **progress needs to be made in the metering of consumption in the region.**
- **The countries analyzed in this report show notable variation in their subsidies for water supply and sanitation services, in terms of eligibility criteria, coverage, and changes relative to the standard tariff:**
 - » The eligibility criteria for water supply and sanitation subsidies vary across countries in the region and between services. Six categories of criteria were identified that are used to determine eligibility for subsidies. Most countries have one or two types of criteria at the national level, but in some countries three, four, five or even all six types are observed. However, at the municipal level, most subsidy systems apply a single eligibility criterion based on the users' financial circumstances, indicating the simplicity of the systems for potential beneficiaries. That is, the decentralization of the water supply and sanitation sector is evident in countries' respective subsidies since, although there is usually a single criterion at the municipal level, the criterion applied varies across municipalities of the same country. Uruguay is an exception, as all municipalities have three criteria for both services. Colombia is the only country where all municipalities apply two different categories of criteria, although they work together as a single criterion. Differences between water supply and sanitation services in terms of the number of criteria found at the national level are only observed in Bolivia, Ecuador and Guatemala, where there are more criteria for the water supply service. The financial category is the most commonly applied in the region, but the specific criteria vary across countries. Other criteria such as age and location are more rarely observed. **Despite the simplicity of eligibility criteria at the municipal level, it is recommended that subsidy targeting studies be updated and extended to other countries in the region.**
 - » In terms of coverage and tariff types in the Latin American municipalities, seven out of ten municipalities analyzed offer subsidies for at least one of the services. In some countries, such as Colombia, Panama, Paraguay and Uruguay, all the municipalities offer subsidies for both services, while other countries such as Bolivia, Ecuador, Honduras and Mexico have a level of coverage ranging between 50% and 90%, for the individual services. Furthermore, the percentage of municipalities that offer subsidies is slightly higher for the water supply service than the sanitation service, with exceptions observed in Guatemala and Mexico. In addition, subsidies tend to be offered in a higher proportion of municipalities with metered tariffs than municipalities with unmetered tariffs, regardless of the service in question. **This finding again supports the need to make progress in metering services.**
 - » The structure and scope of the changes in subsidized tariffs vary significantly across the countries studied. In most Latin American countries, the levels of the subsidies applied to metered tariffs for water supply and sanitation entail significant savings, ranging between 8.1% and 68% depending on the country. Although cross-subsidization is widely used in Latin America, the results indicate that only in Colombia and Ecuador do tariffs explicitly show users subject to surcharges for basic consumption. **To evaluate whether these levels of savings are appropriate, there is a need for municipal-level studies of the affordability of services.**

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