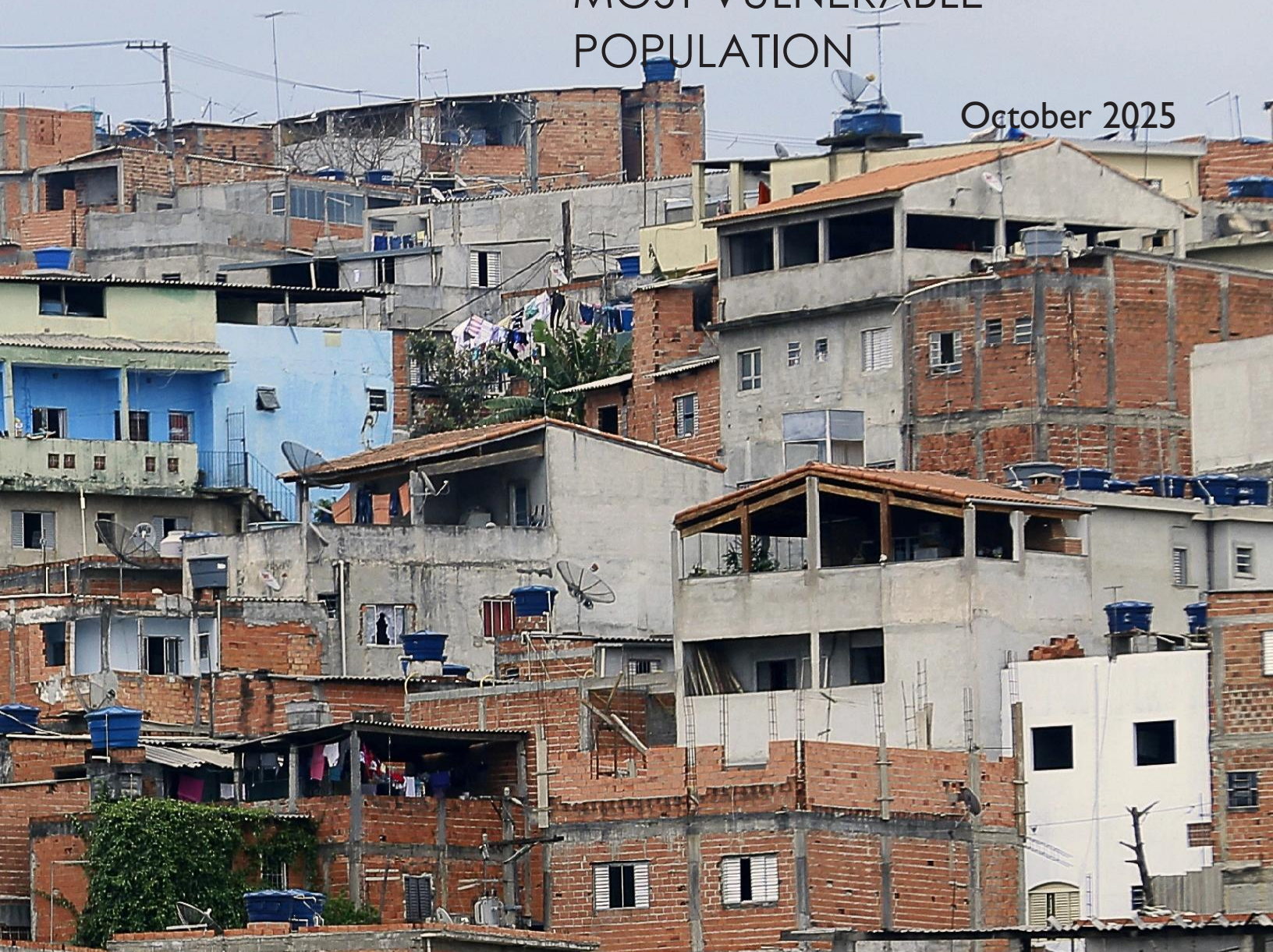


THE ECONOMIC BENEFITS OF EXPANDING SANITATION IN DISTRICTS AND INFORMAL URBAN COMMUNITIES IN THE PINHEIROS RIVER BASIN

GREATER GAINS FOR THE
MOST VULNERABLE
POPULATION

October 2025



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INTRODUCTION

1.1. CONTEXT

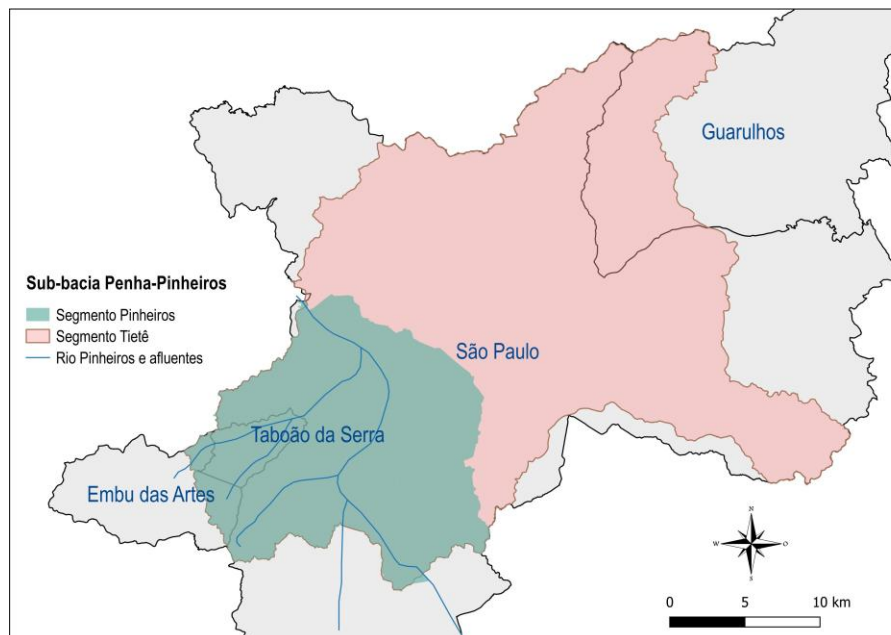
The study conducted by Instituto Trata Brasil, published in June 2025, evaluated the balance between costs and benefits of universalizing sanitation in the Pinheiros River Basin, which covers part of the Metropolitan Region of São Paulo. Within the basin are the municipality of Taboão da Serra and portions of the cities of Embu das Artes and São Paulo, encompassing a population of 3.238 million people. This population represents 27% of the inhabitants of the three cities, living within a territorial area of 275.5 km². Population density reached 11,755 inhabitants per km² in 2022, one of the highest rates in the entire country.

The document emphasized the economic impacts of the Novo Rio Pinheiros Project, a sanitation intervention carried out

by a consortium of public and private entities of the state of São Paulo between 2019 and 2022. The Novo Rio Pinheiros Project was part of the sanitation universalization process in the Basin, with a specific focus on cleaning up the Pinheiros River by directing residential sewage produced in the region for treatment. Part of the sewage generated began to be collected from residences in the region and was routed through the network to the Barueri Wastewater Treatment Plant. Another portion of the sewage, specifically from homes in favelas and informal urban communities, was treated at five Recovery Units installed in tributary streams of the Pinheiros River.

The study identified significant improvements in sanitation in the Pinheiros River Basin between 2000 and 2022, during which

Map I.I The Penha-Pinheiros Sub-basin and its segments



Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

water supply service coverage increased from 94.5% to 99.4% of the population, and sewage collection coverage rose from 82.3% to 96.7% of the population. During this period, the volume of treated sewage increased from 24.5 m³ per inhabitant in 2000 to 44.1 m³ per inhabitant in 2022. The growth rate of the water supply network reached 1.8% per year, while the sewage collection network grew 1.9% per year, rates that exceeded demographic expansion in the cities.

The estimated gains from the improvement of sanitation were substantial. Between 2000 and 2022, the benefits received by residents of the basin totaled BRL 25.0 billion, with social costs of BRL 17.0 billion.

Table I.I. Population of the Pinheiros River Basin, 2022

	Total Population	Living in the Pinheiros River Basin	(%)
Total of the three cities	11,976,232	3,237,992	27.0%
Embu das Artes	250,691	166,892	66.6%
São Paulo	11,451,999	2,797,558	24.4%
Taboão da Serra	273,542	273,542	100.0%

Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

Thus, benefits exceeded social costs by approximately BRL 8.0 billion, corresponding to an average annual gain of BRL 362 million. In addition to the benefits obtained in the past, the significant improvement in sanitation in this region has left a positive legacy for the 3.238 million people who live in the Pinheiros River Basin. A net gain of BRL 8.1 billion is estimated for the post-2022 period, a remarkable legacy of the near-universalization of sanitation in the basin. This amount results from the comparison of future gross benefits, estimated at BRL 17.1 billion, and future social costs of BRL 9.0 billion.

1.2. OBJECTIVE AND METHOD

This new study deepens the analyses developed in the June publication, evaluating the distribution of benefits across different areas of the Pinheiros River Basin and among specific population segments. From a geographic perspective, the study analyzes information related to the districts that make up the basin and the informal urban communities within it. From a social-segment perspective, the study evaluates the situation of women, children and youth, and older adults.

Cities, districts, and communities of the Pinheiros River Basin

The Pinheiros River is the main tributary of the Tietê River within the Penha-Pinheiros Sub-basin, the most populated area of the Alto Tietê Basin. As shown in **Map I.1**, this segment of the Penha-Pinheiros Sub-basin occupies the southwest region, beginning in areas near the Guarapiranga and Billings reservoirs and extending toward the Tietê River. In the Pinheiros River Basin, 3.238 million people lived in 2022, distributed among three cities:

Embu das Artes, São Paulo, and Taboão da Serra. **Table I.1** shows the population distribution of the Pinheiros River Basin among the three cities it encompasses. In 2022, out of the 3 million inhabitants of this hydrographic basin, 2.798 million lived in the city of São Paulo, accounting for 86.4% of the total population of the basin. This means that approximately one in every four residents of São Paulo lived in households located within the Pinheiros River Basin. The second city with the largest share was Taboão da Serra, a city entirely located within the basin. There, about 274 thousand people lived, representing 8.4% of the basin's total population. Finally, 5.2% of the Pinheiros River Basin's population, or 167 thousand people, lived in Embu das Artes. This number corresponded to 66.6% of the city's total population in 2022.

Map I.2 shows the districts of the Pinheiros River Basin. According to IBGE's classification, the cities of Embu das Artes and Taboão da Serra each have only one district. In these two cases, the district-level distribution of benefits presented in this chapter follows the same distribution used for the municipalities themselves, meaning that the values assigned to each city are equivalent to district-level values. In the case of the city of São Paulo, there are 29 districts within the Pinheiros River Basin, of which 12 are partially included and 17 are fully included in the basin. For the districts that are only partially included, the distribution of benefits took census tracts into account, offering a greater level of geographic breakdown. This means that only the share of the population residing in those districts was included in the distribution.

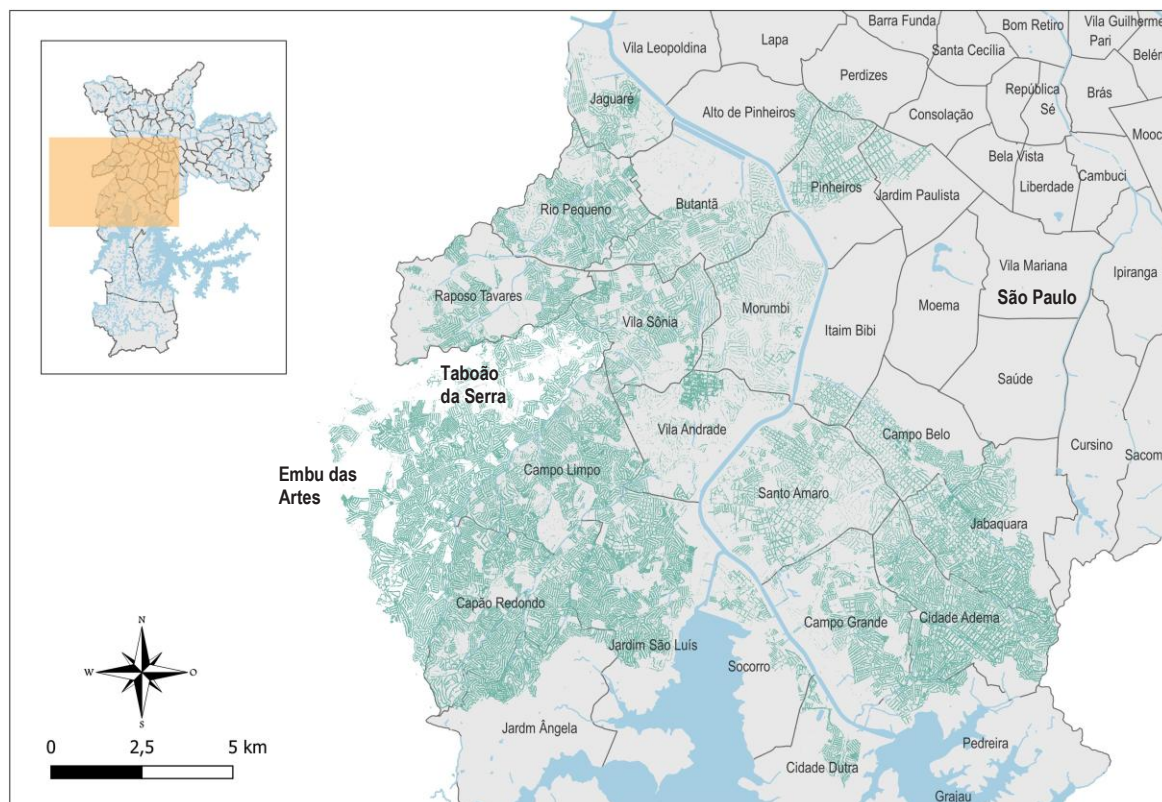
All sanitation interventions (water and sewage) of the Novo Rio Pinheiros Project took place entirely within the Pinheiros River Basin, as

Map I.2 Districts in the Pinheiros River Basin



Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

Map I.3 Intervention Points of the Novo Rio Pinheiros Project, 2020 to 2022



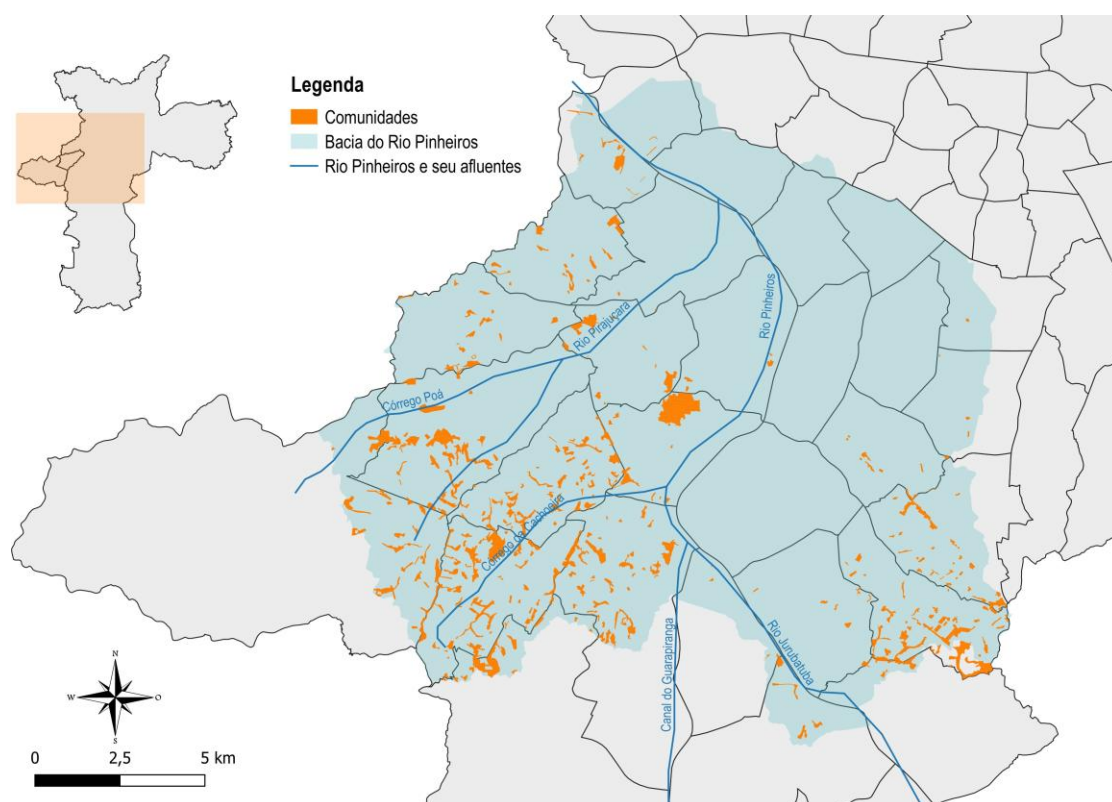
Source: Sabesp and IBGE. Prepared by: Ex Ante Consultoria Econômica.

illustrated in **Map 1.3**. The map shows the location of households, commercial, industrial, and service establishments whose sewage began to be collected and sent for treatment at the Barueri WWTP as a result of the works carried out between 2020 and 2022.

In total, 890,070 residential and non-residential units were connected to the sewage collection network, increasing the volume of sewage collected and sent for treatment at the WWTP. Of the 29 districts analyzed, only 5 did not receive interventions: Moema, Saúde, Vila Mariana, Lapa, and Vila Leopoldina. However, they still experienced improvements in sanitation between 2000 and 2022 and, therefore, observed benefits and costs during this period.

Finally, **Map 1.4** identifies the informal urban communities located within the Pinheiros River Basin, which will be evaluated in this study. In the map, the urban areas containing communities are shown in orange. In the Pinheiros River Basin, there was a wide dispersion of communities, with few larger urban clusters. Among them, the community of Paraisópolis, located in the district of Vila Andrade, stands out, occupying a larger continuous area. There are also some concentrations in the southeastern part of the basin, most of them situated along the region's watercourses, such as the Água Espraiada Stream. In the southwestern region, the dispersion is greater, but again the communities are arranged along local watercourses – such as Alto Pirajuçara, for example.

Map 1.4 Informal urban communities in the Pinheiros River Basin



Measurement of benefits

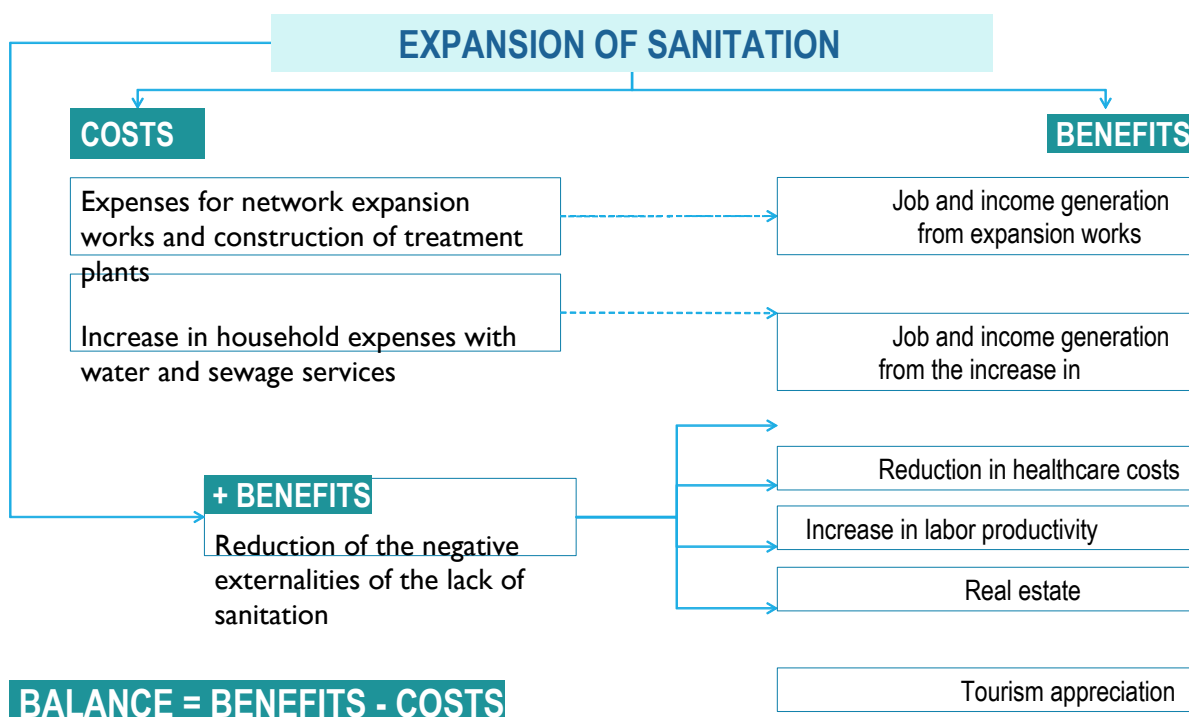
As in the study published in June 2025, this study analyzes the impacts of the lack of sanitation on public health, with emphasis on the incidence of waterborne and respiratory disease. It examines the effects of these diseases on labor productivity, education among children and adolescents, and environmental valuation. These methodological approaches are described in detail in the publication “*Methodological Aspects of Social Cost-Benefit Analysis for Sanitation Investments*”, produced by Instituto Trata Brasil in 2023, which provides the theoretical foundation for the analyses on this topic.

The analytical framework follows the concepts summarized in **Figure 1.1**. The main objective of the analysis is to compare the social costs of sanitation expansion with the benefits gained by

society through the expansion of services. The costs are measured directly and consider the investments made for the expansion and maintenance of water supply and sewage collection networks, the construction and maintenance of water and sewage treatment plants, and the installation and maintenance of all equipment necessary for system operation. In addition to these capital expenditures, which are borne by system operators, the expansion of sanitation also leads to increased household expenses to cover the system’s operational costs.

These costs, however, generate direct benefits, insofar as the expenditures of one part of society represent revenues for the companies that produce the goods and services related to these investments, such as construction firms and manufacturers of machinery, equipment, and construction materials, as well as for the companies that operate

Figure 1.1
Methodological Framework



sanitation systems, producing and distributing treated water and collecting and treating sewage. In this sense, these costs involve financial resources that circulate within society but remain in the economy, generating jobs and income. From this increase in capital and the growth of operations, therefore, direct benefits are generated for society.

In addition to the direct benefits, the expansion of sanitation brings with it the reduction of negative externalities that exist due to the lack of sanitation. These negative externalities include the expenses incurred by society as a result of diseases that affect the health of populations without access to sanitation, such as waterborne diseases and respiratory illnesses (such as flu and pneumonia). The occurrence of these diseases causes people to be absent from their routine activities and, in more severe cases, to be bedridden or hospitalized, often leading to very serious health conditions that may result in death.

Thus, the incidence of these diseases generates healthcare expenses, affects worker productivity, reduces school performance among children and young people, and causes environmental devaluation, with consequences for the real estate market and economic activities such as tourism. On the other hand, the advancement of sanitation effectively reduces the incidence of these diseases, allowing for a reduction in healthcare costs, an increase in labor productivity, appreciation of real estate, and growth in tourism. The progress of sanitation therefore brings indirect benefits through the reduction of negative externalities, positively affecting the balance between the costs and social benefits of these undertakings.

The demographic and socioeconomic data for the present study come from IBGE databases. Sanitation statistics are sourced from the National Sanitation Information System (SNIS), supplemented with specific information about the project provided by Sabesp at the request of Instituto Trata Brasil. In addition to sanitation data, several IBGE surveys are used: the 2019 National Health Survey, the 2021 Brazilian National Accounts, the 2022 Annual Survey of Construction Industry, the 2022 Annual Survey of Services, the 2023 Continuous National Household Sample Survey, and the 2000, 2010, and 2022 Population Censuses. Information on the number and costs of hospitalizations due to waterborne and respiratory diseases covered by the Unified Health System (SUS) comes from DATASUS, as do mortality data. Information on ENEM performance was obtained from INEP (National Institute for Educational Studies and Research) of the Ministry of Education.

Field research

In this new initiative, in addition to data from official statistical sources, information was also collected through a field survey designed to gather data on the perception of well-being among families living in some of the informal urban communities located within the Pinheiros River Basin. This initiative generated information that complements the 2022 Census data and the surveys used in the social benefit-cost analysis, which help to understand the profile of the most vulnerable populations in the Pinheiros River Basin.

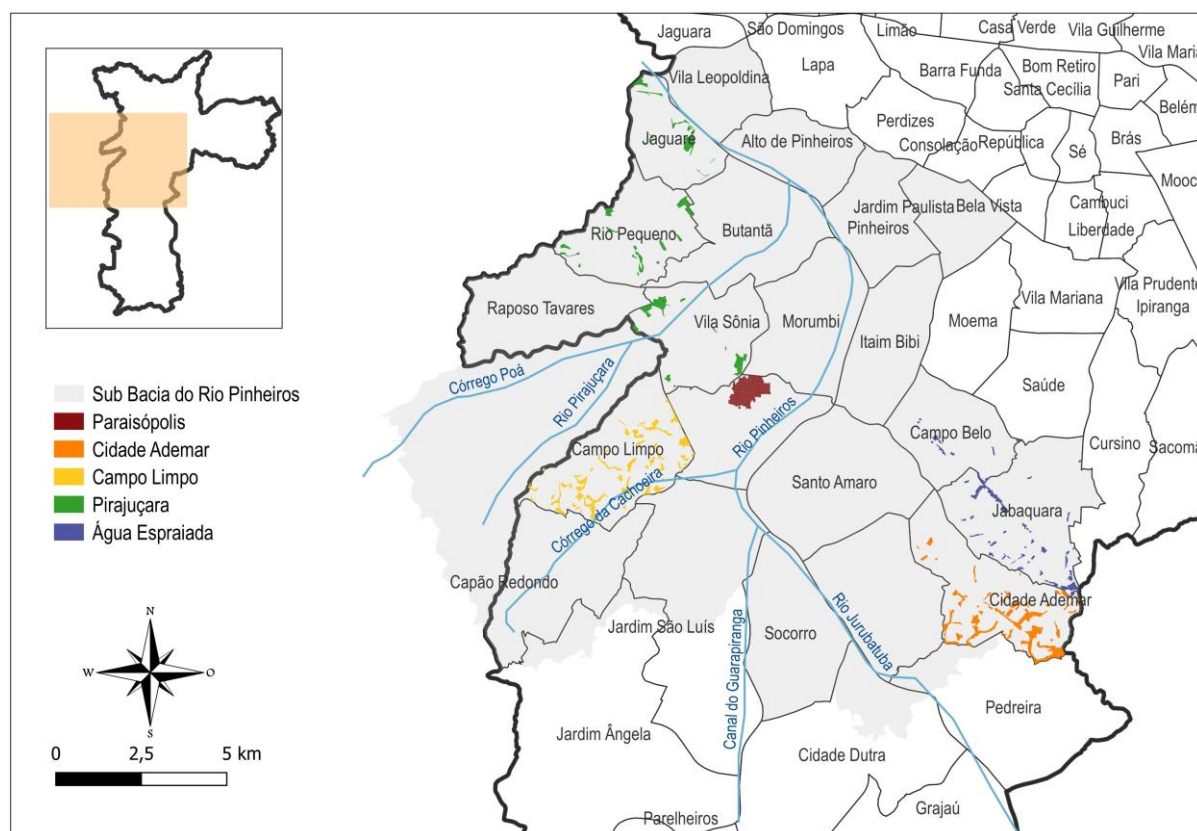
The survey was conducted by the company Favela Diz between April and May 2025 and collected information from 1,300 households in five areas of the city of São Paulo. These interviews collected information from 3,846 residents living in the areas marked in orange on **Map 1.5**. The central brown area corresponds to the Paraisópolis community, where information was collected from 434 households. In the orange and blue areas – located in the districts of Cidade Ademar, Jabaquara and Campo Belo – another 433 interviews were conducted, and in the yellow and green areas – located in the districts of Campo Limpo, Vila Sônia, Rio Pequeno and Jaguaré – the remaining 433 interviews were conducted. Methodological Annex I describes

the statistics and characteristics of the universe of dwellings in these communities, and Methodological Annex 3 presents the sample characteristics.

The questionnaire, detailed in Methodological Annex 2, collected information about the dwellings and residents of the region across six dimensions:

- (i) Personal characteristics of the respondents;
- (ii) Personal characteristics of the residents;
- (iii) Characteristics of the dwellings;
- (iv) Population health;
- (v) Living conditions; and
- (vi) Perception of well-being.

Map 1.5 Informal urban communities in the Pinheiros River Basin



Source: IBGE Prepared by: Ex Ante Consultoria Econômica.

1.3. Analysis outline

Chapter 2 of the report describes the demographic situation and the evolution of sanitation in the 31 districts whose territory belongs to the Pinheiros River Basin from 2000 to 2022. In this analysis, populations with and without access to sanitation services are identified, as well as the distribution of the gains from sanitation universalization among the populations of these districts, considering both past gains and future gains that represent the legacy of universalization already achieved.

Chapter 3 focuses on the population living in informal urban communities

within the Pinheiros River Basin. This population, composed of lower-income families, grew at a faster pace than the average population of the Pinheiros River Basin, in areas lacking sanitation services, at a time when most neighborhoods in these cities were already approaching universalization. Thus, informal communities ended up concentrating the deficits in access to treated water and sewage collection. In this chapter, in addition to discussing demographic and sanitation progress in these communities between 2000 and 2022, the distribution of gains among the communities is estimated, highlighting the greater per capita benefits received by these residents. An important



finding of this analysis is that the most vulnerable population received relatively greater benefits than the rest of the population.

Next, the study examines the situation of women living in the Pinheiros River Basin. Women, as analyzed in Instituto Trata Brasil's study (2023) on the subject, are relatively more affected than men by the lack of sanitation. This occurs mainly due to behavioral reasons. Women are primarily responsible for household chores and for caring for their families. When the lack of sanitation affects their families, the greatest cost in terms of loss of well-being falls on them. The analysis revealed that the situation of women living in the Pinheiros River Basin in 2000 was relatively better than that of men with respect to access to basic sanitation services. For this reason, the per capita benefits from the expansion of sanitation between 2000 and 2022 were relatively smaller than those observed for the male population, even though, in absolute terms, the estimates point to very significant values.

Finally, **Chapter 5** presents the main results of the field research conducted to complement the quantitative analyses carried out for this study. The field research provided information on disease incidence and the perception of well-being among residents of informal urban communities in the Pinheiros River Basin, which are analyzed in the first section of the chapter. Next, the chapter analyzes residents' perceptions of well-being and of the impacts of sanitation universalization in these informal urban communities in the Pinheiros River Basin. Lastly, the chapter examines the perceptions of six personas, defined by age and gender groups, which show significant variation in perception among residents of these informal urban communities. The personas are: women aged 50 or older; men aged 50 or older; women aged 30 to 49; men aged 30 to 49; women aged 16 to 29; and men aged 16 to 29. The chapter also assesses the factors that determine the stance of each persona.

DISTRIBUTION OF THE BENEFITS OF SANITATION ADVANCEMENT AMONG DISTRICTS IN THE PINHEIROS RIVER BASIN FROM 2000 TO 2022

2.1. EVOLUTION OF SANITATION SERVICE COVERAGE RATES

According to data from the 2022 Population Census, and considering the methodology used to aggregate municipal information into indicators for the Pinheiros River Basin, 99.4% of the population in the Pinheiros River Basin had access to water supply services and 96.7% had access to sewage collection services in their homes in 2022. These results reflect the progress made between 2000 and 2022. During this period, 589 thousand people gained access to treated water supply, and 840 thousand people gained access to sewage collection services at home through collection networks.

Table 2.1 shows demographic changes from 2000 to 2022 and the status of basic sanitation in the cities and districts that make up the Pinheiros River Basin during those years. In addition to population data,

the table presents statistics on the number of people served by treated water distribution and sewage collection systems, as well as the number of people incorporated into the basic sanitation system during these 22 years.

One important aspect to note is that, despite the demographic growth observed between 2000 and 2022 in the Pinheiros River Basin, there were several districts where the population declined during this period. These were the cases of Alto de Pinheiros, Butantã, Cidade Dutra, Jardim Paulista, and Socorro. Although these reductions were small, they help explain declines in the number of residents served by water supply and sewage collection systems in some districts of the basin. Overall, however, there was a strong movement of inclusion of residents into water supply and sewage collection systems. In the districts of Embu das Artes and Taboão da Serra, 34.0 thousand and 75.9 thousand residents, respectively, were incorporated into the water supply system, and 83.2 thousand and 128.0 thousand residents were incorporated into the

Table 2.1

Population served by sanitation, Pinheiros River Basin, 2000 and 2022

Cities and districts	Total population			Water supply			Sewerage collection		
	2000	2022	Variation	2000	2022	Variation	2000	2022	Variation
Embu das Artes	132,997	166,892	33,895	132,432	166,892	34,460	58,271	141,492	83,222
São Paulo	2,452,145	2,797,558	345,413	2,299,645	2,777,792	478,148	2,093,686	2,722,426	628,740
Alto de Pinheiros	43,579	37,011	-6,568	42,693	36,979	-5,714	43,724	37,724	-6,000
Butantã	52,089	50,689	-1,400	51,019	50,549	-469	51,212	51,164	-48
Campo Belo	66,228	70,273	4,045	64,463	69,719	5,256	62,362	71,440	9,078
Campo Grande	91,023	115,822	24,799	89,088	115,798	26,710	85,786	117,747	31,961
Campo Limpo	190,822	235,599	44,777	185,955	234,728	48,773	159,932	225,014	65,082
Capão Redondo	239,448	270,503	31,055	232,882	270,348	37,466	190,255	257,574	67,319
Cidade Ademar	241,936	248,858	6,922	234,973	248,917	13,944	199,530	238,688	39,158
Cidade Dutra	31,466	30,228	-1,239	30,594	29,969	-625	28,046	29,205	1,159
Itaim Bibi	81,003	100,867	19,864	79,376	100,753	21,377	81,307	102,790	21,483
Jabaquara	162,156	164,065	1,908	158,275	163,916	5,641	146,470	157,908	11,438
Jaguari	37,244	48,588	11,344	36,414	48,584	12,170	27,499	47,924	20,425
Jardim Ângela	58,410	74,110	15,700	54,614	73,555	18,941	36,332	68,396	32,064
Jardim Paulista	83,010	81,687	-1,323	81,055	81,579	524	81,832	83,167	1,335
Jardim São Luís	213,664	232,803	19,139	207,062	232,589	25,527	188,700	225,985	37,285
Lapa	4,877	6,165	1,288	4,774	6,164	1,390	4,838	6,278	1,439
Moema	71,126	81,714	10,588	69,681	81,351	11,670	70,913	83,306	12,393
Morumbi	34,170	43,586	9,416	33,271	43,458	10,186	31,393	43,949	12,556
Pedreira	18,285	23,509	5,224	17,640	23,257	5,617	8,765	21,832	13,067
Perdizes	4,281	4,307	26	4,195	4,309	114	4,282	4,394	112
Pinheiros	62,378	64,928	2,550	61,120	64,910	3,790	62,234	66,160	3,925
Raposo Tavares	90,083	117,279	27,196	87,555	116,657	29,101	84,437	112,595	28,158
Rio Pequeno	111,324	131,434	20,110	108,904	130,991	22,087	97,615	124,435	26,820
Saúde	48,867	53,225	4,358	47,870	53,076	5,206	48,871	53,962	5,091
Santo Amaro	59,315	84,557	25,242	58,094	84,482	26,388	58,608	86,133	27,525
Socorro	20,953	20,509	-444	20,498	20,494	-3	20,778	20,607	-170
Vila Andrade	73,352	168,378	95,026	71,646	165,116	93,470	53,323	160,788	107,465
Vila Leopoldina	21,653	38,521	16,868	20,970	38,541	17,571	21,341	39,292	17,951
Vila Mariana	62,208	64,422	2,214	60,928	64,172	3,243	62,509	65,711	3,202
Vila Sônia	86,685	123,626	36,941	84,035	122,832	38,797	80,791	118,259	37,468
Taboão da Serra	197,644	273,542	75,898	197,460	273,542	76,082	138,222	266,203	127,981
Pinheiros River Basin	2,782,786	3,237,992	455,206	2,629,537	3,218,226	588,689	2,290,178	3,130,122	839,943

Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

sewage collection system. In the city of São Paulo, the districts with the largest demographic contingents incorporated into the system were Vila Andrade, Campo Limpo, Vila Sônia, Capão Redondo, Raposo Tavares, Santo Amaro, Campo Grande, Rio Pequeno, Itaim Bibi, and Jardim São Luís. For sewage collection, the districts of Cidade Ademar and Jardim Ângela must also be added to this list.

Table 2.2 shows the coverage rate of basic sanitation services in the cities and districts that make up the Pinheiros River Basin in 2000 and 2022. In addition to the rates, the table presents

the evolution of the share of the population served by treated water distribution and sewage collection systems over these 22 years. On average, the coverage rate for water supply services increased by 4.9 percentage points between 2000 and 2022. The districts of Embu das Artes and Taboão da Serra showed small improvements, but the districts in the city of São Paulo recorded an increase of 5.5 percentage points. Of these, 13 districts experienced small declines in coverage rates, while 16 showed increases.

Table 2.2. Population

served by sanitation, Pinheiros River Basin, 2000 and 2022

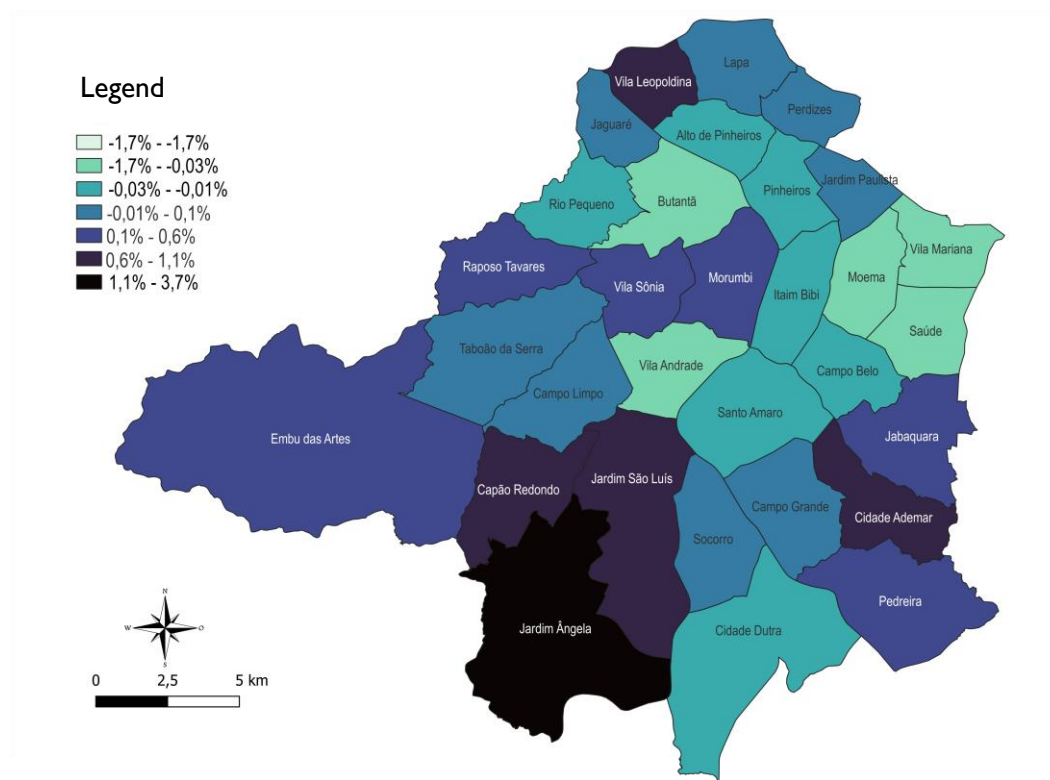
Cities and districts	Water	supply	a	Sewage collection		
	2000	2022	Variation	2000	2022	Variation
Embu das Artes	99.6%	100.0%	0.4%	43.8%	84.8%	41.0%
São Paulo	93.8%	99.3%	5.5%	85.4%	97.3%	11.9%
Alto de Pinheiros	100.0%	99.8%	-0.2%	99.6%	99.7%	0.1%
Butantã	99.9%	99.6%	-0.3%	97.6%	98.8%	1.2%
Campo Belo	99.3%	99.1%	-0.2%	93.5%	99.5%	6.0%
Campo Grande	99.9%	99.9%	0.0%	93.6%	99.5%	5.9%
Campo Limpo	99.4%	99.5%	0.1%	83.2%	93.4%	10.2%
Capão Redondo	99.2%	99.8%	0.6%	78.9%	93.2%	14.3%
Cidade Ademar	99.1%	99.9%	0.8%	81.9%	93.8%	12.0%
Cidade Dutra	99.2%	99.0%	-0.2%	88.5%	94.5%	6.1%
Itaim Bibi	100.0%	99.8%	-0.2%	99.6%	99.7%	0.1%
Jabaquara	99.6%	99.8%	0.2%	89.7%	94.2%	4.5%
Jaguari	99.8%	99.9%	0.1%	73.3%	96.5%	23.2%
Jardim Ângela	95.4%	99.1%	3.7%	61.7%	90.3%	28.5%
Jardim Paulista	99.6%	99.7%	0.1%	97.9%	99.6%	1.8%
Jardim São Luís	98.9%	99.8%	0.9%	87.7%	95.0%	7.3%
Lapa	99.9%	99.9%	0.0%	98.5%	99.6%	1.2%
Moema	100.0%	99.4%	-0.5%	99.0%	99.7%	0.8%
Morumbi	99.4%	99.6%	0.2%	91.2%	98.7%	7.5%
Pedreira	98.4%	98.8%	0.4%	47.6%	90.9%	43.3%
Perdizes	100.0%	99.9%	-0.1%	99.3%	99.8%	0.5%
Pinheiros	100.0%	99.8%	-0.1%	99.0%	99.7%	0.7%
Raposo Tavares	99.2%	99.3%	0.2%	93.0%	93.9%	0.9%
Rio Pequeno	99.8%	99.5%	-0.3%	87.0%	92.6%	5.6%
Saúde	100.0%	99.6%	-0.4%	99.3%	99.2%	-0.1%
Santo Amaro	99.9%	99.8%	-0.2%	98.1%	99.7%	1.6%
Socorro	99.8%	99.8%	0.0%	98.4%	98.3%	-0.1%
Vila Andrade	99.7%	97.9%	-1.7%	72.2%	93.4%	21.3%
Vila Leopoldina	98.8%	99.9%	1.1%	97.8%	99.8%	2.0%
Vila Mariana	99.9%	99.5%	-0.5%	99.7%	99.8%	0.1%
Vila Sônia	98.9%	99.2%	0.3%	92.5%	93.6%	1.1%
Taboão da Serra	99.9%	100.0%	0.1%	69.9%	97.3%	27.4%
Pinheiros River Basin	94.5%	99.4%	4.9%	82.3%	96.7%	14.4%

Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

Map 2.1 shows the evolution of the share of the population served by water supply services in the Pinheiros River Basin between 2000 and 2022. In the map, the darker colors indicate the districts with the largest percentage point increases in sanitation service coverage. More intense expansions can be seen in the southwestern and southeastern areas of the basin. In the northern area, only the district of Vila Leopoldina recorded a more significant increase.

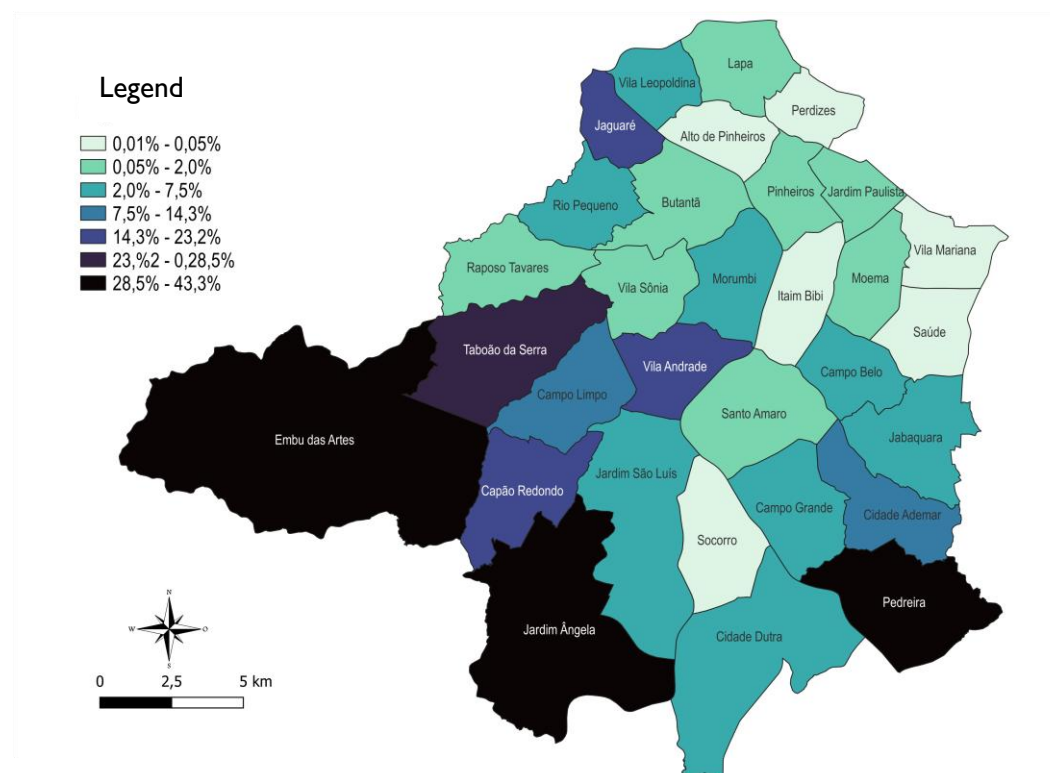
Regarding sewage collection coverage, there was expansion in 29 of the 31 districts of the Pinheiros River Basin, with an average increase of 14.4 percentage points between 2000 and 2022. The districts of Embu das Artes and Taboão da Serra showed large improvements, and among the districts in the city of São Paulo, the highlights were: Pedreira, Jardim Ângela, Jaguaré, and Vila Andrade. **Map 2.2** shows the evolution of the share of the population served by sewage collection services.

Map 2.1 Evolution of the share of the population served by water supply services, Pinheiros River Basin, 2000 to 2022



Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

Map 2.2 Evolution of the share of the population served by sewage collection services, Pinheiros River Basin, 2000 to 2022



Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

2.2. EVOLUTION OF WATER AND SEWAGE VOLUMES

Based on SNIS data, estimates were made regarding the growth in the volumes of water consumed, sewage collected, and sewage treated in the three cities. The estimates are shown in **Charts 2.1 to 2.4**.

On average across the basin, the volume of water consumed per inhabitant remained stable during this period; however, increases were observed in the cities of Embu das Artes and Taboão da Serra, which were offset by a slight decline in the districts of the city of São Paulo. This reduction reflected decreases in distribution losses and increased consumption efficiency, resulting from behavioral and technological changes, such as the introduction of reuse water for gardens.

The volume of sewage collected increased over the period, rising from 110.5 liters per inhabitant per day to 125.7 liters per inhabitant per day (**Chart 2.2**). This reflects the expansion of the sewer network in the three cities. Taboão da Serra and Embu das Artes showed faster expansion rates than the districts of São Paulo included in the Pinheiros River Basin.

The estimates also indicate an increase in the volume of sewage treated (**Chart 2.3**). Between 2000 and 2022, the volume of treated sewage in the Pinheiros River Basin increased from 67.1 liters per inhabitant per day to 120.7 liters per inhabitant per day. In Embu das Artes and Taboão da Serra, the expansion started from zero in the year 2000. In the districts of São Paulo, the volume nearly doubled. These three movements can be summarized in **Chart 2.4**, which shows the evolution of the ratio between the volume of treated sewage and the volume of water consumed between 2000 and 2022. On average across the Pinheiros River Basin, this ratio increased from 39.6% in 2000 to 71.3% in 2022, which can be considered relatively high, since part of the water distributed is lost in the network and another part evaporates or

is absorbed into the soil before returning to the sewer network. In the city of São Paulo, this ratio reached 73.1% in 2022.

2.3. DISTRIBUTION OF BENEFITS AMONG DISTRICTS IN THE PINHEIROS RIVER BASIN

Table 2.3 presents the net benefits of sanitation expansion in the Pinheiros River Basin between 2000 and 2022. The values include both the gains already observed in the past and those expected for the future. The table also shows total gains and values per inhabitant in each district.

Considering the basin as a whole, the net benefits from sanitation universalization reached BRL 16.0 billion, with approximately 50% already observed and 50% expected in the future. Most of these gains are concentrated in the districts of the city of São Paulo: BRL 13.4 billion, or 83.6% of the total. Taboão da Serra recorded estimated gains of BRL 2.2 billion (13.6% of the total) and Embu das Artes recorded BRL 1.1 billion (7.1% of the total). In the city of São Paulo, the districts with the highest net benefits were: Vila Andrade, Capão Redondo, Cidade Ademar, Campo Limpo, Jardim São Luís, and Jardim Ângela. In general, the highest gains occurred in the more peripheral areas of the city, as shown in **Map 2.3**.

Despite the concentration in the districts of São Paulo, it is important to note that per capita benefits are higher in the cities of Taboão da Serra and Embu das Artes, which are precisely the cities that incorporated proportionally more residents into the sanitation system over these 22 years. While the average gains per inhabitant for the population living in the Pinheiros River Basin are estimated at BRL 5.3 thousand, in Embu das Artes they reach BRL 7.6 thousand, and in Taboão da Serra, BRL 9.4 thousand. Among the districts in the city of São Paulo, the more peripheral areas in the southeast and southwest regions show the highest estimates of benefits per inhabitant, particularly the districts of Pedreira, Vila

Chart 2.1

Volume of water consumed, in liters per inhabitant per day, Pinheiros River Basin

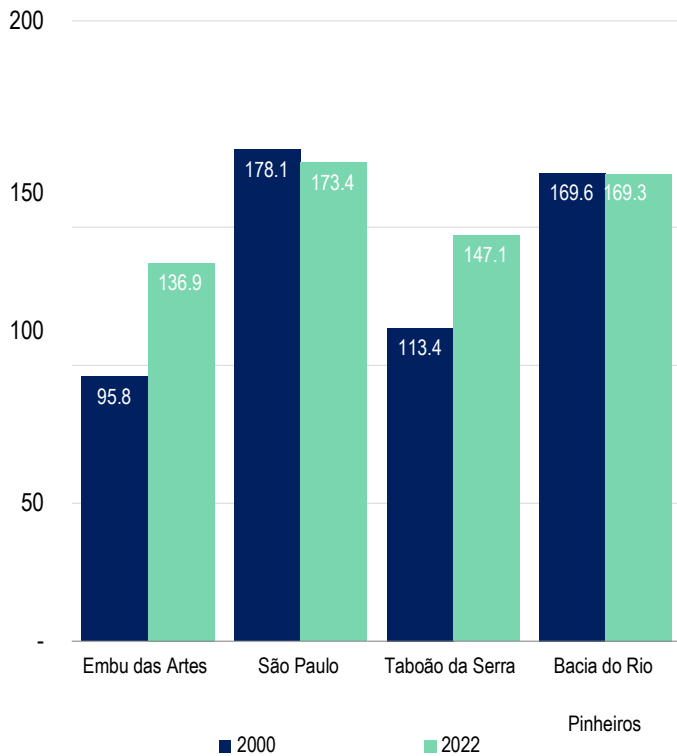


Chart 2.3

Volume of treated sewage, in liters per inhabitant per day, Pinheiros River Basin

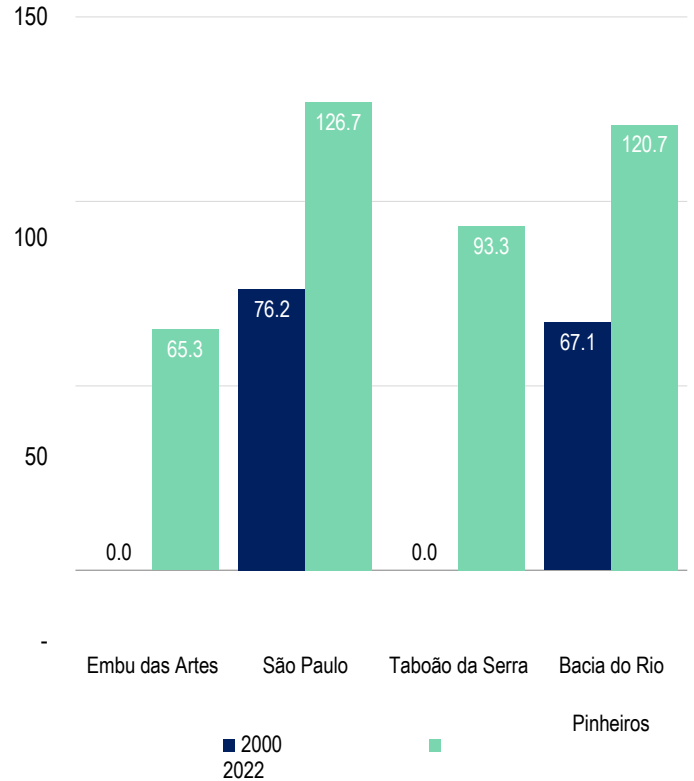


Chart 2.2

Volume of sewage collected, in liters per inhabitant per day, Pinheiros River Basin

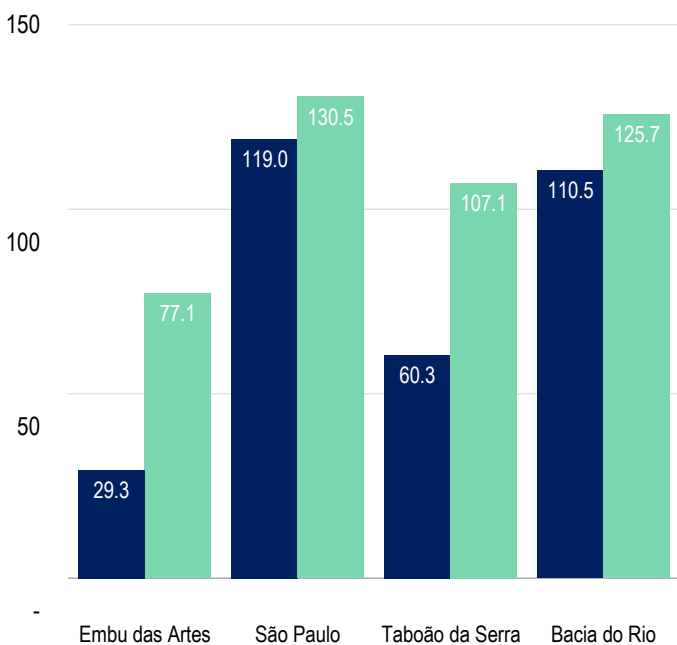
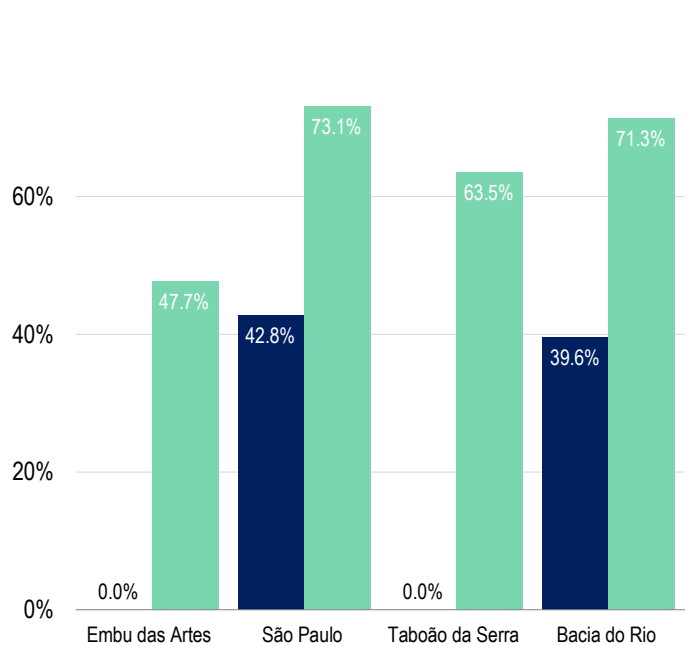


Chart 2.4

Volume of treated sewage relative to the volume of water consumed, in (%), Pinheiros River Basin





Source: SNIS and IBGE. Prepared by: Ex Ante Consultoria Econômica.

Table 2.3. Benefits of sanitation universalization in the Pinheiros River Basin

Cities and districts	BRL million		Total	Per capita (BRL per inhabitant)
	2000-2022	Legacy		
Embu das Artes	565.780	572.762	1138.543	7642.05
São Paulo	6,658.843	6741.012	13399.856	5116.08
Alto de Pinheiros	53.831	54.495	108.327	2697.31
Butantã	84.102	85.140	169.242	3293.65
Campo Belo	89.499	90.604	180.103	2640.01
Campo Grande	291.844	295.445	587.289	5719.80
Campo Limpo	565.864	572.847	1138.711	5370.47
Capão Redondo	630.648	638.430	1269.078	4986.51
Cidade Ademar	570.449	577.488	1147.937	4678.34
Cidade Dutra	124.489	126.026	250.515	8122.83
Itaim Bibi	133.152	134.795	267.946	2964.30
Jabaquara	160.615	162.597	323.212	1981.58
Jaguari	161.048	163.035	324.083	7618.47
Jardim Ângela	426.761	432.027	858.788	13052.77
Jardim Paulista.	85.699	86.757	172.456	2094.29
Jardim São Luís	499.025	505.183	1004.207	4502.60
Lapa	7.084	7.171	14.255	2599.66
Moema	118.143	119.601	237.744	3118.52
Morumbi	61.290	62.047	123.337	3195.94
Pedreira	170.379	172.482	342.861	16536.95
Perdizes	3.458	3.500	6.958	1620.40
Pinheiros	81.031	82.031	163.063	2562.26
Raposo Tavares	282.886	286.377	569.263	5538.36
Rio Pequeno	297.514	301.185	598.699	4949.49
Saúde	81.499	82.505	164.004	3215.79
Santo Amaro	171.946	174.067	346.013	4885.80
Socorro	101.424	102.675	204.099	9845.55
Vila Andrade.	897.748	908.826	1806.573	16255.75
Vila Leopoldina	60.762	61.512	122.274	4233.78
Vila Mariana	83.103	84.129	167.232	2641.67
Vila Sônia	363.550	368.036	731.586	7067.06
Taboão da Serra	1,082.234	1095.588	2177.822	9366.31
Pinheiros River Basin	7,961.091	8059.329	16020.419	5336.99

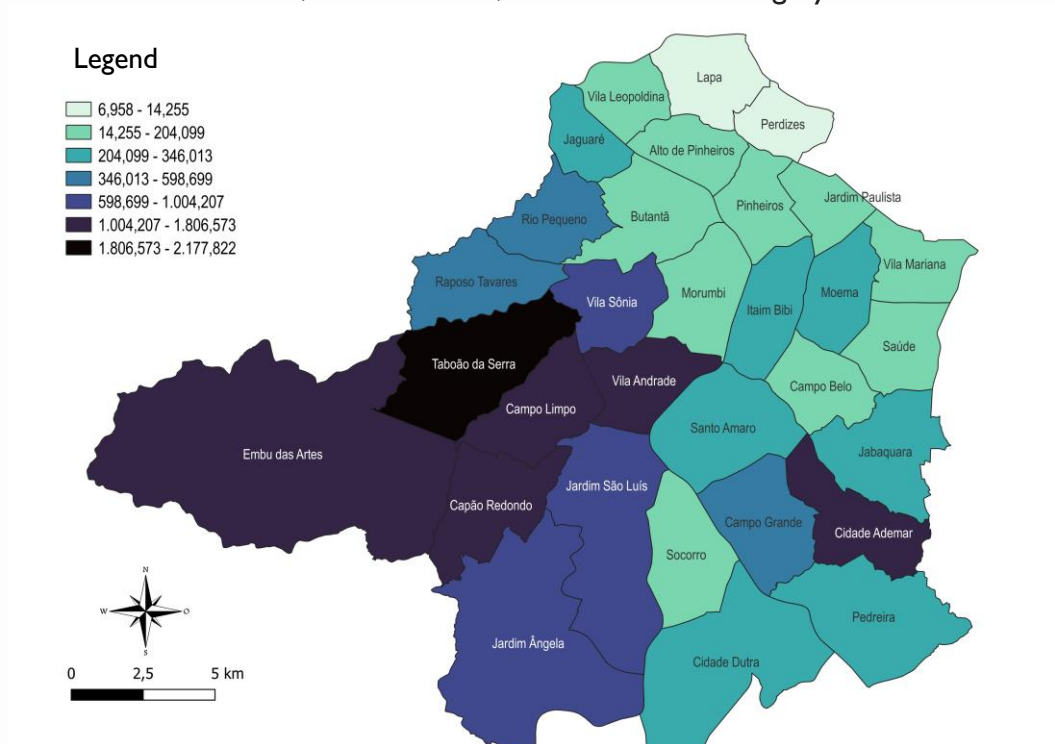
Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

Andrade, Jardim Ângela, and Cidade Dutra. Districts in the northeastern portion of the Pinheiros River Basin have relatively small per capita gains. **Map 2.4** confirms this finding.

This highlights the redistributive aspect of wealth associated with sanitation improvements in the basin. The peripheral

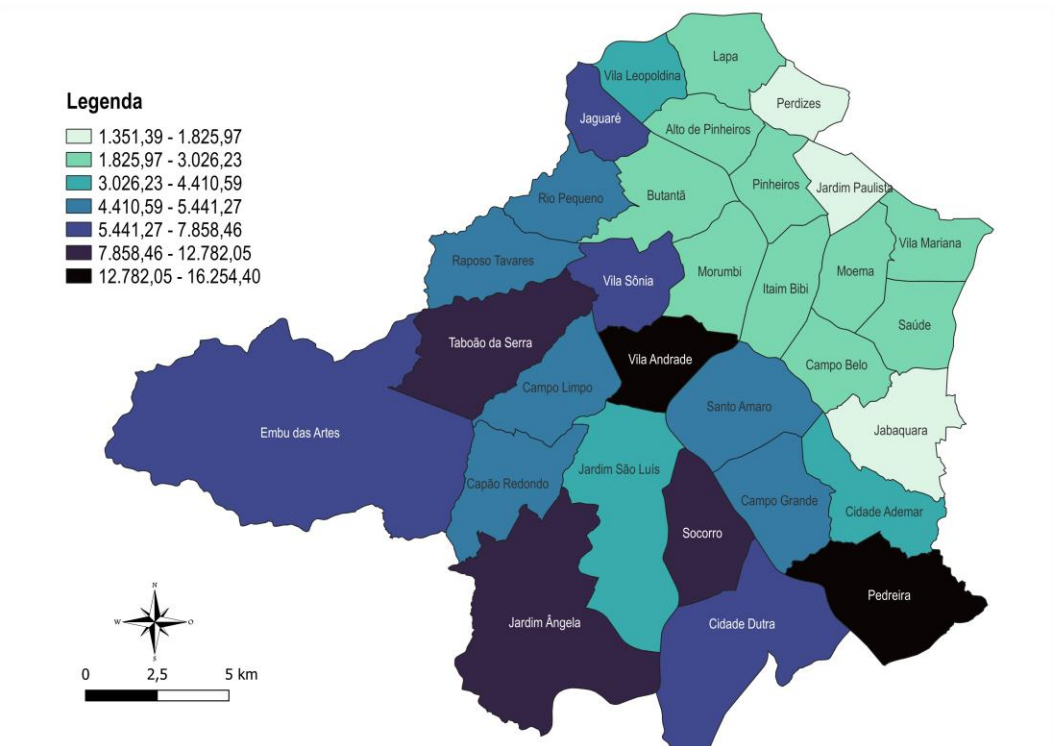
areas, which have the worst socioeconomic conditions, are the ones that have benefited, and will continue to benefit, the most from the sanitation progress observed in the Pinheiros River Basin from 2000 to 2022 and from the legacy it leaves for the future.

Map 2.3 Gains from sanitation universalization in the districts of the Pinheiros River Basin, in BRL million, 2000 to 2022 and legacy



Source: IBGE. Prepared by: Ex Ante Consultoria

Map 2.4 Per capita gains in the districts of the Pinheiros River Basin, in BRL per inhabitant, 2000 to 2022 and legacy



Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

3

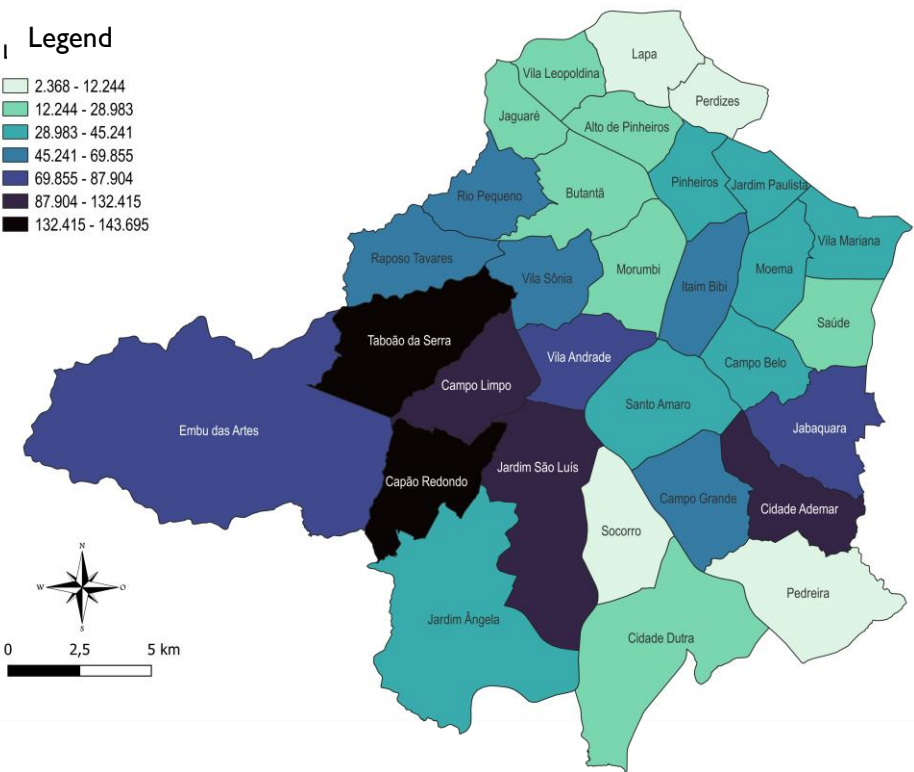
BENEFITS OF SANITATION ADVANCEMENT FOR WOMEN LIVING IN THE PINHEIROS RIVER BASIN

3.1. Female population of the Pinheiros River Basin

According to data from the 2022 Population Census, 1,707,912 women lived within the geographic boundaries of the Pinheiros River Basin. Of this total, 1,483,456 lived in households located in the city of São Paulo, representing 86.9% of the entire female population in the Pinheiros River Basin. Among the remaining residents, 143,695 women lived in Taboão da Serra and 80,761 in Embu das Artes – representing 8.4% and 4.7%, respectively, of the female population in the Pinheiros River Basin. In the city of São Paulo, approximately 40% of the population living in informal urban communities is concentrated in just six districts: Vila Andrade, Jabaquara, Capão Redondo, Cidade Ademar, Campo Limpo, and Jardim São Luís. All six districts have female populations larger than that of Embu das Artes. **Map 3.1** presents the female population of the 31 districts of the Pinheiros River Basin in 2022.

Table 3.1 shows the demographic evolution of women in the Pinheiros River Basin by district between 2000 and 2022. It is observed that the demographic growth of the female population was 0.8% per year between 2000 and 2022, a rate slightly higher than the 0.7% per year observed for the overall population of the Pinheiros River Basin. This pattern holds true in two of the three cities in the basin. In Embu das Artes, while the population residing in the Pinheiros River Basin grew 1.04% per year, the number of women increased 1.02% per year. In Taboão da Serra, while the population residing in the Pinheiros River Basin grew at 1.5% per year, the number of women increased at 1.6% per year. In the city of São Paulo, the difference was smaller but still favorable to the female population: 0.7% per year vs. 0.8% per year for women.

Map 3.1 Female population in the Pinheiros River Basin, 2022



Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

3.2. Evolution of sanitation service coverage rates among the female population

As shown in **Chapter 2**, 99.4% of the population in the Pinheiros River Basin was served with water supply and 96.7% was served with sewage collection in their homes in 2022. From 2000 to 2022, 589 thousand people gained access to treated water supply, and 840 thousand people gained access to sewage collection services at home through collection networks. This positive progress is similar within the female population of the Pinheiros River Basin, given the proportion of men and women in the region.

Table 3.2 presents the situation of basic sanitation in 2000 and 2022 for the female population in the cities and districts that make up the Pinheiros River Basin. In addition to the data on the population served by treated water distribution and

sewage collection systems, the table also shows the number of women incorporated into the sanitation system over these 22 years.

Again, an important aspect can be observed: In line with the demographic changes that occurred between 2000 and 2022 in the communities of the Pinheiros River Basin, several districts experienced a decline in the number of women served by the water supply system during this period. These were the cases of Alto de Pinheiros, Butantã, Cidade Dutra, Jardim Paulista, Pinheiros, and Socorro. These reductions are largely explained by the decrease in population in those districts of the basin.

Overall, however, there was strong progress in incorporating women into the water supply and sewage collection systems. In the districts of Embu das Artes and Taboão da Serra, 17.5 thousand and 43.3 thousand women, respectively, were incorporated into the water supply system, and 25.4 thousand and 51.6 thousand

Table 3.1 Female population of the Pinheiros River Basin, 2000 and 2022

Cities and districts	Female population			Total population		Variation
	2000	2022	(%) per year	2000	2022	
Embu das Artes	64,631	80761	1.0%	132,997	166892	1.0%
São Paulo	1,264,027	1483456	0.7%	2,452,145	2797558	0.6%
Alto de Pinheiros	24061	20146	-0.8%	43,579	37011	-0.7%
Butantã	27837	27005	-0.1%	52,089	50689	-0.1%
Campo Belo	35799	37846	0.3%	66,228	70273	0.3%
Campo Grande	48226	62322	1.2%	91,023	115822	1.1%
Campo Limpo	98708	123924	1.0%	190,822	235599	1.0%
Capão Redondo	123887	142858	0.6%	239,448	270503	0.6%
Cidade Ademar	126327	132415	0.2%	241,936	248858	0.1%
Cidade Dutra	16348	16061	-0.1%	31,466	30228	-0.2%
Itaim Bibi	45309	54076	0.8%	81,003	100867	1.0%
Jabaquara	85976	87757	0.1%	162,156	164065	0.1%
Jaguará	19408	25632	1.3%	37,244	48588	1.2%
Jardim Ângela	29768	38561	1.2%	58,410	74110	1.1%
Jardim Paulista.	47882	44457	-0.3%	83,010	81687	-0.1%
Jardim São Luís	122588	123017	0.0%	213,664	232803	0.4%
Lapa	2686	3333	1.0%	4,877	6165	1.1%
Moema	39483	44521	0.5%	71,126	81714	0.6%
Morumbi	18401	23049	1.0%	34,170	43586	1.1%
Pedreira	9387	12244	1.2%	18,285	23509	1.1%
Perdizes	2360	2368	0.0%	4,281	4307	0.0%
Pinheiros	35317	35106	0.0%	62,378	64928	0.2%
Raposo Tavares	46804	62353	1.3%	90,083	117279	1.2%
Rio Pequeno	57994	69855	0.8%	111,324	131434	0.8%
Saúde	26893	28983	0.3%	48,867	53225	0.4%
Santo Amaro	32148	45241	1.6%	59,315	84557	1.6%
Socorro	11152	11032	0.0%	20,953	20509	-0.1%
Vila Andrade.	37638	87904	3.9%	73,352	168378	3.8%
Vila Leopoldina	11696	20492	2.6%	21,653	38521	2.7%
Vila Mariana	34841	35217	0.0%	62,208	64422	0.2%
Vila Sônia	45104	65681	1.7%	86,685	123626	1.6%
Taboão da Serra	101,131	143695	1.6%	197,644	273542	1.5%
Pinheiros River Basin	1,429,789	1707912	0.8%	2,782,786	3237992	0.7%

Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

Table 3.2. Female population served by sanitation, Pinheiros River Basin, 2000 and 2022

Cities and districts	Water	supply	a	Sev	collection	Variation
	2000	2022	Variation	age 2000	2022	
Embu das Artes	62,068	79543	17476	37612	63016	25404
São Paulo	1,255,965	1476809	220844	1122534	1419079	296545
Alto de Pinheiros	24061	20105	-3956	24040	20088	-3952
Butantã	27837	26905	-932	27376	26681	-695
Campo Belo	35482	37489	2007	33796	37637	3841
Campo Grande	48226	62238	14012	45529	61974	16445
Campo Limpo	98213	123368	25155	82808	115918	33110
Capão Redondo	123034	142615	19581	99139	133148	34009
Cidade Ademar	125478	132294	6816	103992	124364	20372
Cidade Dutra	16241	15910	-331	14525	15195	669
Itaim Bibi	45309	53940	8631	45163	53918	8755
Jabaquara	85721	87582	1862	77432	82751	5318
Jaguaré	19323	25597	6274	14568	24753	10185
Jardim Ângela	28398	38233	9835	18634	34897	16263
Jardim Paulista.	47668	44348	-3320	46914	44281	-2633
Jardim São Luís	120917	122768	1851	108738	116973	8235
Lapa	2686	3328	642	2665	3320	655
Moema	39483	44266	4783	39086	44408	5322
Morumbi	18307	22960	4653	16983	22754	5771
Pedreira	9224	12106	2882	4585	11146	6561
Perdizes	2360	2366	6	2350	2364	13
Pinheiros	35317	35054	-263	35031	35005	-26
Raposo Tavares	46274	61996	15722	43564	58678	15114
Rio Pequeno	57932	69554	11622	50454	64818	14364
Saúde	26881	28865	1984	26728	28759	2031
Santo Amaro	32060	45149	13089	31546	45085	13539
Socorro	11131	11011	-120	11028	10849	-179
Vila Andrade.	37467	86077	48610	27354	82230	54876
Vila Leopoldina	11662	20478	8816	11554	20445	8891
Vila Mariana	34824	35044	220	34771	35145	374
Vila Sônia	44451	65162	20711	42179	61497	19318
Taboão da Serra	99,422	142716	43294	86083	137683	51600
Pinheiros River Basin	1,417,454	1699068	281614	1246229	1619778	373549

Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

women were incorporated into the sewage collection system. In the city of São Paulo, 220.8 thousand women were incorporated into the water supply system and 296.58 thousand women into the sewage collection system. The districts with the largest contingents of women incorporated into the water supply system were: Campo Grande, Campo Limpo, Capão Redondo, Jardim Ângela, Raposo Tavares, Rio Pequeno, Santo Amaro, Vila Andrade, and Vila Sônia. For sewage collection, the districts included in the list were: Campo Grande, Campo Limpo, Capão Redondo, Cidade Ademar, Jardim Ângela, Raposo Tavares, Rio Pequeno, Santo Amaro, Vila Andrade, and Vila Sônia.

Table 3.3 presents the coverage rate of basic sanitation services for the female population in the Pinheiros River Basin in 2000 and 2022. In addition to the rates in each year, it shows the evolution of the share of the population served by treated water distribution and sewage collection systems over these 22 years. On average across the three cities, the coverage rate for water supply services increased 0.3 percentage point between 2000 and 2022. The female populations of Embu das Artes and Taboão da Serra showed relatively strong progress, with increases of 2.5 percentage points and 1.0 percentage point, respectively. The female population of the city of São Paulo within the Pinheiros River Basin recorded an increase of 0.2 percentage point. Of the 29 districts in the city, 12 showed small reductions in the water supply service coverage rate.

Regarding the sewage collection service coverage rate for the female population, there was an increase in 28 of the 31 districts of the Pinheiros River Basin. On average across the basin, the share of women with access to the sewer network increased by only 7.7 percentage points between 2000 and 2022, a less pronounced expansion than that observed for the total population. The districts of Embu das Artes and Taboão da Serra showed significant improvements, of 19.8 percentage points and 10.7 percentage points, respectively, and among the districts in the city of São Paulo, the highlights

were: Jaguaré, Jardim Ângela, Pedreira, and Vila Andrade.

Map 3.2 shows the evolution of the share of the female population served by water supply services in the informal urban communities of the Pinheiros River Basin between 2000 and 2022. In the map, the darker colors indicate the districts with the greatest percentage point increases in water supply service coverage. More intense expansions are seen in the districts located in the southwestern and southeastern areas of the basin. **Map 3.3** shows the evolution of the share of the female population of the Pinheiros River Basin served by sewage collection services.

3.3. Distribution of benefits among communities in the Pinheiros River Basin

Table 3.4 presents the distribution of net benefits for the female population resulting from the expansion of sanitation in the Pinheiros River Basin between 2000 and 2022. The values include both the gains already observed in the past and those expected for the future. The total gains and the per-woman values in each district are also presented.

Considering the female population in the Pinheiros River Basin, the net benefits from sanitation universalization reached BRL 7.750 billion, with approximately 50% corresponding to the past period and 50% to the future. Most of these gains are concentrated in the female population of the city of São Paulo: BRL 6.247 billion, or 80.6% of the total. Women in Taboão da Serra recorded estimated gains of BRL 1.048 billion (13.5% of the total), and in Embu das Artes, BRL 455 million (5.9% of the total). In the city of São Paulo, the districts where women experienced the highest net benefits were: Campo Limpo, Capão Redondo, Cidade Ademar, Jardim Ângela, Raposo Tavares, Rio Pequeno, Vila Andrade, and Vila Sônia. In general, the largest gains occurred in the more peripheral areas of the city, as illustrated in **Map 3.4**.

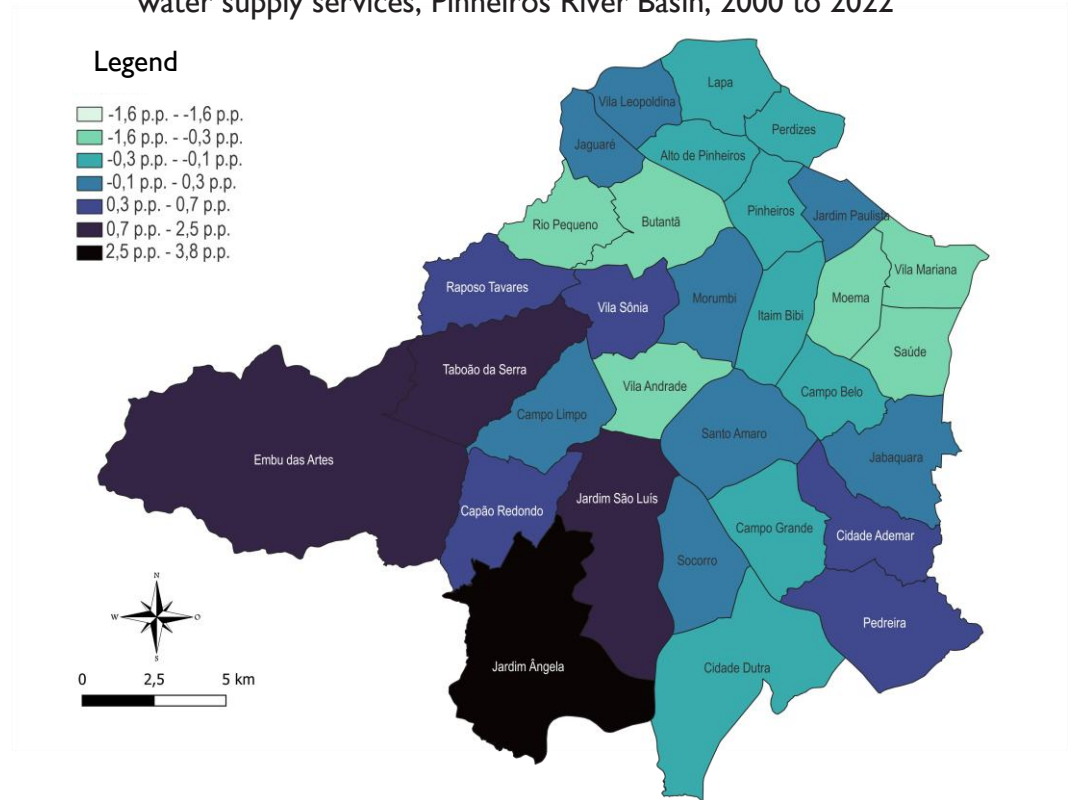
Table 3.3

Share of the female population served by sanitation, Pinheiros River Basin, 2000 and 2022

Cities and districts	Water supply			Sewerage collection		
	2000	2022	Variation	2000	2022	Variation
Embu das Artes	96.0%	98.5%	2.5 p.p.	58.2%	78.0%	19.8 p.p.
São Paulo	99.4%	99.6%	0.2 p.p.	88.8%	95.7%	6.9 p.p.
Alto de Pinheiros	100.0%	99.8%	-0.2 p.p.	99.9%	99.7%	-0.2 p.p.
Butantã	100.0%	99.6%	-0.4 p.p.	98.3%	98.8%	0.5 p.p.
Campo Belo	99.1%	99.1%	-0.1 p.p.	94.4%	99.4%	5.0 p.p.
Campo Grande	100.0%	99.9%	-0.1 p.p.	94.4%	99.4%	5.0 p.p.
Campo Limpo	99.5%	99.6%	0.1 p.p.	83.9%	93.5%	9.6 p.p.
Capão Redondo	99.3%	99.8%	0.5 p.p.	80.0%	93.2%	13.2 p.p.
Cidade Ademar	99.3%	99.9%	0.6 p.p.	82.3%	93.9%	11.6 p.p.
Cidade Dutra	99.3%	99.1%	-0.3 p.p.	88.9%	94.6%	5.8 p.p.
Itaim Bibi	100.0%	99.7%	-0.3 p.p.	99.7%	99.7%	0.0 p.p.
Jabaquara	99.7%	99.8%	0.1 p.p.	90.1%	94.3%	4.2 p.p.
Jaguari	99.6%	99.9%	0.3 p.p.	75.1%	96.6%	21.5 p.p.
Jardim Ângela	95.4%	99.1%	3.8 p.p.	62.6%	90.5%	27.9 p.p.
Jardim Paulista.	99.6%	99.8%	0.2 p.p.	98.0%	99.6%	1.6 p.p.
Jardim São Luís	98.6%	99.8%	1.2 p.p.	88.7%	95.1%	6.4 p.p.
Lapa	100.0%	99.9%	-0.1 p.p.	99.2%	99.6%	0.4 p.p.
Moema	100.0%	99.4%	-0.6 p.p.	99.0%	99.7%	0.8 p.p.
Morumbi	99.5%	99.6%	0.1 p.p.	92.3%	98.7%	6.4 p.p.
Pedreira	98.3%	98.9%	0.6 p.p.	48.8%	91.0%	42.2 p.p.
Perdizes	100.0%	99.9%	-0.1 p.p.	99.6%	99.8%	0.2 p.p.
Pinheiros	100.0%	99.9%	-0.1 p.p.	99.2%	99.7%	0.5 p.p.
Raposo Tavares	98.9%	99.4%	0.6 p.p.	93.1%	94.1%	1.0 p.p.
Rio Pequeno	99.9%	99.6%	-0.3 p.p.	87.0%	92.8%	5.8 p.p.
Saúde	100.0%	99.6%	-0.4 p.p.	99.4%	99.2%	-0.2 p.p.
Santo Amaro	99.7%	99.8%	0.1 p.p.	98.1%	99.7%	1.5 p.p.
Socorro	99.8%	99.8%	0.0 p.p.	98.9%	98.3%	-0.5 p.p.
Vila Andrade.	99.5%	97.9%	-1.6 p.p.	72.7%	93.5%	20.9 p.p.
Vila Leopoldina	99.7%	99.9%	0.2 p.p.	98.8%	99.8%	1.0 p.p.
Vila Mariana	100.0%	99.5%	-0.4 p.p.	99.8%	99.8%	0.0 p.p.
Vila Sônia	98.6%	99.2%	0.7 p.p.	93.5%	93.6%	0.1 p.p.
Taboão da Serra	98.3%	99.3%	1.0 p.p.	85.1%	95.8%	10.7 p.p.
Pinheiros River Basin	99.1%	99.5%	3.7 p.p.	87.2%	94.8%	7.7 p.p.

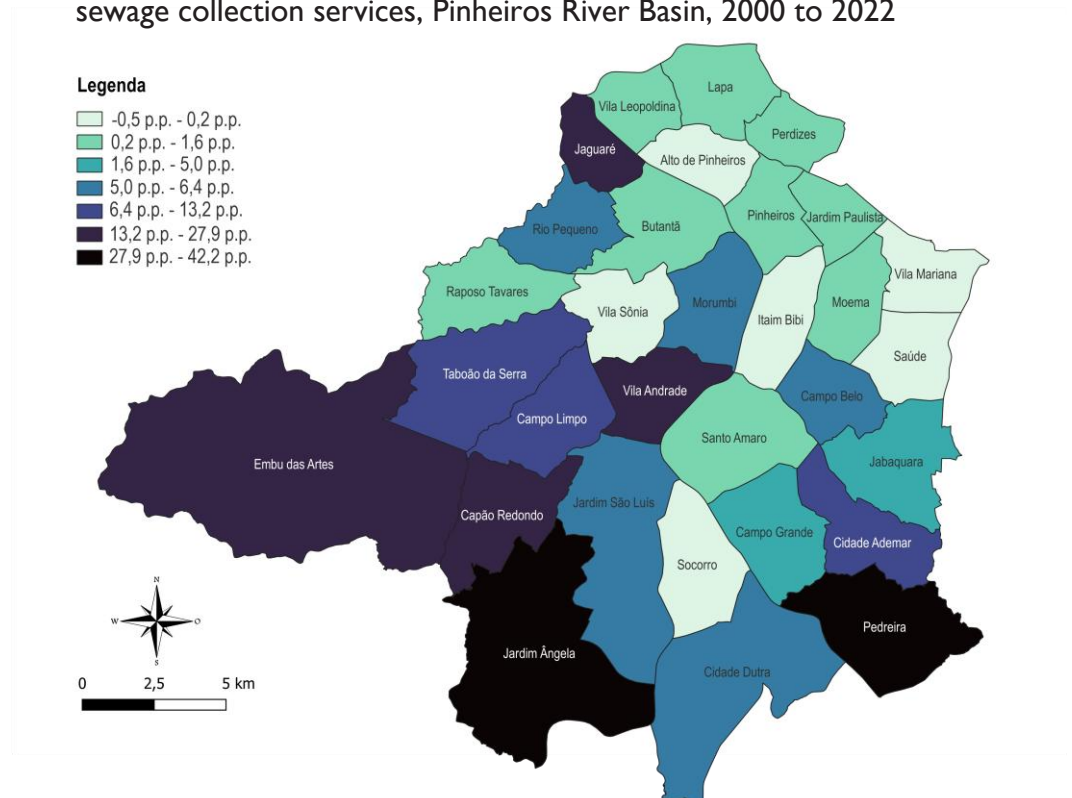
Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

Map 3.2 Evolution of the share of the female population served by water supply services, Pinheiros River Basin, 2000 to 2022



Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

Map 3.3 Evolution of the share of the female population served by sewage collection services, Pinheiros River Basin, 2000 to 2022



Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

Table 3.4

Benefits of sanitation universalization

for the female population of the Pinheiros River Basin, by municipality

Cities and districts	—	BRL million		Per capita (BRL per inhabitant)
		2000-2022	Legacy	Total
Embu das Artes		226.332	229.125	455.457
São Paulo		3,104.222	3142.527	6246.749
Alto de Pinheiros		36.304	36.752	73.057
Butantã		72.545	73.441	145.986
Campo Belo		36.136	36.582	72.718
Campo Grande		151.543	153.413	304.956
Campo Limpo		289.742	293.317	583.060
Capão Redondo		323.762	327.757	651.518
Cidade Ademar		288.358	291.916	580.274
Cidade Dutra		69.117	69.970	139.086
Itaim Bibi		54.028	54.695	108.724
Jabaquara		64.503	65.299	129.802
Jaguará		81.585	82.592	164.176
Jardim Ângela		218.877	221.578	440.455
Jardim Paulista.		34.432	34.857	69.290
Jardim São Luís		75.453	76.384	151.838
Lapa		3.247	3.287	6.533
Moema		49.649	50.262	99.911
Morumbi		28.088	28.434	56.522
Pedreira		86.426	87.492	173.918
Perdizes		0.306	0.310	0.616
Pinheiros		2.930	2.967	5.897
Raposo Tavares		152.304	154.184	306.488
Rio Pequeno		158.032	159.983	318.015
Saúde		31.834	32.227	64.062
Santo Amaro		84.910	85.958	170.869
Socorro		19.081	19.316	38.397
Vila Andrade.		462.396	468.102	930.499
Vila Leopoldina		30.279	30.653	60.932
Vila Mariana		7.798	7.894	15.691
Vila Sônia		190.554	192.906	383.460
Taboão da Serra		520.613	527.037	1047.650
Pinheiros River Basin		3,851.167	3898.689	7749.856

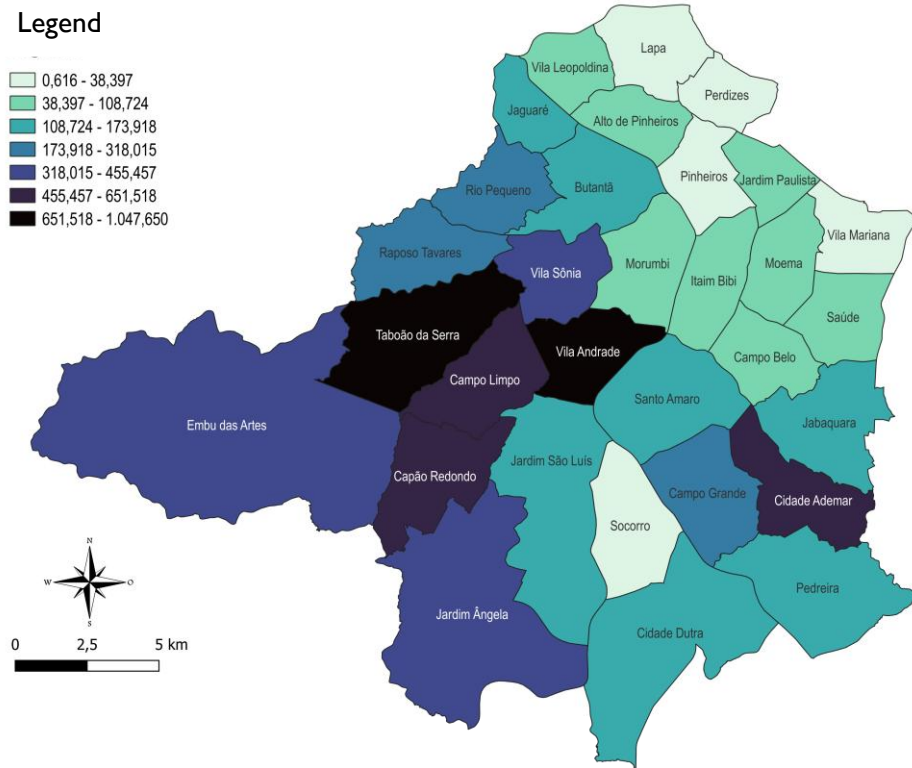
Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

Despite the concentration of gains among the female population in the city of São Paulo, it is important to note that per capita benefits are higher in Taboão da Serra and Embu das Artes, which are precisely the cities that proportionally incorporated more women into the basic sanitation system over these 22 years. While the average gains per woman in the Pinheiros River Basin are estimated at BRL 4,959, in Embu das Artes they reach BRL 6,304, and in Taboão da Serra, BRL 8,691. Among the districts in the city of São Paulo, the most peripheral areas in the southeastern and southwestern regions show the highest estimated gains per woman, especially in the districts of Cidade Dutra, Jaguaré, Jardim Ângela, Pedreira, Vila Andrade, and Vila Sônia. As discussed in the previous chapters, the female population in the northeastern districts of the Pinheiros River Basin had relatively small per capita gains (**Map 3.5**).

Once again, this highlights the redistributive aspect of wealth generated by sanitation improvements in the basin, as the female populations in the peripheral districts have benefited, or will benefit, relatively more than the total female population of the Pinheiros River Basin. **Chart 3.1** shows, however, that the share of women in the total benefits from sanitation improvements was smaller than their share of the population in the three cities that make up the Pinheiros River Basin. This resulted in lower per capita gains among women compared with the basin's total population (**Chart 3.2**).

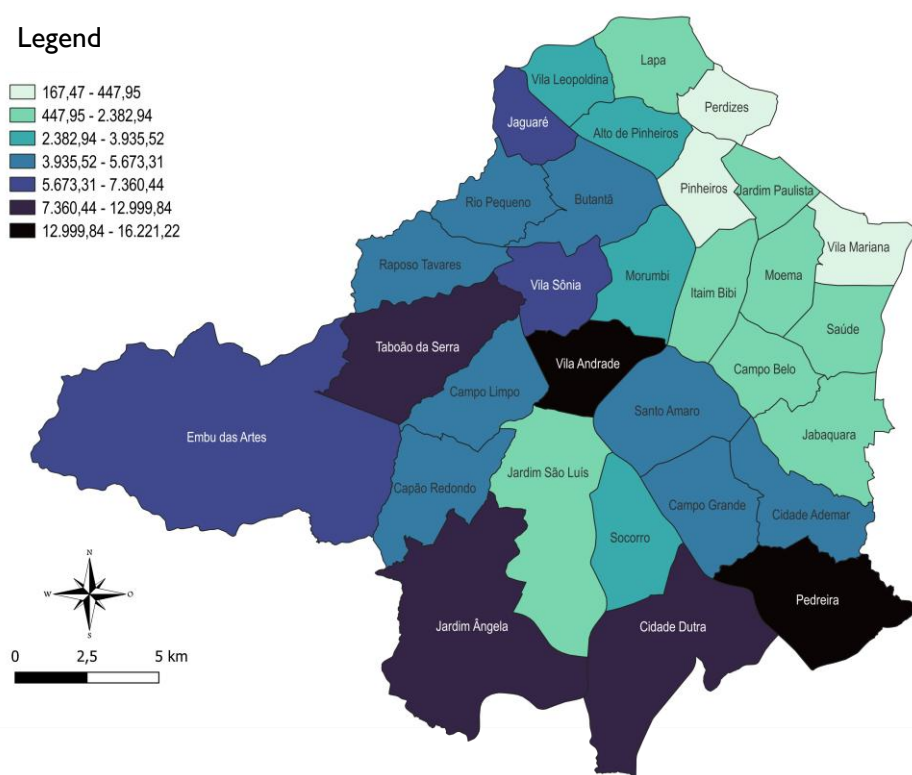


Map 3.4 Gains from sanitation universalization among the female population of the Pinheiros River Basin, in BRL million, 2000 to 2022 and legacy



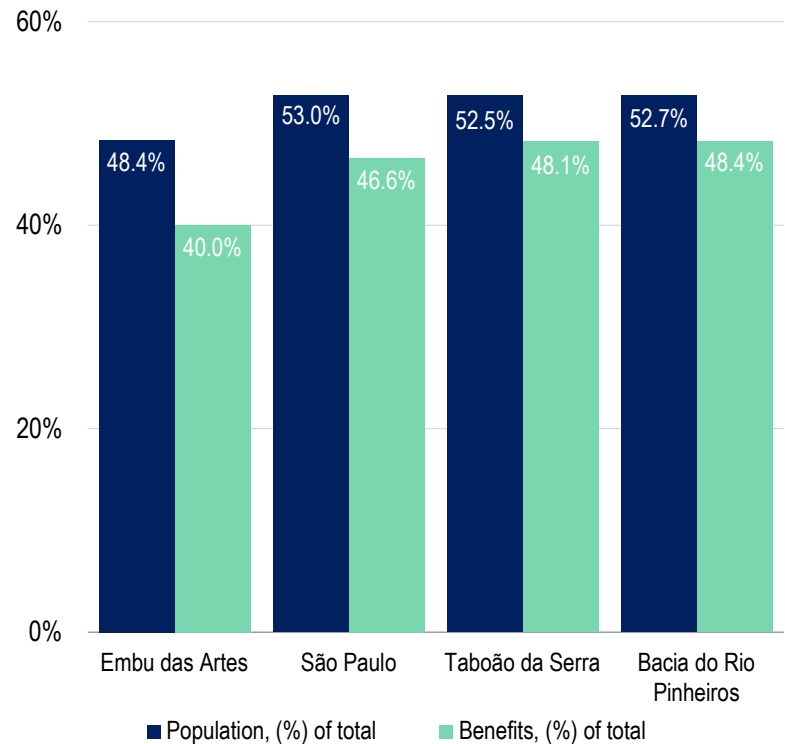
Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

Map 3.5 Per capita gains among the female population of the Pinheiros River Basin, in BRL per inhabitant, 2000 to 2022 and legacy



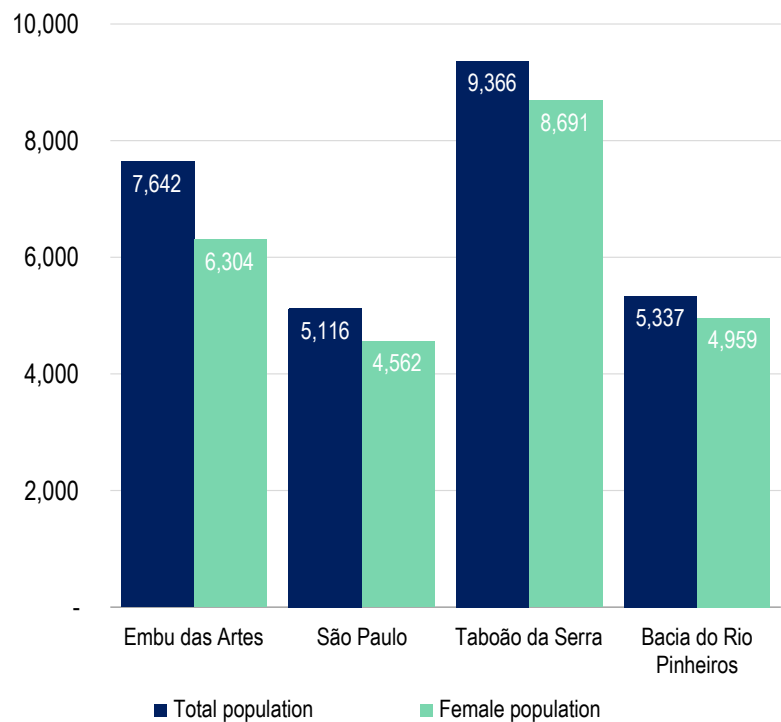
Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

Chart 3.1. Population and benefits from sanitation universalization, women in the Pinheiros River Basin, (%) of total, by municipality



Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

Chart 3.2. Benefits of sanitation universalization among the female population and the total population of the Pinheiros River Basin, in BRL per inhabitant, by municipality



Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

BENEFITS OF SANITATION ADVANCEMENT IN THE INFORMAL URBAN COMMUNITIES OF THE PINHEIROS RIVER BASIN

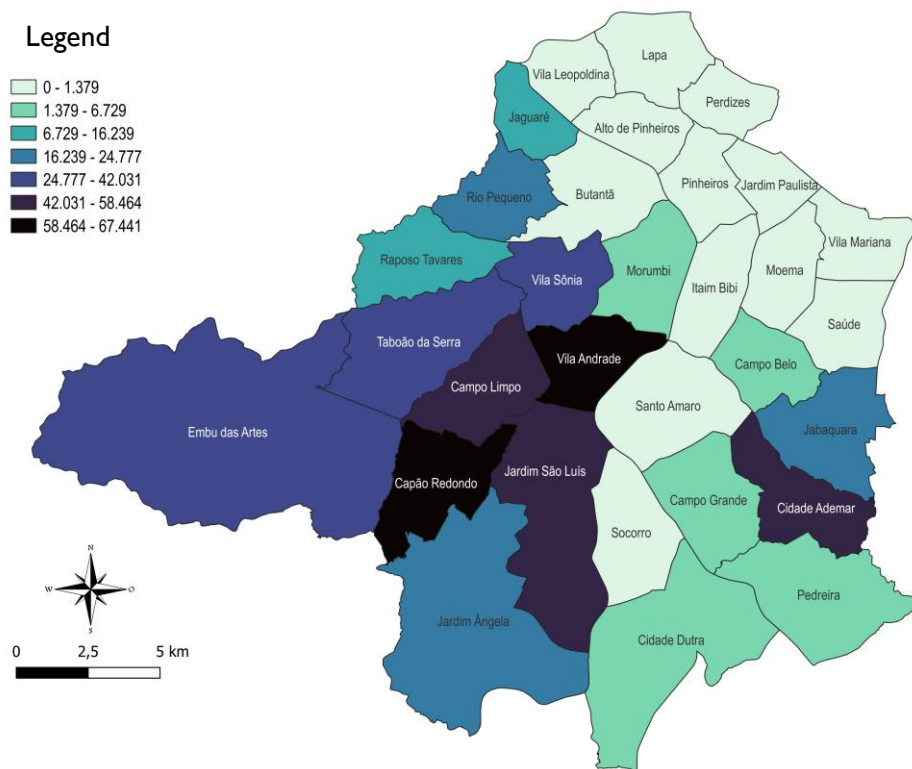
4.1. Demographics of informal urban communities

According to data from the 2022 Population Census, and considering the geographic extent of the Pinheiros River Basin within the cities, 520,594 people lived in informal urban communities. Of this total, 449,393 people lived in households located in the city of São Paulo, that is, 86.3% of the total population of informal urban communities in the Pinheiros River Basin. Among the remaining residents, 42,031 people lived in Taboão da Serra and 29,170 in Embu das Artes – representing 8.1% and 5.6%, respectively, of the population of informal urban communities in the Pinheiros River Basin. In the city of São Paulo, almost 65% of the population living in informal urban communities is concentrated in just five districts: Vila Andrade, where the Paraisópolis

community is located, Capão Redondo, Cidade Ademar, Campo Limpo, and Jardim São Luís. All five districts have populations living in informal urban communities that are larger than those of Embu das Artes and Taboão da Serra. **Map 4.1** shows the population living in informal urban communities across the 31 districts of the Pinheiros River Basin in 2022.

Table 4.1 presents the demographic evolution of informal urban communities in the Pinheiros River Basin by district between 2000 and 2022. An important aspect to note is that demographic growth within these communities was 1.7% per year between 2000 and 2022, a rate much higher than the 0.7% per year observed for the total population in the districts of the Pinheiros River Basin. This pattern held true in all cities. In Embu das Artes, while the population of the municipality residing in the Pinheiros River Basin

Map 4.1 Population in informal urban communities in the districts of the Pinheiros River Basin, 2022



Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

grew at 1.0% per year, the number of residents in informal urban communities grew at 3.5% per year. In Taboão da Serra, while the population residing in the Pinheiros River Basin grew at 1.5% per year, the number of residents in informal urban communities increased by 3.8% per year. In the city of São Paulo, the difference was smaller, but still showed faster growth within the communities: 0.6% per year versus 1.5% per year.

It is worth noting that eight districts had no informal urban communities. These districts were: Alto de Pinheiros, Itaim Bibi, Jardim Paulista, Lapa, Moema, Perdizes, Pinheiros, and Santo Amaro. In six of them, informal communities already existed in 2000, and in the case of Alto de Pinheiros and Itaim Bibi, small communities, with

47 and 205 residents, respectively, ceased to exist as a result of resettlement.

4.2. Evolution of sanitation service coverage rates

As shown in **Chapter 2**, 99.4% of the population of the Pinheiros River Basin was served with water supply and 96.7% was served with sewage collection in their homes in 2022. From 2000 to 2022, 589 thousand people gained access to treated water supply, and 840 thousand people gained access to sewage collection services at home through collection networks. This positive progress is similar among the residents of informal urban communities in the Pinheiros River Basin. **Table 4.2** shows the basic sanitation conditions in 2000 and 2022 in the cities and districts that

Table 4.1
Population in informal urban communities of
the Pinheiros River Basin, 2000 and 2022

Cities and districts	Population	in communities		Total		Variation
	2000	2022	(%) per year	2000	2022	
Embu das Artes	13,699	29,170	3.5%	132,997	166,892	1.0%
São Paulo	324,155	449,393	1.5%	2,452,145	2,797,558	0.6%
Alto de Pinheiros	47	-	-100.0%	43,579	37,011	-0.7%
Butantã	-	667	-	52,089	50,689	-0.1%
Campo Belo	4,673	4,208	-0.5%	66,228	70,273	0.3%
Campo Grande	1,145	3,825	5.6%	91,023	115,822	1.1%
Campo Limpo	34,234	50,642	1.8%	190,822	235,599	1.0%
Capão Redondo	50,059	65,595	1.2%	239,448	270,503	0.6%
Cidade Ademar	45,499	58,464	1.1%	241,936	248,858	0.1%
Cidade Dutra	6,561	6,729	0.1%	31,466	30,228	-0.2%
Itaim Bibi	205	-	-100.0%	81,003	100,867	1.0%
Jabaquara	13,240	22,397	2.4%	162,156	164,065	0.1%
Jaguará	11,119	13,523	0.9%	37,244	48,588	1.2%
Jardim Ângela	11,455	23,475	3.3%	58,410	74,110	1.1%
Jardim Paulista.	-	-	-	83,010	81,687	-0.1%
Jardim São Luís	41,449	48,555	0.7%	213,664	232,803	0.4%
Lapa	-	-	-	4,877	6,165	1.1%
Moema	-	-	-	71,126	81,714	0.6%
Morumbi	5244	3431	-1.9%	34,170	43,586	1.1%
Pedreira	6178	6277	0.1%	18,285	23,509	1.1%
Perdizes	-	-	-	4,281	4,307	0.0%
Pinheiros	-	-	-	62,378	64,928	0.2%
Raposo Tavares	11,338	16,239	1.6%	90,083	117,279	1.2%
Rio Pequeno	22,905	24,777	0.4%	111,324	131,434	0.8%
Saúde	361	1,279	5.9%	48,867	53,225	0.4%
Santo Amaro	-	-	-	59,315	84,557	1.6%
Socorro	364	1,069	5.0%	20,953	20,509	-0.1%
Vila Andrade.	38,293	67,441	2.6%	73,352	168,378	3.8%
Vila Leopoldina	1,515	1,379	-0.4%	21,653	38,521	2.7%
Vila Mariana	456	1,072	4.0%	62,208	64,422	0.2%
Vila Sônia	17,814	28,349	2.1%	86,685	123,626	1.6%
Taboão da Serra	18,639	42,031	3.8%	197,644	273,542	1.5%
Pinheiros River Basin	356,492	520,594	1.7%	2,782,786	3,237,992	0.7%

Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

Table 4.2

Population served by sanitation, informal urban communities in the
Pinheiros River Basin, 2000 and 2022

Cities and districts	Water supply		a	Sewage collection		
	2000	2022		2000	2022	Variation
Embu das Artes	13,071	28,962	15891	4906	18132	13226
São Paulo	318,590	445064	126474	184146	365527	181381
Alto de Pinheiros	47	0	-47	0	0	0
Butantã	0	667	667	0	570	570
Campo Belo	4516	4208	-308	1140	4093	2953
Campo Grande	1145	3819	2674	485	3775	3290
Campo Limpo	33918	49474	15556	17049	37856	20807
Capão Redondo	49801	65251	15450	27745	53478	25733
Cidade Ademar	44291	58315	14024	24360	48175	23815
Cidade Dutra	6531	6718	187	4456	6384	1928
Itaim Bibi	205	0	-205	205	0	-205
Jabaquara	13021	22187	9166	5586	15942	10356
Jaguará	11038	13511	2473	2061	12706	10645
Jardim Ângela	10691	23123	12432	6291	20275	13984
Jardim Paulista.	0	0	0	0	0	0
Jardim São Luís	39454	47724	8270	29466	41135	11669
Lapa	0	0	0	0	0	0
Moema	0	0	0	0	0	0
Morumbi	5244	3424	-1820	3942	3330	-612
Pedreira	6122	6268	146	2660	5484	2824
Perdizes	0	0	0	0	0	0
Pinheiros	0	0	0	0	0	0
Raposo Tavares	11299	15594	4295	9339	12245	2906
Rio Pequeno	22849	24462	1613	11758	17063	5305
Saúde	361	1,278	917	361	827	466
Santo Amaro	0	0	0	0	0	0
Socorro	364	1066	702	364	1010	646
Vila Andrade.	38126	67256	29130	20562	57196	36634
Vila Leopoldina	1489	1375	-114	1232	1368	136
Vila Mariana	456	1072	616	456	1070	614
Vila Sônia	17622	28272	10650	14629	21545	6916
Taboão da Serra	18,384	40798	22414	12231	35661	23430
Pinheiros River Basin	350,045	514824	164779	201283	419320	218037

Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

make up the Pinheiros River Basin. In addition to the data on the population served by the treated water distribution and sewage collection systems, the table also presents the number of people incorporated into the basic sanitation system over these 22 years.

An important aspect to note is that, in line with the demographic expansion observed between 2000 and 2022 in the communities of the Pinheiros River Basin, there are several districts where the population served by the water supply system decreased during this period. These were the cases in Alto de Pinheiros, Campo Belo, Itaim Bibi, Morumbi, and Vila Leopoldina. These reductions, although small, are explained by demographic declines in those districts of the basin. Overall, however, there was a strong movement of inclusion of residents into water supply and sewage collection systems. In the districts of Embu das Artes and Taboão da Serra, 22.0 thousand and 15.9 thousand residents of informal urban communities, respectively, were incorporated into the water supply system, and 23.4 thousand and 13.2 thousand residents were incorporated into the sewage collection system. In the city of São Paulo, 126.5 thousand residents of informal urban communities were incorporated into the water supply system, and 181.4 thousand residents were incorporated into the sewage collection system. The districts with the largest demographic contingents incorporated into the water supply system were Campo Limpo, Capão Redondo, Cidade Ademar, Jardim Ângela, Vila Andrade, and Vila Sônia. For sewage collection, the districts included on the list were Campo Limpo, Capão Redondo, Cidade Ademar, Jabaquara, Jaguaré, Jardim Ângela, Jardim São Luís, and Vila Andrade.

Table 4.3 presents the coverage rate of basic sanitation services in the informal urban communities of the Pinheiros River Basin

in 2000 and 2022. In addition to the rates, the table shows the evolution of the share of the population served by treated water distribution and sewage collection systems over these 22 years. On average across the communities in the three cities, the coverage rate for water supply services increased by 3.1 percentage points between 2000 and 2022. The communities in Embu das Artes showed relatively significant progress, with a 3.9-percentage-point increase in coverage. The informal urban communities in the city of São Paulo within the Pinheiros River Basin recorded a gain of 0.8 percentage point. Of these, seven communities experienced substantial expansions in coverage rates. In Taboão da Serra, the share of the population served by the water supply system decreased between 2000 and 2022.

Map 4.2 shows the evolution of the share of the population served by water supply services in the informal urban communities of the Pinheiros River Basin between 2000 and 2022. In the map, the darker colors indicate the districts with the greatest percentage point increases in water supply service coverage. More intense expansions can be seen in the communities located in the southwestern and southeastern regions of the basin. In the northern area, only the district of Vila Leopoldina recorded a more significant increase.

Map 4.3 shows the evolution of the share of the population served by sewage collection services in the informal urban communities of the Pinheiros River Basin. Regarding the sewage collection coverage rate, there was an expansion in 17 of the 23 districts of the Pinheiros River Basin where informal urban communities were present. On average across the basin, the share of residents in informal communities with access to the sewer network increased by 24.1 percentage points between 2000 and 2022,

Table 4.3.

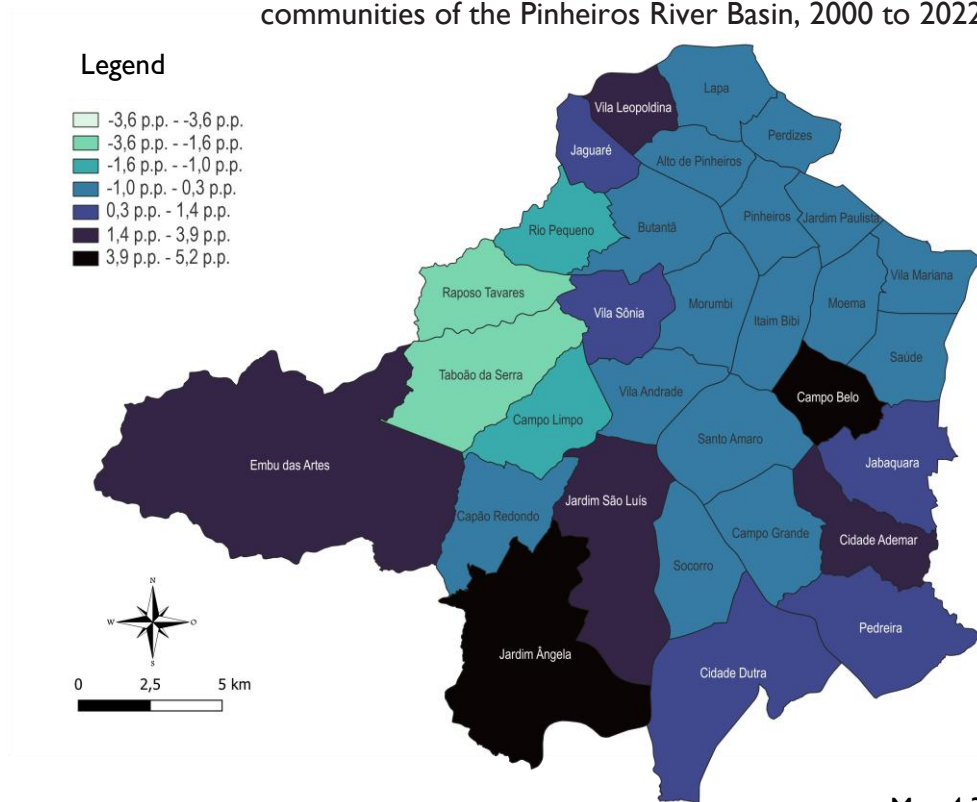
Share of the population served by sanitation, informal urban communities of the Pinheiros River Basin, in (%), 2000 and 2022

Cities and districts	Water supply			Sewerage collection		
	2000	2022	Variation	2000	2022	Variation
Embu das Artes	95.4%	99.3%	3.9 p.p.	35.8%	62.2%	26.3 p.p.
São Paulo	98.3%	99.0%	0.8 p.p.	56.8%	81.3%	24.5 p.p.
Alto de Pinheiros	100.0%	-	-	0.0%	-	-
Butantã	-	100.0%	-	-	85.5%	-
Campo Belo	96.6%	100.0%	3.4 p.p.	24.4%	97.3%	72.9 p.p.
Campo Grande	100.0%	99.8%	-0.2 p.p.	42.3%	98.7%	56.3 p.p.
Campo Limpo	99.1%	97.7%	-1.4 p.p.	49.8%	74.8%	25.0 p.p.
Capão Redondo	99.5%	99.5%	0.0 p.p.	55.4%	81.5%	26.1 p.p.
Cidade Ademar	97.3%	99.7%	2.4 p.p.	53.5%	82.4%	28.9 p.p.
Cidade Dutra	99.5%	99.8%	0.3 p.p.	67.9%	94.9%	27.0 p.p.
Itaim Bibi	100.0%	-	-	100.0%	-	-
Jabaquara	98.3%	99.1%	0.7 p.p.	42.2%	71.2%	29.0 p.p.
Jaguari	99.3%	99.9%	0.6 p.p.	18.5%	94.0%	75.4 p.p.
Jardim Ângela	93.3%	98.5%	5.2 p.p.	54.9%	86.4%	31.4 p.p.
Jardim Paulista.	-	-	-	-	-	-
Jardim São Luís	95.2%	98.3%	3.1 p.p.	71.1%	84.7%	13.6 p.p.
Lapa	-	-	-	-	-	-
Moema	-	-	-	-	-	-
Morumbi	100.0%	99.8%	-0.2 p.p.	75.2%	97.1%	21.9 p.p.
Pedreira	99.1%	99.9%	0.8 p.p.	43.1%	87.4%	44.3 p.p.
Perdizes	-	-	-	-	-	-
Pinheiros	-	-	-	-	-	-
Raposo Tavares	99.7%	96.0%	-3.6 p.p.	82.4%	75.4%	-7.0 p.p.
Rio Pequeno	99.8%	98.7%	-1.0 p.p.	51.3%	68.9%	17.5 p.p.
Saúde	100.0%	99.9%	-0.1 p.p.	100.0%	64.7%	-35.3 p.p.
Santo Amaro	-	-	-	-	-	-
Socorro	100.0%	99.7%	-0.3 p.p.	100.0%	94.5%	-5.5 p.p.
Vila Andrade.	99.6%	99.7%	0.2 p.p.	53.7%	84.8%	31.1 p.p.
Vila Leopoldina	98.3%	99.7%	1.4 p.p.	81.3%	99.2%	17.9 p.p.
Vila Mariana	100.0%	100.0%	0.0 p.p.	100.0%	99.8%	-0.2 p.p.
Vila Sônia	98.9%	99.7%	0.8 p.p.	82.1%	76.0%	-6.1 p.p.
Taboão da Serra	98.6%	97.1%	-1.6 p.p.	65.6%	84.8%	19.2 p.p.
Pinheiros River Basin	98.2%	98.9%	3.1 p.p.	56.5%	80.5%	24.1 p.p.

Source: Ex Ante Consultoria Econômica.

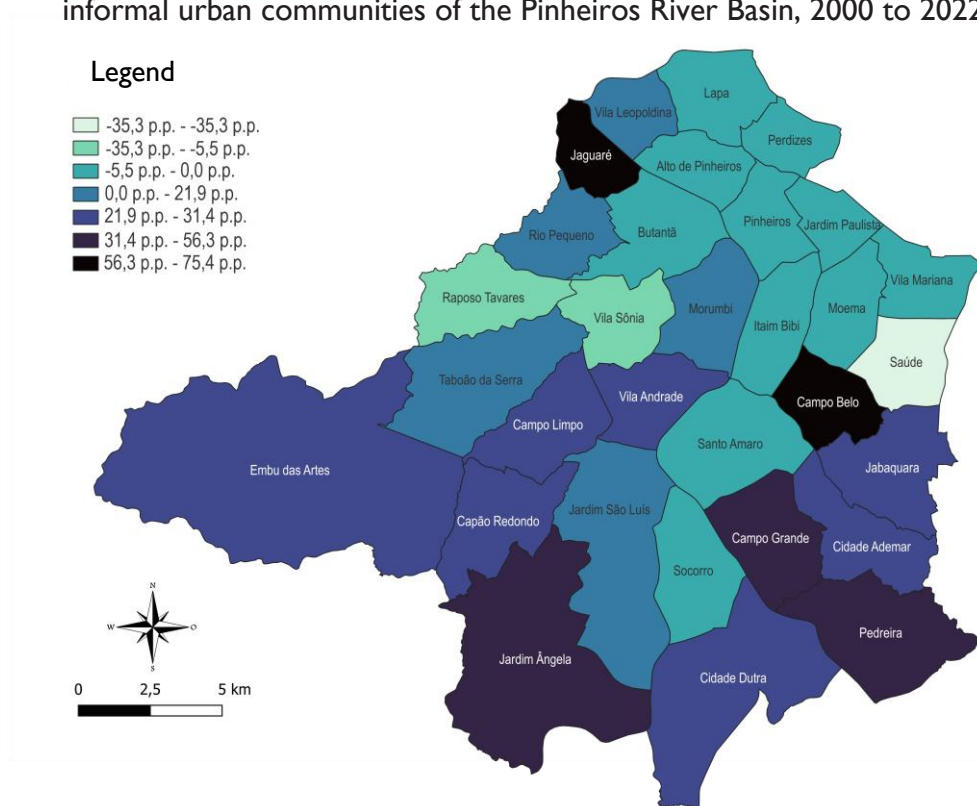
Map 4.2

Evolution of the share of the population served by water supply services, informal urban communities of the Pinheiros River Basin, 2000 to 2022



Map 4.3

Evolution of the share of the population served by sewage collection services, informal urban communities of the Pinheiros River Basin, 2000 to 2022



Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

a more pronounced expansion than that observed for the total population. The districts of Embu das Artes and Taboão da Serra showed significant improvements, 26.3 percentage points and 19.2 percentage points, respectively, and among the districts in the city of São Paulo, the highlights were: Campo Belo, Campo Grande, Jaguaré, Pedreira, and Vila Andrade.

4.4. Distribution of benefits among communities in the Pinheiros River Basin

Table 4.4 presents the distribution of the net benefits from the expansion of sanitation between 2000 and 2022 across the communities in the Pinheiros River Basin. The values include both the gains already observed in the past and those expected for the future. The table also shows total gains and values per inhabitant in each district.

Considering the population of informal urban communities in the Pinheiros River Basin, the net benefits from sanitation universalization reached BRL 5.3 billion, with approximately 50% already realized and 50% expected in the future. Most of these gains are concentrated in the communities of the city of São Paulo: BRL 4.4 billion, or 83.7% of the total. The communities of Taboão da Serra recorded estimated gains of BRL 513 million (9.8% of the total), and those of Embu das Artes recorded BRL 342 million (6.5% of the total). In the city of São Paulo, the districts with the highest net benefits were: Cidade Ademar, Vila Andrade, Capão Redondo, Jardim Ângela, and Campo Limpo. In general, the highest gains occurred in the more peripheral areas of the city, as shown in **Map 4.4**.

Despite the concentration of gains in the communities of the city of São Paulo, it is important to note that per capita gains are higher in Taboão da

Serra and Embu das Artes, which are precisely the cities that proportionally incorporated more residents of informal communities into the basic sanitation system over these 22 years. While the average per capita gains for communities in the Pinheiros River Basin are estimated at BRL 12,200, in Embu das Artes they reach BRL 17,100, and in Taboão da Serra, BRL 18,300. Among the informal urban communities located in the city of São Paulo, the most peripheral areas in the southeastern and southwestern regions show the highest estimated gains per inhabitant, especially in the districts of Campo Grande, Jardim Ângela, Cidade Dutra, Cidade Ademar, Vila Andrade, and Socorro, in that order from highest to lower gains. As discussed in the previous chapter, communities in the northeastern districts of the Pinheiros River Basin experienced relatively small per-capita gains (**Map 4.5**).

Once again, this highlights the redistributive aspect of wealth generated by sanitation improvements in the basin, given that the populations of these communities have already benefited, or will benefit, relatively more than the total population of the Pinheiros River Basin. The peripheral areas, which are those with the poorest economic and social conditions, are again the ones that benefited and will continue to benefit the most from the sanitation progress observed in the Pinheiros River Basin from 2000 to 2022, and from the legacy it leaves for the future. **Chart 4.1** shows that the share of residents in informal urban communities in the benefits of the sanitation expansion was greater than their share in the populations of the three cities that make up the Pinheiros River Basin. This resulted in higher per capita gains for the population living in urban communities compared with the total population of the basin (**Chart 4.2**).

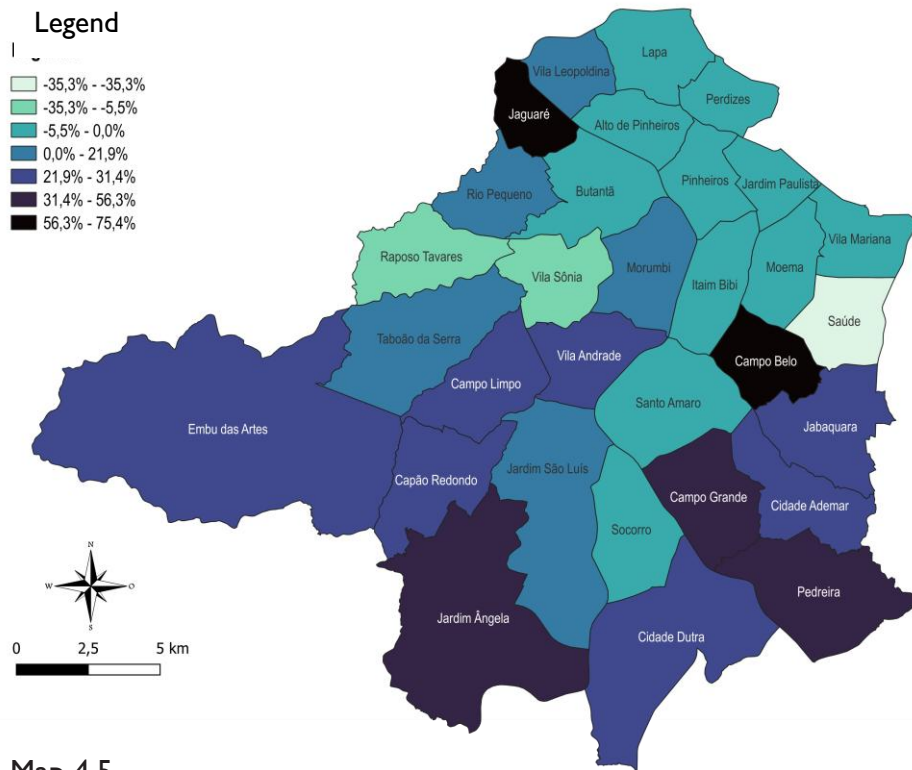
Table 4.4
Benefits of sanitation universalization in the informal urban
communities of the Pinheiros River Basin

Cities and districts	BRL million		Per capita	
	2000-2022	Legacy	Total	(BRL per inhabitant)
Embu das Artes	170.196	172.296	342.493	17132.60
São Paulo	2,185.007	2211.970	4396.977	11520.30
Alto de Pinheiros	-	-	-	-
Butantã	1.682	1.703	3.385	11876.60
Campo Belo	13.496	13.662	27.158	6122.95
Campo Grande	29.656	30.022	59.679	28502.57
Campo Limpo	180.710	182.940	363.650	8733.48
Capão Redondo	249.986	253.071	503.056	8778.75
Cidade Ademar	453.401	458.996	912.398	17690.19
Cidade Dutra	92.373	93.512	185.885	27972.13
Itaim Bibi	-	-	-	-
Jabaquara	39.935	40.428	80.363	4666.41
Jaguará	59.896	60.635	120.531	9828.60
Jardim Ângela	230.252	233.094	463.346	28254.04
Jardim Paulista.	-	-	-	-
Jardim São Luís	158.755	160.714	319.469	7121.05
Lapa	-	-	-	-
Moema	-	-	-	-
Morumbi	0.613	0.620	1.233	290.70
Pedreira	21.608	21.875	43.482	6981.50
Perdizes	-	-	-	-
Pinheiros	-	-	-	-
Raposo Tavares	35.091	35.524	70.615	5203.72
Rio Pequeno	82.835	83.857	166.692	6996.85
Saúde	2.139	2.165	4.303	6,319.40
Santo Amaro	-	-	-	-
Socorro	5.071	5.134	10.205	16,328.99
Vila Andrade.	440.566	446.003	886.569	17,445.38
Vila Leopoldina	2.900	2.936	5.836	4,034.83
Vila Mariana	1.587	1.606	3.193	4,560.68
Vila Sônia	82.456	83.473	165.929	7,383.34
Taboão da Serra	254.793	257.937	512.730	18,317.94
Pinheiros River Basin	2,609.996	2,642.203	5,252.199	12,191.74

Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

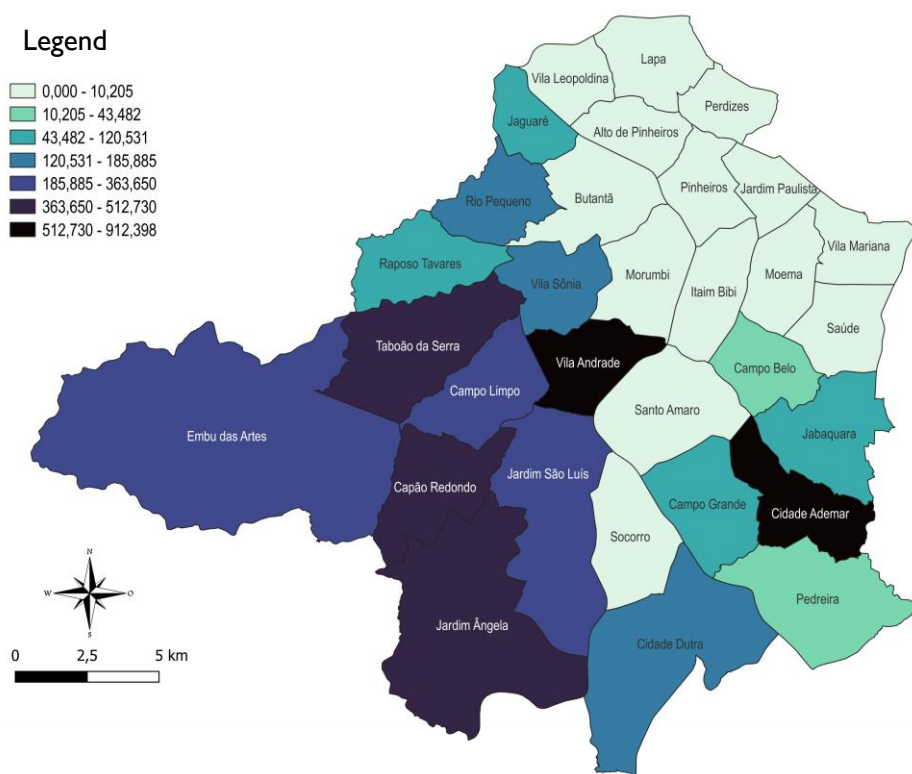
Map 4.4

Gains from sanitation universalization in the communities of the Pinheiros River Basin, in BRL millions, 2000 to 2022 and legacy



Map 4.5

Per capita gains in the communities of the districts of the Pinheiros River Basin, in BRL per inhabitant, 2000 to 2022 and legacy



Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

Chart 4.1.

Population and benefits from sanitation universalization in the communities of the Pinheiros River Basin, (%) of total, by municipality

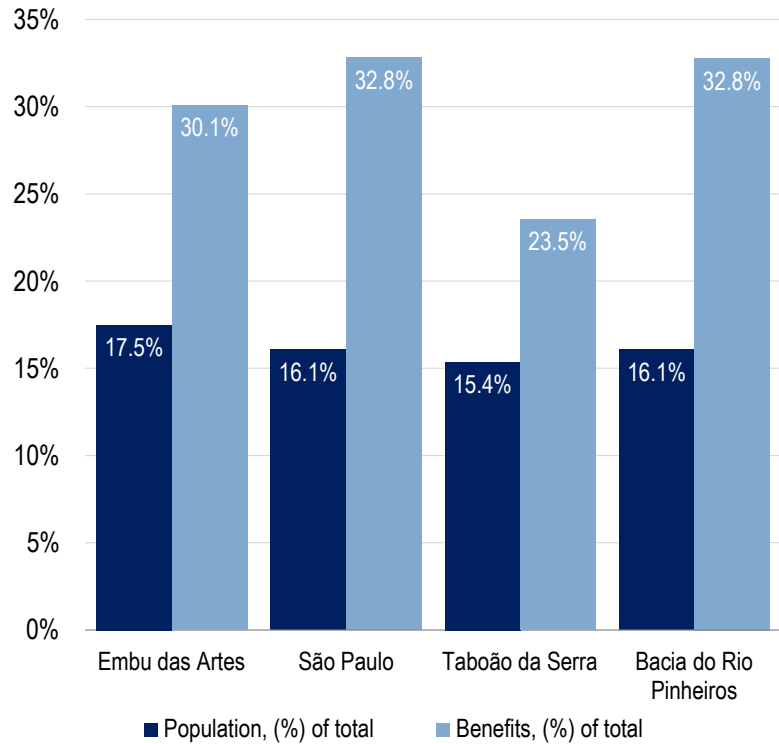
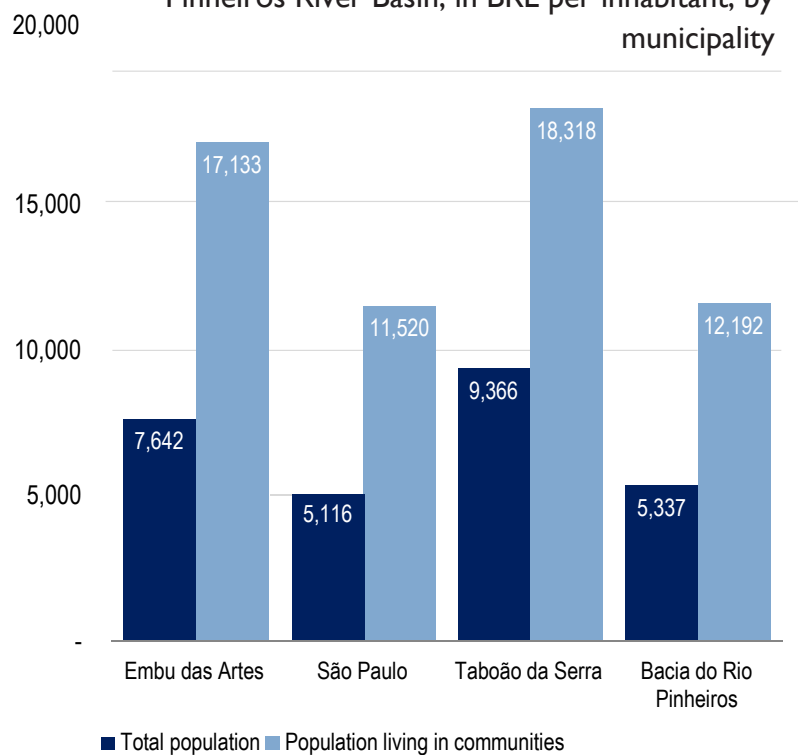


Chart 4.2.

Benefits from sanitation universalization in the communities and in the total population of the Pinheiros River Basin, in BRL per inhabitant, by municipality



Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

SANITATION ADVANCEMENT FROM THE PERSPECTIVE OF RESIDENTS OF INFORMAL URBAN COMMUNITIES IN THE PINHEIROS RIVER BASIN

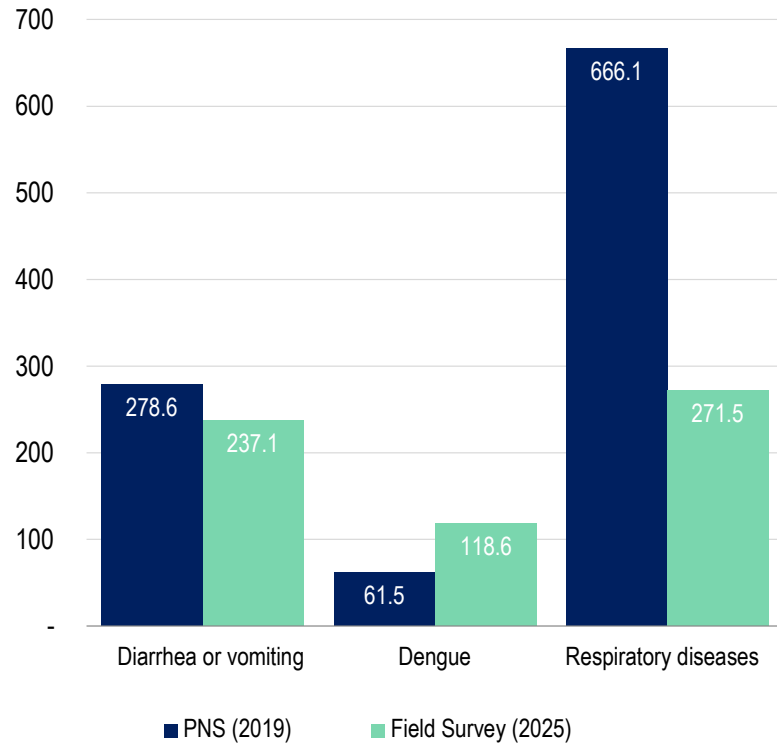
Chapter 4 identified significant welfare gains from the universalization of sanitation in the informal urban communities of the Pinheiros River Basin. Considering the size of the population living in these communities, the gains were relatively greater than the average for the residents of the Pinheiros River Basin, indicating more significant improvements for the relatively poorer population. This chapter presents information from a field survey conducted between April and May 2025, which complements the quantitative data analysis based on the IBGE Demographic Census data. The methodology and the answers to the field survey questions are presented in the Statistical Annex of the field survey at the end of this study.

5.1. Incidence of diseases in informal urban communities in the Pinheiros River Basin

The first point to be addressed based on the field survey data is the incidence of waterborne and respiratory diseases in the surveyed communities. Regarding this issue, residents were asked about the occurrence of absences from routine activities due to: (i) diarrhea and vomiting, (ii) dengue fever, and (iii) flu or pneumonia. These three categories of diseases are strongly correlated with the lack of sanitation, as verified by the study on diseases related to inadequate environmental sanitation by Instituto Trata Brasil (Instituto Trata Brasil, 2025a) and the study on the aggregate of the Pinheiros River Basin (Instituto Trata Brasil, 2025b).

Chart 5.1.

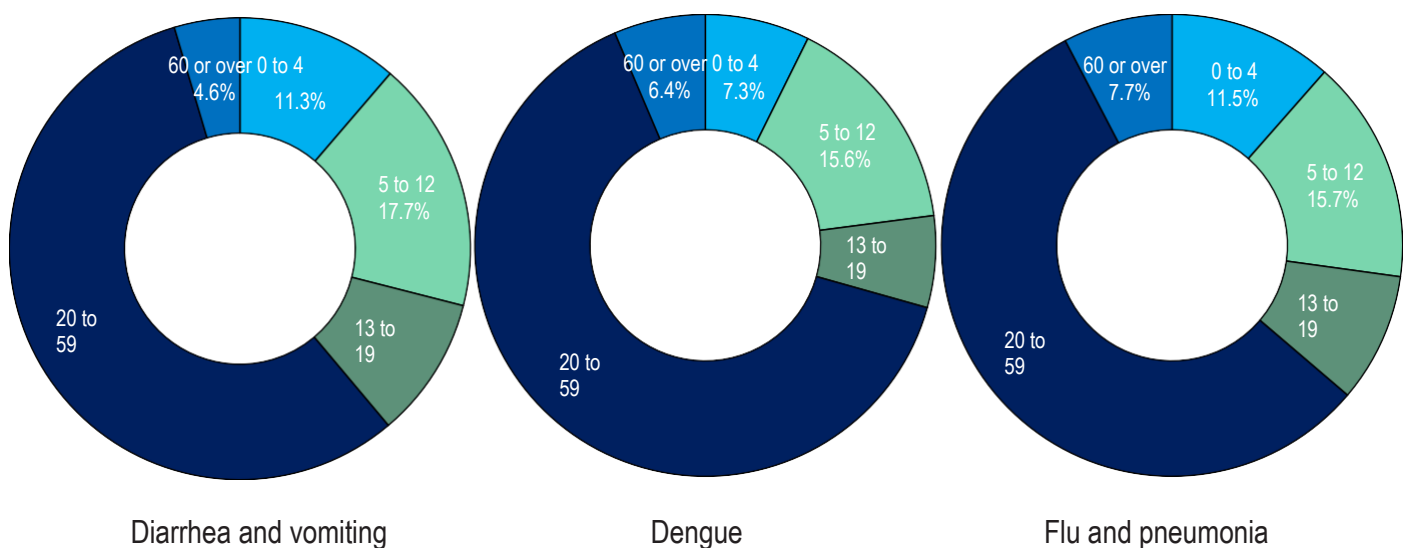
Incidence rates of waterborne and respiratory diseases in the surveyed informal urban communities, in cases per thousand inhabitants, 2025



Source: Favela Diz and IBGE. Prepared by: Ex Ante Consultoria Econômica.

Chart 5.2.

Distribution of cases of diseases related to lack of sanitation in the surveyed informal urban communities, by age group, 2025



Source: Favela Diz. Prepared by: Ex Ante Consultoria Econômica.

Chart 5.1 presents the incidence rates of diseases related to the lack of sanitation among the heads of households in the informal urban communities of the city of São Paulo located in the Pinheiros River Basin. The data refer to the months of April and May 2025. The incidence rate of diarrhea or vomiting reached 237.1 cases per thousand heads of household in 2025 (12-month period), resulting from 76 cases in a population of 3,846 people. In the case of dengue, the incidence rate reached 118.6 cases per thousand inhabitants. Finally, the incidence rate of respiratory diseases was 271.5 cases per thousand people.

These estimates were compared with data from the National Health Survey (PNS) conducted by IBGE in 2019 for the city of São Paulo, considering only households within the bottom 20% of per capita income in the city, a cutoff consistent with that of informal urban communities. Based on the occurrence of absences due to diarrhea among heads of household in São Paulo, it is estimated that in 2019 there were 278.6 absences per thousand inhabitants, i.e., a rate higher than the 237.1 cases per thousand inhabitants found in the 2025 field survey. This comparison suggests that there may have been a reduction in the incidence of these diseases in urban communities, partly as a result of progress in sanitation.

In the case of dengue, the PNS indicated a smaller number of cases: in 2019, there were 61.5 absences per thousand inhabitants. This rate was much lower than that found in the field survey, which reached 118.6 cases per thousand inhabitants. However, this difference is not surprising, since the city of São Paulo, like much of the Southeast and Central-West regions of Brazil, has been experiencing dengue outbreaks with record numbers since 2023. This idea is supported by statistics from the Ministry of Health, which indicate that the number of hospitalizations due to dengue in the city of São Paulo in the first half of 2025 (1,200 cases) was 4.5 times higher than the number of hospitalizations from this disease in the first half of 2019 (269 cases).

Finally, the field survey data indicated an incidence rate of respiratory diseases much lower than the rate recorded by the PNS in 2019, which was 666.1 cases per thousand inhabitants. This comparison reinforces the idea that there may have been a reduction in the incidence of these diseases associated with the lack of sanitation in urban communities.

Chart 5.2 shows the age-group distribution of the total number of cases identified in the field survey. For the three types of illnesses among all residents, there is a high concentration in the adult population aged 30 to 59 years, which has broad implications for the labor market. As highlighted by the Instituto Trata Brasil study (2025b), absences from work reduce the population's income, which in the case of the communities comes mainly from employment earnings.

Associating the incidence of absences due to these diseases in the surveyed households with variables that identify the physical and economic conditions of the dwellings helps explain the factors that influence the phenomenon.

In the case of the incidence of diarrhea and vomiting, the survey indicated that the following factors affected the occurrence of diseases in the communities: (i) water supply through the public network, (ii) regularity of the water supply, (iii) per capita household income, and (iv) location of the residence outside flood or inundation-prone areas. These four factors consistently reduced the incidence of diarrhea and vomiting in the sample.

In the case of dengue incidence, the survey indicated that the factors that affected the occurrence of diseases in the communities were: (i) waste disposal, (ii) water supply through the public network, (iii) sewage disposal, and (iv) per capita household income.

Finally, for the incidence of flu and pneumonia, the survey indicated that the factors that affected the occurrence of diseases in the communities were: (i) regularity of the water supply, (ii) per capita household income, (iii) sewage disposal,

and (iv) location of the dwelling outside flood or inundation-prone areas. In other words, these relationships indicate that sanitation has been essential in reducing the incidence of diseases in the communities of the Pinheiros River Basin.

5.2. Perception of well-being and impacts of the universalization of sanitation among residents of informal urban communities in the Pinheiros River Basin

By incorporating the perspective of residents of the selected communities regarding issues related to sanitation and its recent developments, the field survey data complement the conclusions drawn from the quantitative estimates of the benefits of expanding sanitation in the Pinheiros River Basin. The main statistics, through which we can develop a broader understanding of the process, are summarized in **Figure 5.1**.

The field survey showed that a significant share of respondents expressed concern about waterborne diseases. In total, 48.8% of respondents were concerned or very concerned, compared with only 37.0% who were not worried about the issue. Concern about these diseases was much higher among respondents living in dwellings where many cases of diarrhea or respiratory diseases had occurred in the recent past, **revealing that memories of problems related to the lack of sanitation remain present in respondents' minds.**

Another important information concerns families' satisfaction with sanitation services in general. In this regard, the survey revealed that there are proportionally more people dissatisfied with sanitation than satisfied: 47.2% versus 42.2%, respectively. The most dissatisfied families live in areas subject to flooding or inundation, without regular water supply, or where sewage does not discharge into the public sewer network. In general, these are homes without a water tank, that is, residences without their own water storage capacity, making any supply interruptions

more harmful. **These data show that dissatisfaction is based on concrete facts that, in the respondents' view, result in a loss of well-being.**

One noteworthy point is that the share of respondents who were aware of the Novo Rio Pinheiros project was smaller than the share who were unaware of it. Considering the extensive publicity surrounding the project at its launch in 2019, **the difference of 4.6 percentage points between those who were unaware of it and those who were aware suggests that the time elapsed since the beginning of the works had a significant effect on forgetfulness.**

Despite the lack of awareness, the vast majority of respondents (92.8%) consider the river-cleaning works on the Pinheiros River important or very important. This indicates that residents of the communities are aware of environmental issues and of the need to preserve the city's waterways. **Such a positive perception from the population is surprising, while at the same time indicating that the conditions are favorable for expanding these structured environmental recovery actions, and if these actions are carried out, there will be public support, especially among those who are likely to benefit from it.**

Regarding the effects of the works on families' daily lives, the field survey provided important information. For 46.9% of respondents, water supply services showed some improvement or improved a lot. Conversely, only 18.5% believe that the services have worsened. With respect to the presence of insects and animals that are disease vectors, perceptions were more balanced. Of the total respondents, 39.3% believe there has been a reduction in the number of mosquitoes, while 27.4% saw an increase in their number. The difference is reversed in the case of cockroaches and rats: 32.4% of respondents perceived a reduction, and 36.1% observed an increase. According to the respondents, the perception of a foul sewage odor near their homes decreased for 42.2% of residents in the surveyed communities, while for 25.1% of respondents the sewage odor worsened.

Finally, with regard to the incidence of diseases, the percentages of respondents who perceived reductions in diseases in general, and specifically in stomach and intestinal illnesses and respiratory diseases, exceeded the percentages of respondents who believed that there had been an increase in disease incidence. The differences between these two groups range from 13.5 to 15.8 percentage points.

These findings indicate that residents of informal urban communities perceive the improvements associated with the sanitation expansion and pollution-control efforts carried out in the Pinheiros River in recent years. These improvements are seen mainly as reductions in previously existing negative externalities, such as the incidence of diseases and foul odors. Thus,

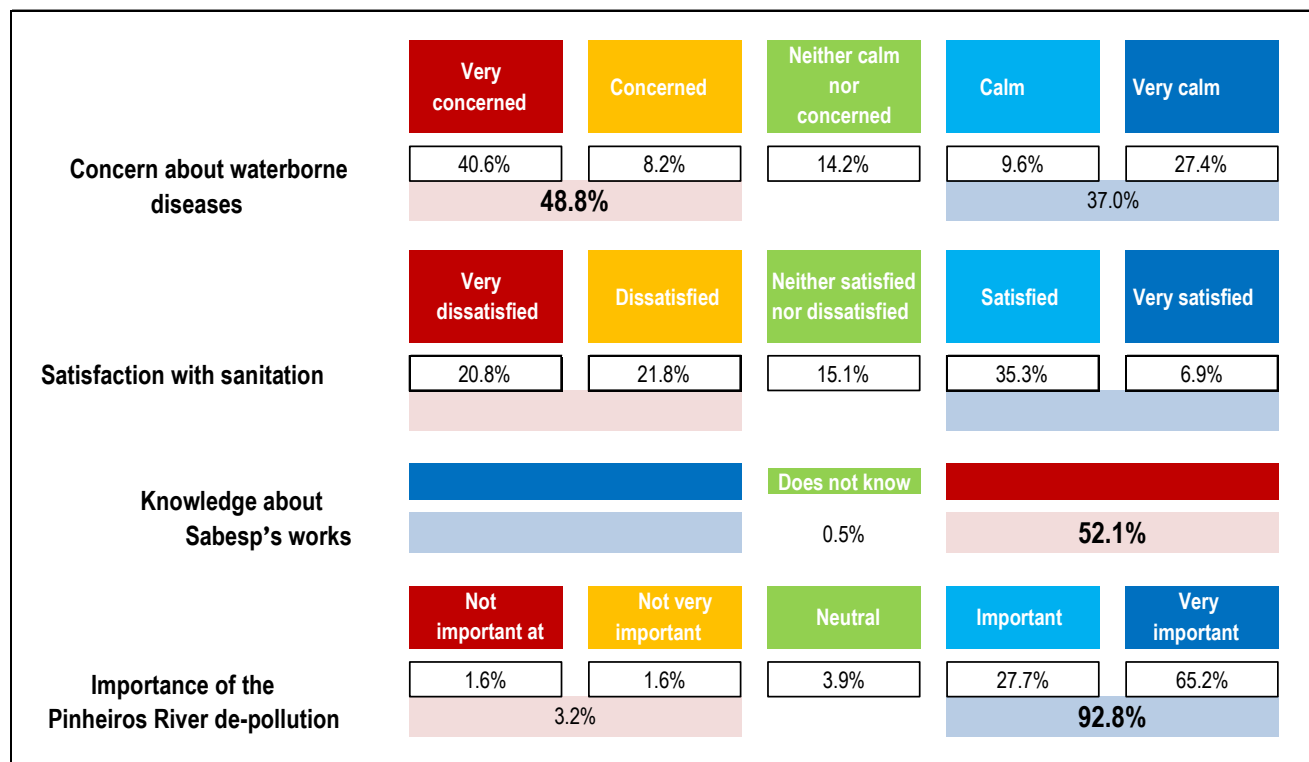
the field survey data reinforce the quantitative conclusion that the informal urban communities of the Pinheiros River Basin experienced net positive benefits from the expansion of sanitation in the region.

5.3. Personas

Although the average perception of the respondents is positive, it is important to note that there is a large variance in opinions within the sample of 1,300 individuals. There are groups with perceptions much more favorable than the population average, and others who perceived more worsening than improvements after Sabesp's works in the Pinheiros River Basin. To visualize the positioning of these groups, *personas*¹ were created, understood as fictional representations of real people who

Figure 5.1.

Overview of residents of the surveyed informal urban communities in the city of São Paulo located in the Pinheiros River Basin regarding diseases, sanitation, and Sabesp's works, 2025

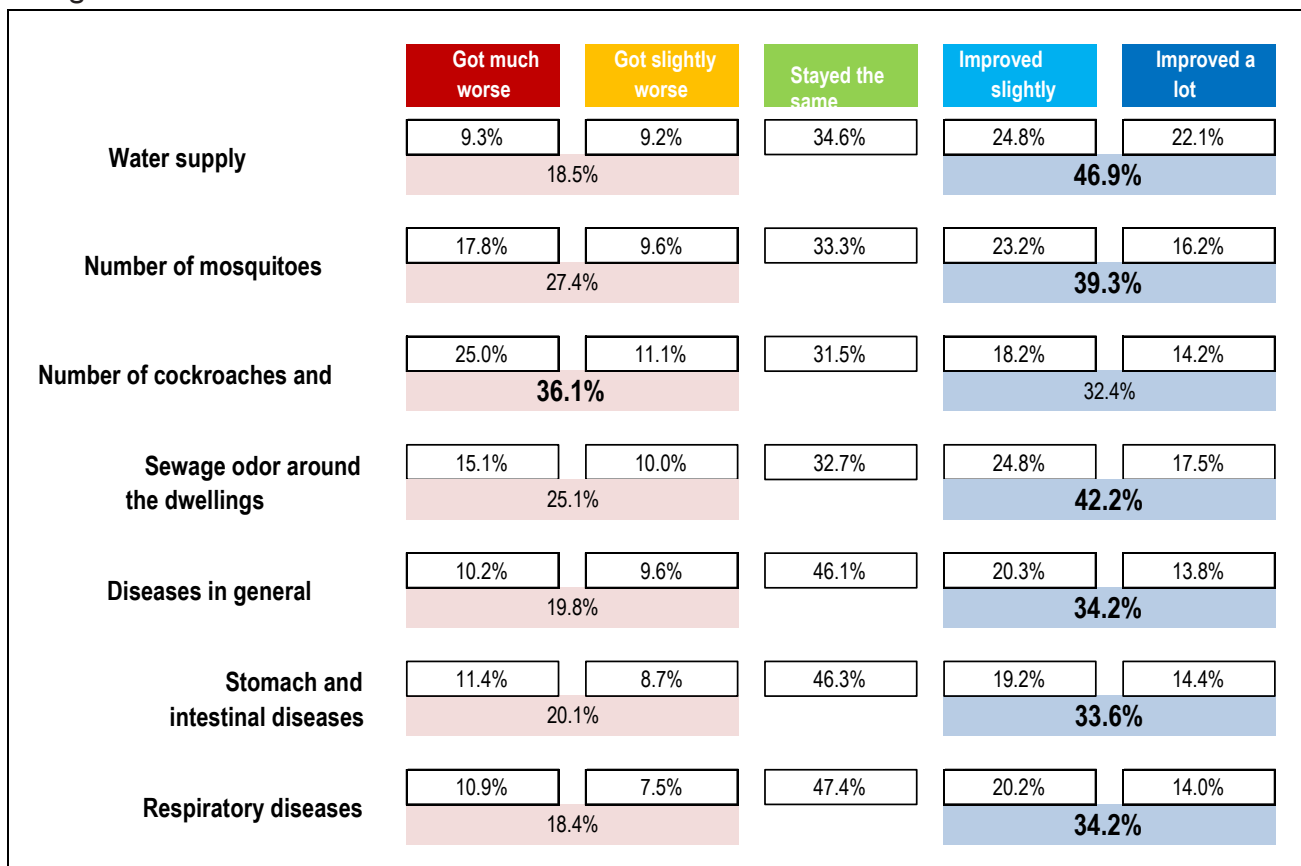


Source: Favela Diz. Prepared by: Ex Ante Consultoria Econômica.

¹The word *personas* is the plural of the Latin word *personae*, which means "character." In several fields of knowledge, from psychoanalysis to marketing, as well as medicine, politics, music, and graphic design, this concept is used to create archetypes that synthesize personal characteristics linked to worldviews and similar opinions. For more on this analytical tool, known as *Persona Studies*, see Marshall, Moore, and Barbour (2020).

Figure 5.2.

Perception of residents of the surveyed informal urban communities in the city of São Paulo located in the Pinheiros River Basin regarding changes after the works, 2025



Source: Favela Diz. Prepared by: Ex Ante Consultoria Econômica.

live in the informal urban communities of the Pinheiros River Basin and who are actual or potential Sabesp customers. What groups the respondents into distinct archetypes are their personal characteristics and their converging opinions regarding the topic, which in this case is the perception of changes in sanitary conditions after the works carried out by Sabesp in the Pinheiros River Basin. The analysis of the factors that most strongly influence opinions indicated two personal characteristics that differentiate those with more positive perceptions from those with less positive perceptions. These factors are: the age group of the respondents and gender. Regarding age, the respondents were divided into three groups: 16 to 29 years old, 30 to 49 years old, and 50 years old or older. Thus, six personas were created to compare their

perceptions regarding the changes after the works.

Figure 5.3 presents fictional images of the six personas developed in this study, whose opinions are evaluated in the following section.

Women aged 50 or older

The first persona analyzed represents women between 30 and 49 years of age. **Table 5.1** presents the personal characteristics of these women. The average age of this persona is approximately 61 years. This persona is characterized by a predominantly Black population (self-identified as Black or Brown) and with low educational attainment. One out of four of these women is retired, but 52% are still part of the labor force. This persona dedicates a significant amount of time to household chores, and their monthly

Figure 5.3.

Personas of informal communities in the city of São Paulo located in the Pinheiros River Basin



Prepared by: Ex Ante Consultoria Econômica.

household income is low, below 2 minimum wages (BRL 3,036.00). These women receive relatively few federal transfers from the Bolsa Família Program or from the Continuous Cash Benefit (BPC). They live in brick houses, with access to water supply and sewage collection services. They are more likely to live in a residence with a water tank. They have lived in these communities for more than six years.

The perception of the effects of Sabesp’s works in the Pinheiros River Basin on this persona’s daily life is presented in **Figure 5.4**. For 53.1% of the respondents, water supply services showed some improvement or improved a lot. This represents a frequency 6.2 percentage points higher than the sample average. For 13.8% of these women, the services worsened, which represents a frequency 4.6 percentage points lower than the average.

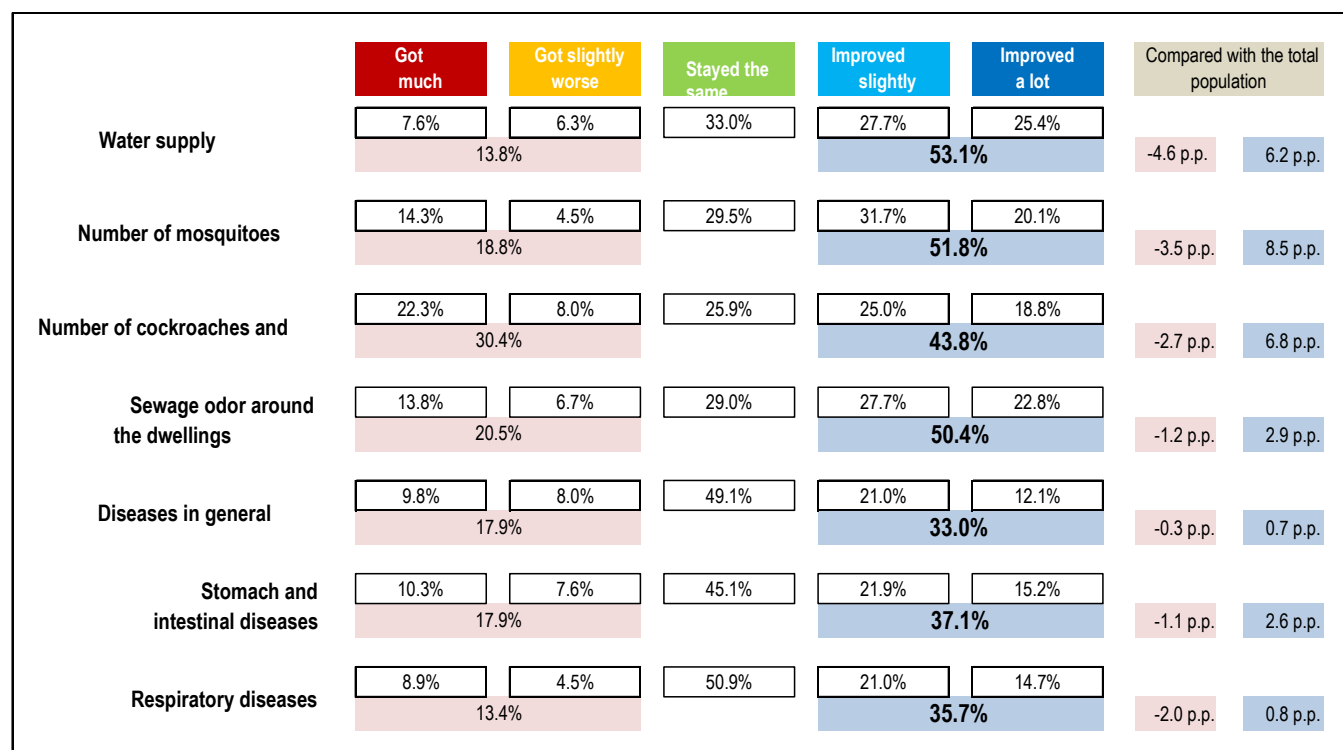
Table 5.1.

Personal characteristics of women aged 50 or older, informal communities in the city of São Paulo located in the Pinheiros River Basin, 2025

Average age: 60.9 years	
Ethnicity: 70.1% Black or Brown and 26.3% White	
Education: 62.5% with incomplete elementary education and 78.1% without a completed high school education	
Employment: 51.8% are in the labor force and 25.0% are retired	
Household chores: 70.7% are dedicated to household chores	
Income: 68.8% have a household income of up to 2 minimum wages (BRL 3,036.00)	
Transfers: only 18.3% of households receive Bolsa Família or BPC	
Housing: Houses (95.1%), built with masonry (99.1%), with access to treated water (98.7%), sewage collection (84.8%), and a water tank (55.8%)	
Time living in the community: 87.8% have lived in the community for more than 6 years	



Figure 5.4.
Perception of women aged 50 or older regarding
the changes after the works, informal communities in the Pinheiros River Basin, 2025



Source: Favela Diz. Prepared by: Ex Ante Consultoria Econômica.

Regarding the **presence of insects and animals** that are disease vectors, the perception of improvement is much more positive. Of the total respondents, 51.8% believe there has been a **reduction** in the number of mosquitoes, compared with 18.8% who observed an **increase** in the number of mosquitoes. These results indicate a positive perception frequency 8.5 percentage points higher than the sample average, and a negative perception 3.5 percentage points lower than the sample average.

In the case of **cockroaches and rats**, 43.8% of respondents perceived a **reduction** and 30.4% observed an **increase**. These results indicate a positive perception frequency 6.8 percentage points higher than the sample average, and a negative perception 2.7 percentage points lower than the sample average. Thus, most women aged 50 or older perceived improvements, in contrast to what is observed for the sample average.

For these women, the perception of improvement regarding the **foul sewage odor** near their homes is also relatively more positive. 50.4% of residents perceived improvements, and only 20.5% perceived worsening. These percentages are, respectively, 2.9 percentage points higher and 1.2 percentage points lower than the sample averages.

Finally, regarding the incidence of diseases, the percentages of respondents who perceived reductions in **diseases in general**, and specifically in **stomach/intestinal diseases and respiratory diseases**, exceeded the corresponding percentages in the overall sample. The opposite occurs regarding the percentage of women who believe there was an increase in the incidence of diseases.

In summary, these statistics indicate that, unequivocally, **women aged 50 or older living in the informal communities of São Paulo perceive the changes**

after Sabesp’s interventions in the Pinheiros River Basin as more positive than the average respondent.

Men aged 50 or older

The first persona analyzed represents men between 30 and 49 years of age. **Table 5.2** presents the personal characteristics of these men. The average age of this second persona is also approximately 61 years. This persona is also characterized by a predominantly Black population (self-identified as Black or Brown) and with low educational attainment. Three out of every ten of these men are retired, but 60% are still part of the labor force. This persona dedicates relatively little time to household chores, and their monthly household income is also low, below 2 minimum wages (BRL 3,036.00). These men receive relatively few federal transfers from the Bolsa Família Program or from the Continuous Cash Benefit (BPC), as is the case for women aged 50 or older. They live in

brick houses, with access to water supply and sewage collection services. There is also a higher likelihood that they live in a residence with a water tank. They have lived in these communities for more than six years (91.2% of the cases).

The perception of the effects of Sabesp’s works in the Pinheiros River Basin on this second persona’s daily life is presented in **Figure 5.5**. For 52.6% of respondents, water supply services showed some improvement or improved a lot. This represents a frequency 5.7 percentage points higher than the sample average. For only 11.7% of these men, the services worsened, which represents a frequency 6.8 percentage points lower than the sample average.

Regarding the **presence of insects and animals that are disease vectors**, this persona’s perception of improvement is also much more positive than the average. Of the total respondents, 48.5% believe there has been a reduction in the number of mosquitoes,

Table 5.2.
Personal characteristics of men aged 50 or older, informal communities in the city of São Paulo located in the Pinheiros River Basin, 2025

Average age: 60.9 years
Ethnicity: 64.3% Black or Brown and 30.4% White
Education: 68.4% with incomplete elementary education and 86.5% without a completed high school education
Employment: 60.2% are in the labor force and 30.4% are retired Household chores: 50.3% are dedicated to household chores
Income: 66.1% have a household income of up to 2 minimum wages (BRL 3,036.00)
Transfers: only 16.4% of households receive Bolsa Família or BPC
Housing: Houses (95.9%), built with masonry (97.7%), with access to treated water (98.8%), sewage collection (88.9%), and a water tank (60.2%)
Time living in the community: 91.2% have lived in the community for more than 6 years

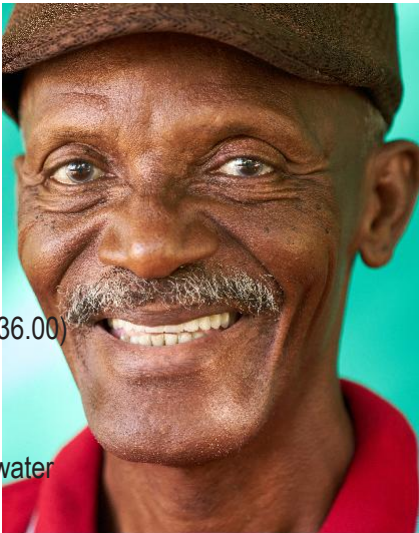
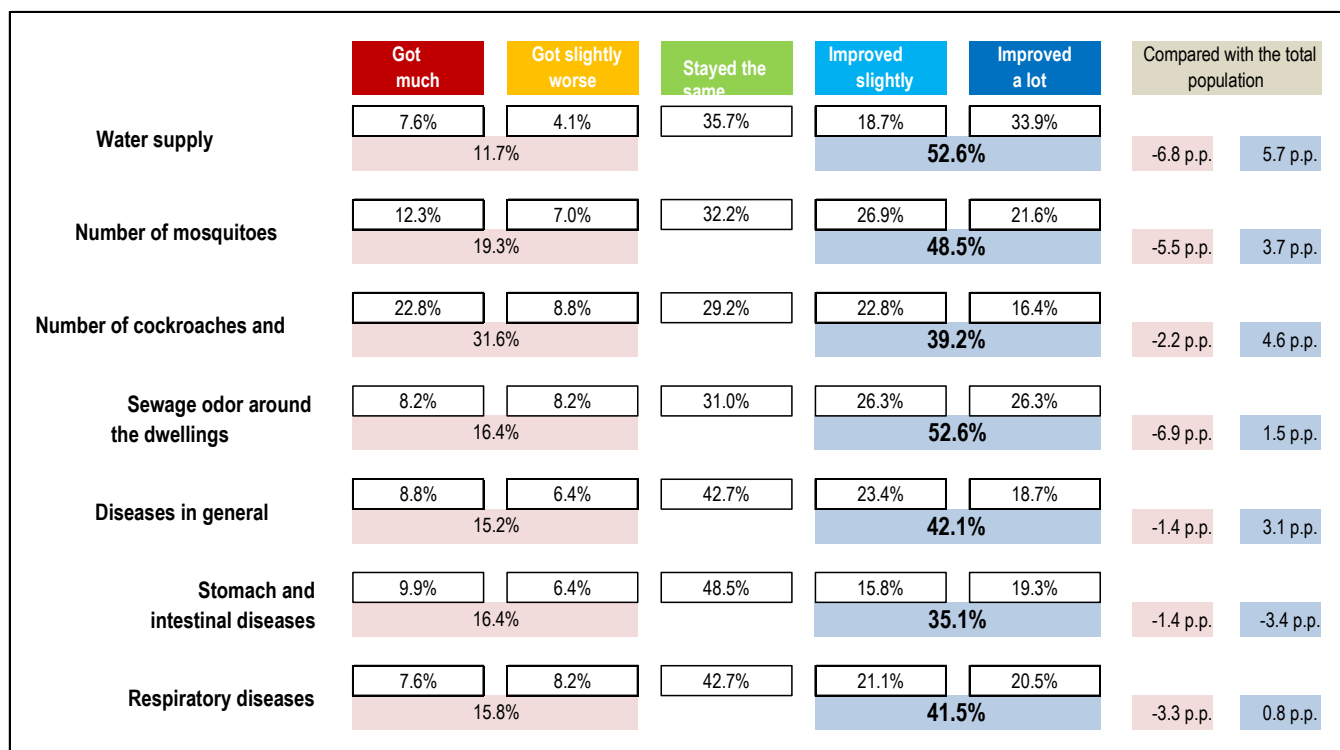


Figure 5.5.
Perception of men aged 50 or older regarding
the changes after the works, informal communities in the Pinheiros River Basin, 2025



Source: Favela Diz. Prepared by: Ex Ante Consultoria Econômica.

compared with 19.3% who observed an increase in their number. These results indicate a positive perception frequency 3.7 percentage points higher than the sample average, and a negative perception 5.5 percentage points lower than the average of all respondents.

Regarding the presence of cockroaches and rats, 39.2% of respondents perceived a reduction, while 31.6% believe there was an increase in cockroaches and rats. These results indicate a positive perception frequency 4.6 percentage points higher than the sample average, and a negative perception 2.2 percentage points lower than the sample average. As with the women aged 50 or older, most men aged 50 or older perceived improvements, in contrast with what is observed for the sample average.

For these men, the perception of improvement regarding the foul sewage odor near their homes is also relatively more positive.

52.6% of respondents perceived improvements, and only 16.4% perceived worsening. These percentages are, respectively, 1.5 percentage points higher and 6.9 percentage points lower than the sample averages.

With respect to the incidence of diseases, the percentage of respondents who perceived reductions in diseases in general exceeded the corresponding percentage observed in the overall sample: the difference was 3.1 percentage points. The opposite occurs regarding the percentage of men aged 50 or older who believe there was an increase in the incidence of diseases: in this case, the difference was 1.4 percentage points lower. However, it is worth noting that while this persona views improvements in respiratory diseases more positively, their perception regarding the incidence of stomach and intestinal illnesses is relatively less positive than that of the overall population and of women aged 50 or older.

Once again, the set of statistics indicates that **men aged 50 or older** living in the informal communities of São Paulo **perceive more positive changes after Sabesp’s interventions in the Pinheiros River Basin than the average respondent.** Their stance is similar to that of women in the same age group, indicating that the persona’s age positively influences how these individuals view the changes in sanitary conditions in the communities in recent years.

Women aged 30 to 49 years

The third persona analyzed represents women between 30 and 49 years of age. Table 5.3 presents the personal characteristics of these women. The average age of this persona is 39.4 years. This persona is also characterized by a predominantly Black population (self-identified as Black or Brown) and with low educational attainment, although their education level is higher than the average of women aged 50 or older. Approximately

85% of these women participate in the labor force, but the unemployment rate is relatively high: 14.4% compared with a sample average of 13.2%. This persona has the highest rate of dedication to household chores among all personas, and their monthly household income is relatively higher than that of women aged 50 or older: 65.0% have a household income below 2 minimum wages (BRL 3,036.00). These women receive the largest share of federal transfers from the Bolsa Família Program or the Continuous Cash Benefit (BPC): 41.6% of all women aged 30 to 49. Bolsa Família benefits largely account for this result. Like the older women, this persona lives in brick houses with access to water supply and sewage collection services. However, the likelihood of this persona living in a residence with a water tank is significantly lower. They have also lived in their communities for more than six years (82.3%).

Table 5.3.

Personal characteristics of women aged 30 to 49 years, informal communities in the city of São Paulo located in the Pinheiros River Basin, 2025

Average age: 39.4 years	
Ethnicity: 71.8% Black or Brown and 25.6% White	
Education: 31.6% with incomplete elementary education and 52.1% without a completed high school education	
Employment: 84.8% are in the labor force, but unemployment is high (14.4%)	
Household chores: 83.5% are dedicated to household chores	
Income: 65.0% have a household income of up to 2 minimum wages (BRL 3,036.00)	
Transfers: only 41.6% of households receive Bolsa Família or BPC	
Housing: Houses (96.6%), built with masonry (98.0%), with access to treated water (99.1%), sewage collection (89.7%), and a water tank (48.4%)	
Time living in the community: 82.3% have lived in the community for more than 6 years	

Figure 5.6.

Perception of women aged 30 to 49 regarding the changes after the works, informal communities in the Pinheiros River Basin, 2025

	Got much	Got slightly worse	Stayed the same	Improved slightly	Improved a lot	Compared with the total population	
Water supply	14.0%	12.0%	29.6%	27.1%	17.4%	44.4%	7.5 p.p. -2.5 p.p.
Number of mosquitoes	26.8%	11.1%	31.9%	20.8%	9.4%	30.2%	9.0 p.p. -2.4 p.p.
Number of cockroaches and	33.6%	14.2%	29.3%	14.2%	8.5%	22.8%	8.6 p.p. -4.0 p.p.
Sewage odor around the dwellings	21.1%	11.1%	33.9%	23.4%	10.5%	33.9%	6.0 p.p. -1.4 p.p.
Diseases in general	12.8%	12.0%	47.3%	19.4%	8.5%	27.9%	2.7 p.p. -0.9 p.p.
Stomach and intestinal diseases	16.0%	9.4%	47.9%	17.7%	9.1%	26.8%	4.6 p.p. -1.6 p.p.
Respiratory diseases	14.8%	9.7%	47.0%	19.9%	8.5%	28.5%	3.9 p.p. -0.3 p.p.

Source: Favela Diz. Prepared by: Ex Ante Consultoria Econômica.

The perception of the effects of Sabesp's works in the Pinheiros River Basin on this persona's daily life, shown in **Figure 5.6**, reveals a scenario quite different from that observed among the older population. For only 44.4% of respondents, water supply services showed some improvement or improved a lot. This represents a frequency 2.5 percentage points lower than the sample average. For 25.9% of these women, water supply services worsened, which represents a frequency 7.5 percentage points higher than the sample average.

The perception of improvement regarding the **presence of insects and animals that are disease vectors** is much more negative. Of the total respondents, only 30.2% believe there has been a **reduction** in the number of mosquitoes, compared with 37.9% who observed an **increase** in their number. These results indicate a positive perception frequency 2.4 percentage points lower than the sample average and a

negative perception 9.0 percentage points higher than the sample average.

A similar pattern is observed in the case of **cockroaches and rats**: 22.8% of respondents perceived a **reduction**, and 47.9% observed an **increase**. These results indicate a positive perception frequency 4.0 percentage points lower than the sample average and a negative perception 8.6 percentage points higher than the sample average. Thus, most women aged 30 to 49 perceived worsening, contrary to what is observed among women aged 50 or older.

For this group of women, the perception of improvement regarding the **foul sewage odor** near their homes is also relatively less positive: only 33.9% perceived improvements, a rate close to that of those who perceived worsening, which is 32.2%. These percentages are, respectively, 1.4 percentage

points lower and 6.0 percentage points higher than the sample average.

Finally, regarding the incidence of diseases, the percentages of respondents who perceived reductions in **diseases in general**, and also in **stomach/intestinal diseases and respiratory diseases**, were lower than the corresponding percentages in the overall sample. The opposite occurs regarding the percentage of women who believe there was an increase in the incidence of diseases.

In summary, these statistics indicate that **women aged 30 to 49** living in the informal communities of São Paulo **perceive the changes after Sabesp’s interventions in the Pinheiros River Basin less positively** than the average respondent.

Men aged 30 to 49 years

Men aged 30 to 49 represent the fourth persona analyzed in this study.

Table 5.4 presents the personal characteristics of these men. The average age of this fourth persona is also approximately 39.4 years, as in the case of the third persona. This persona is also characterized by a predominantly Black population (self-identified as Black or Brown) and with low educational attainment, although their education level is higher than the average of men aged 50 or older, which confirms the idea that educational attainment increases across generations. Almost all of these men (96%) are in the labor force, with an unemployment rate relatively lower than the sample average. This persona dedicates relatively little time to household chores, and their monthly household income is also relatively higher, since only 55.8% have a household income below 2 minimum wages (BRL 3,036.00). These men receive relatively few federal transfers from the Bolsa Família Program or the Continuous Cash Benefit (BPC), unlike what was observed among women aged 30 to 49. They also live in

Table 5.4.

Personal characteristics of men aged 30 to 49 years, informal communities in the city of São Paulo located in the Pinheiros River Basin, 2025

Average Age: 39.4 years

Ethnicity: 76.5% Black or Brown and 19.9% White

Education: 36.3% with incomplete elementary education and 59.3% without a completed high school education

Employment: 96.0% are in the labor force, but unemployment is high (9.2%)

Household chores: 60.6% are dedicated to household chores

Income: 55.8% have a household income of up to 2 minimum wages (BRL 3,036.00)

Transfers: only 18.1% of households receive Bolsa Família or BPC

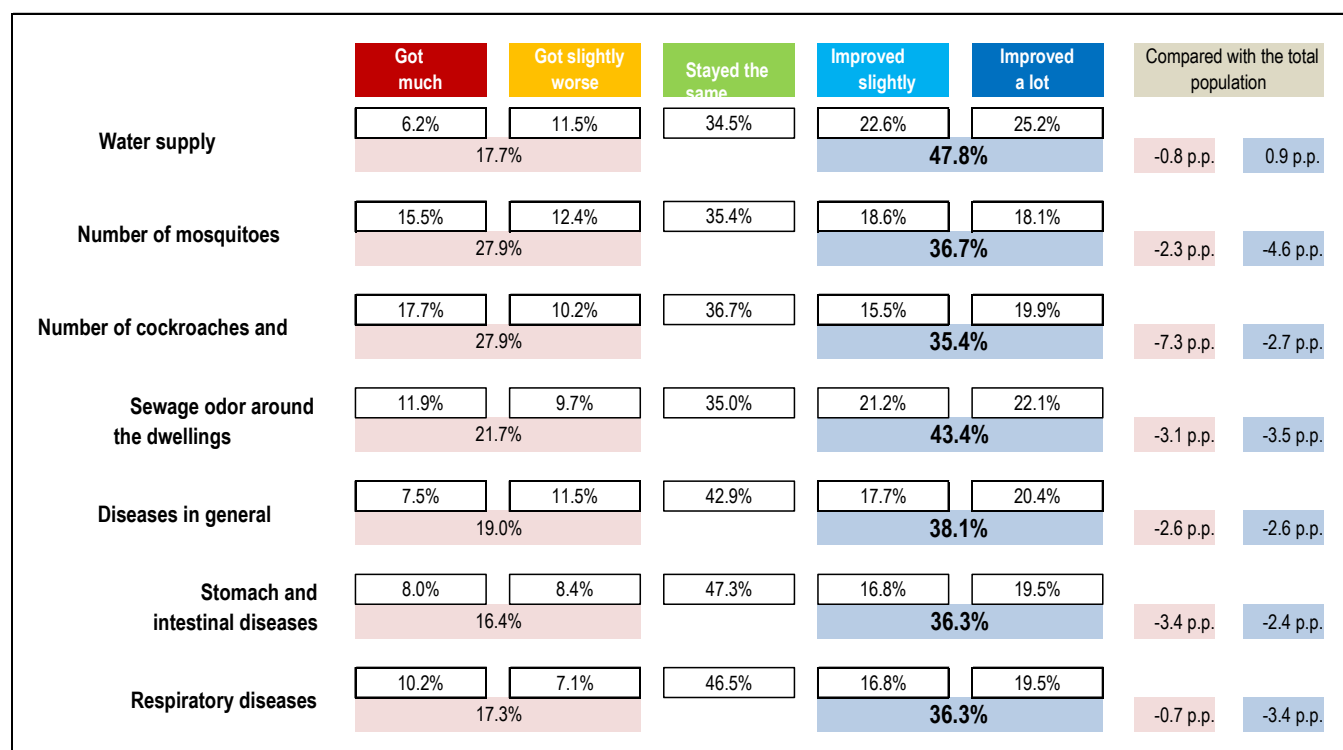
Housing: Houses (94.7%), built with masonry (97.6%), with access to treated water (99.1%), sewage collection (91.6%), and a water tank (60.2%)

Time living in the community: 82.7% have lived in the community for more than 6 years



Figure 5.7.

Perception of men aged 30 to 49 regarding the changes after the works, informal communities in the Pinheiros River Basin, 2025



Source: Favela Diz. Prepared by: Ex Ante Consultoria Econômica.

brick houses, with access to water supply and sewage collection services. There is also a relatively higher likelihood that they live in a residence with a water tank. They have lived in these communities for more than six years (82.7% of cases).

The perception of the effects of Sabesp's works in the Pinheiros River Basin on this fourth persona's daily life is presented in **Figure 5.7**. For 47.8% of respondents, water supply services showed some improvement or improved a lot. This represents a frequency 0.9 percentage point higher than the sample average. For only 17.7% of these men, the services worsened, representing a frequency 0.8 percentage point lower than the sample average.

For all other issues associated with sanitary conditions, this persona's perception is relatively less positive than the sample average. Regarding the **presence of insects and animals**

that are disease vectors, this persona's perception of improvement is also less positive than the average. Of the total respondents, 36.7% believe there has been a **reduction** in the number of mosquitoes, compared with 27.9% who observed an **increase** in their number. These results indicate a positive perception frequency 4.6 percentage points lower than the sample average, and a negative perception 2.3 percentage points lower than the average of all respondents. Note, however, that the share with a positive perception decreases more than the share with a negative perception, indicating a deterioration of the result relative to the sample average.

Regarding the **presence of cockroaches and rats**, a slightly different situation occurs: 35.4% of respondents perceived a **reduction**, and 27.9% believe there was an **increase in cockroaches and rats**. These results indicate a positive perception frequency 2.7 percentage points lower than the sample average, and a negative

perception 7.3 percentage points lower than the sample average. Thus, the share with a positive perception decreases less than the share with a negative perception, indicating a relative improvement in the result compared with the sample average.

For these men, the perception of improvement regarding the **foul sewage odor** near their homes is also relatively less positive. 43.2% of these men perceived improvements and 21.7% perceived worsening. These percentages are, respectively, 3.5 percentage points lower and 3.1 percentage points lower than the sample averages.

Regarding the incidence of diseases, the percentage of respondents who perceived reductions in **diseases in general** was lower than the corresponding percentage observed in the overall sample: the difference was 2.6 percentage points less. The same occurs regarding the percentage of men aged 30 to 49 who believe there was an increase in the incidence of diseases:

in this case, the difference was also 2.6 percentage points less. It is worth noting that this persona perceives improvements in both respiratory diseases and stomach/intestinal diseases less positively.

Thus, the set of statistics indicates that **men aged 30 to 49** living in the informal communities of São Paulo **perceive the changes after Sabesp’s interventions in the Pinheiros River Basin less positively** than the average respondent. Their perspective is closer to that of women in the same age group, reinforcing the idea that the persona’s age positively influences how these individuals perceive the changes in sanitary conditions in the communities in recent years.

Women aged 16 to 29 years

The third female persona analyzed in this study represents women aged 16

Table 5.5

Personal characteristics of women aged 16 to 29 years, informal communities in the city of São Paulo located in the Pinheiros River Basin, 2025

Average age: 23.8 years

Ethnicity: 71.9% Black or Brown and 26.0% White

Education: 14.6% with incomplete elementary education and 41.7% without a completed high school education

Employment: 92.7% are in the labor force, but unemployment is very high (21.9%)

Household chores: 78.1% are dedicated to household chores

Income: 70.8% have a household income of up to 2 minimum wages (BRL 3,036.00)

Transfers: 43.8% of households receive Bolsa Família or BPC

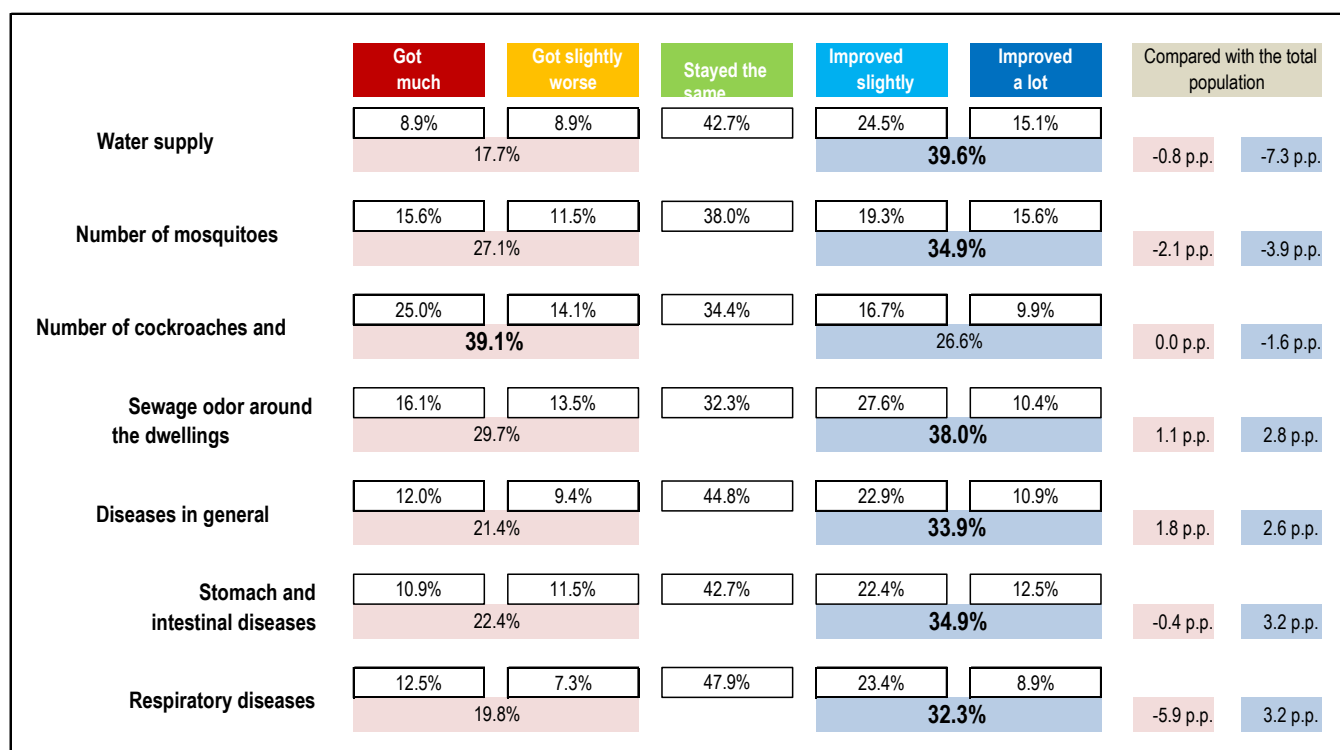
Housing: Houses (97.9%), built with masonry (98.4%), with access to treated water (100%), sewage collection (85.4%), and a water tank (47.4%)

Time living in the community: 69.3% have lived in the community for more than 6 years



Figure 5.8.

Perception of women aged 16 to 29 regarding the changes after the works, informal communities in the Pinheiros River Basin, 2025



Source: Favela Diz. Prepared by: Ex Ante Consultoria Econômica.

to 29. **Table 5.5** presents the personal characteristics of these women. The average age of this persona is 23.8 years. This persona is also characterized by a predominantly Black population (self-identified as Black or Brown), but already shows more advanced educational attainment: 58.3% of these women have at least completed high school. Approximately 93% of these women participate in the labor force, but the unemployment rate is extremely high: 21.9% compared with a sample average of 13.2%. This persona has the lowest rate of dedication to household chores among the women, and their monthly household income is relatively low, as 70.8% have a household income below 2 minimum wages (BRL 3,036.00). These women also receive larger amounts of federal transfers from the Bolsa Família Program or the Continuous Cash Benefit (BPC): 52.6% of all women aged 30 to 49. In this result, Bolsa Família benefits for women with children play an important role. Like the other female personas, this persona lives in brick

houses, with access to water supply and sewage collection services. She has the lowest likelihood of living in a residence with a water tank among all personas analyzed. They have also lived in their communities for more than six years (69.3%).

The perception of the effects of Sabesp's works in the Pinheiros River Basin on this persona's daily life is presented in Figure 5.8. A scenario quite different from that of the female persona aged 50 or older can be seen, but similar to that of the female persona aged 30 to 49. For only 39.6% of respondents, water supply services showed some improvement or improved a lot. This represents a frequency 7.3 percentage points lower than the sample average. For 17.7% of these women, water supply services worsened, which is a frequency very close to the sample average.

The perception of improvement regarding the **presence of insects and animals that are disease vectors** is also more negative than the sample average. Of the total respondents, only 34.9% believe there has been a **reduction** in the number of mosquitoes, compared with 27.1% who observed an **increase**. These results indicate a positive perception frequency 3.9 percentage points lower than the sample average, and a negative perception 2.1 percentage points lower than the sample average.

A similar pattern is observed regarding the **presence of cockroaches and rats**: 26.6% of respondents perceived a **reduction** and 39.1% observed an **increase**. These results indicate a positive perception frequency 1.6 percentage points lower than the sample average, with a negative perception identical to the sample average. Thus, most women aged 16 to 29 perceive worsening, unlike what is observed among women aged 50 or older.

However, for this persona, the perception of improvement regarding the **foul sewage odor** near their homes is also relatively more positive: 38.0% perceived improvements, a rate higher than that of the women who perceived worsening, which is 29.7%. These percentages are, respectively, 2.8 percentage points higher and 1.1 percentage points higher than the sample average.

Regarding the incidence of diseases, the percentages of respondents who perceived reductions in **diseases in general**, and also in **stomach/intestinal diseases and respiratory diseases**, were higher than the corresponding percentages of the overall sample. The opposite occurs regarding the percentage of women who believe there was an increase in the incidence of diseases. This position is quite different from that of the women aged 30 to 49.

In summary, these statistics indicate that **women aged 16 to 29** living in the

Table 5.6

Personal characteristics of men aged 16 to 29 years, informal communities in the city of São Paulo located in the Pinheiros River Basin, 2025

Average Age: 23.2 years

Ethnicity: 73.5% Black or Brown and 23.5% White

Education: 7.4% with incomplete elementary education and 47.8% without a completed high school education

Employment: 91.9% are in the labor force, but unemployment is high (12.5%)

Household chores: 52.9% are dedicated to household chores

Income: 50.7% have a household income of up to 2 minimum wages (BRL 3,036.00)

Transfers: only 25.0% of households receive Bolsa Família or BPC

Housing: Houses (96.3%), built with masonry (97.8%), with access to treated water (98.5%), sewage collection (88.2%), and a water tank (52.9%)

Time living in the community: 75.0% have lived in the community for more than 6 years



informal communities of São Paulo **perceive the changes after Sabesp's interventions in the Pinheiros River Basin positively**. This persona holds an intermediate stance between the positive perception of women aged 50 or older and the negative perception of women aged 30 to 49.

Men aged 16 to 29 years

Men aged 16 to 29 represent the sixth and final persona analyzed in this study. **Table 5.6** presents the personal characteristics of these men. The average age of this persona is approximately 23.2 years, a slightly lower age than that of the fifth persona. This persona is also characterized by a predominantly Black population (self-identified as Black or Brown) and with higher educational attainment – 52.2% of respondents with this profile had at least completed high school, which reinforces the idea that education advances across generations. Most of these men (92%) are in the labor force, with an unemployment rate of 12.5%. This persona dedicates relatively little time to household chores, and their monthly household income is also relatively higher, as only 50.7% of respondents have a household income below 2 minimum wages (BRL 3,036.00). These men receive relatively few federal transfers from the Bolsa Família Program or the Continuous Cash Benefit (BPC), unlike what was observed among women aged 16 to 29. They also live in brick houses, with access to water supply and sewage collection services. There is also a relatively higher likelihood that they live in a residence with a water tank. They have lived in these communities for more than six years (75.0% of cases).

An important aspect to note is that this male persona has a more positive perception than the persona of the same age but of the opposite sex. The perception of the effects of Sabesp's works in the Pinheiros River Basin on this persona's daily life is presented in **Figure 5.9**.

For 44.9% of respondents, water supply services showed some improvement or improved a lot. This represents a frequency 2.1 percentage points lower than the sample average, but higher than that of women aged 16 to 29. For only 17.6% of these men, the services worsened, which represents a frequency 0.8 percentage point lower than the sample average.

Regarding the **presence of insects and animals that are disease vectors**, this persona's perception of improvement is also slightly more positive than the sample average. Of the total respondents, 41.2% believe there has been a **reduction** in the number of mosquitoes, compared with 24.3% who observed an **increase** in their number. These results indicate a positive perception frequency 0.4 percentage point lower than the sample average, and a negative perception 3.8 percentage points lower than the average of all respondents.

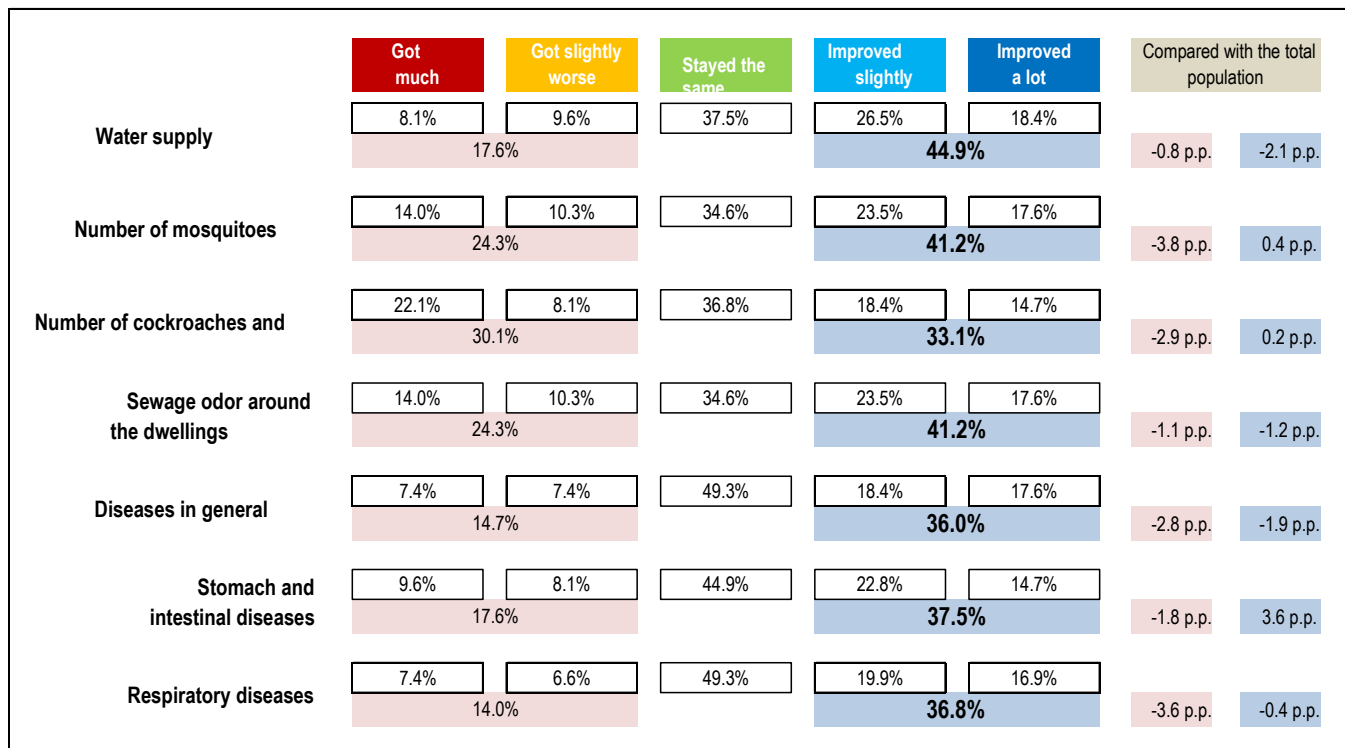
Regarding the **presence of cockroaches and rats**, a situation similar to the previous one occurs: 33.1% of respondents perceived a **reduction**, and 30.1% believe there was an **increase** in cockroaches and rats. These results indicate a positive perception frequency 0.2 percentage point lower than the sample average, and a negative perception 2.9 percentage points lower than the sample average.

For this persona, the perception of improvement regarding the **foul sewage odor** near their homes is also relatively less positive. 41.2% of these men perceived improvements and 24.3% perceived worsening. These percentages are, respectively, 1.2 percentage points lower and 1.1 percentage points lower than the sample averages.

Regarding the incidence of diseases, the percentage of respondents who perceived reductions in **diseases in general** was lower than the corresponding percentage observed in the overall sample: the difference was 1.9 percentage points less. The same occurs regarding the percentage of men aged 16 to 29 who believe there was an increase in the incidence of respiratory diseases: in this case, the difference was also

Figure 5.9.

Perception of men aged 16 to 29 regarding the changes after the works, informal communities in the Pinheiros River Basin, 2025



Source: Favela Diz. Prepared by: Ex Ante Consultoria Econômica.

0.4 percentage point less. It is worth noting, however, that this persona perceives improvements in stomach and intestinal diseases more positively.

Thus, the set of statistics indicates that **men aged 16 to 29** living in the informal communities of São Paulo **perceive the changes after Sabesp's interventions in the Pinheiros River Basin less positively** than older men, but their perception is more positive than that of women in the same age group.

Determinants of positioning

Finally, it is worth analyzing the factors that determine the positioning of the personas presented in this study. Clearly, age and gender decisively influence the personas' perceptions regarding the changes observed after

Sabesp's works in the Pinheiros River Basin. Men generally have more positive perceptions than women, and as personas fall into higher age groups, their perceptions become more positive.

Another factor that affects positioning – and that is associated with age itself – is the length of residence in the community: residents who have lived longer in the same community have more positive perceptions. In addition, positioning is related to the personas' perception of quality of life: those with more positive perceptions assign higher scores to their quality of life. Personas with lower household income and heavier workloads inside and outside the home tend to have less positive perceptions. Finally, it is worth noting that the incidence of diseases related to the lack of sanitation affects the personas' perceptions: for personas with lower incidence of diseases (diarrhea and

vomiting, dengue, flu, and pneumonia), the perception of the changes brought by sanitation works in the Pinheiros River Basin is relatively more positive. In other words, the most positive personas are those who experienced lower incidence rates of these diseases in their homes.



6

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METHODOLOGICAL ANNEX I.

CHARACTERISTICS OF THE UNIVERSE OF DWELLINGS IN INFORMAL URBAN COMMUNITIES

This Annex provides the tabulation of the characteristics of the universe of dwellings in informal urban communities based on data from the 2022 Demographic Census. The informal urban communities were divided into three: Paraisópolis, Água Espreiada, and Pirajuçara. The characteristics of the population are presented (Tables A.I.1 to A.I.4), as well as those of household heads (Tables A.I.5 to A.I.8), and of the dwellings (Tables A.I.9 to A.I.14).

Table A.I.1 Population by gender, 2022

Field areas	Women	Men	Total
Paraisópolis	30,315	28,212	58,527
Água Espreiada	36,859	33,728	70,587
Pirajuçara	38,891	36,565	75,456
Total	106,065	98,505	204,570
Share			
Paraisópolis	51.8%	48.2%	100.0%
Água Espreiada	52.2%	47.8%	100.0%
Pirajuçara	51.5%	48.5%	100.0%
Total	51.8%	48.2%	100.0%

Table A.I.2 Population by self-declared race, 2022

Field areas	White	Black	Asian	Brown	Indigenous	Not declared	Total
Paraisópolis	17,808	8,105	26	32,489	85	14	58,527
Água Espreiada	22,886	11,543	76	35,677	63	342	70,587
Pirajuçara	23,479	11,260	47	40,145	137	388	75,456
Total	64,173	30,908	149	108,311	285	744	204,570
Share							
Paraisópolis	30.4%	13.8%	0.0%	55.5%	0.1%	0.0%	100.0%
Água Espreiada	32.4%	16.4%	0.1%	50.5%	0.1%	0.5%	100.0%
Pirajuçara	31.1%	14.9%	0.1%	53.2%	0.2%	0.5%	100.0%
Total	31.4%	15.1%	0.1%	52.9%	0.1%	0.4%	100.0%

Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

Table A.1.3
Population by age group, 2022

Field areas	0 to 14 years from	15 to 59 years	60 or older	Total
Paraisópolis	14,526	40,797	3,204	58,527
Água Espraiada	15,769	47,574	7,244	70,587
Pirajuçara	17,841	51,407	6,208	75,456
Total	48,136	139,778	16,656	204,570
Share				
Paraisópolis	24.8%	69.7%	5.5%	100.0%
Água Espraiada	22.3%	67.4%	10.3%	100.0%
Pirajuçara	23.6%	68.1%	8.2%	100.0%
Total	23.5%	68.3%	8.1%	100.0%

Table A.1.4 Population by literacy, 2022

Field areas	Can read and write	Cannot read write	Total
Paraisópolis	40,507	18,020	58,527
Água Espraiada	50,940	19,647	70,587
Pirajuçara	53,770	21,686	75,456
Total	145,217	59,353	204,570
Literacy rate			
Paraisópolis	69.2%	30.8%	100.0%
Água Espraiada	72.2%	27.8%	100.0%
Pirajuçara	71.3%	28.7%	100.0%
Total	71.0%	29.0%	100.0%

Table A.1.5 Household heads by gender, 2022

Field areas	Women	Men	Total
Paraisópolis	12,464	8,982	21,446
Água Espraiada	14,152	10,403	24,555
Pirajuçara	15,009	11,182	26,191
Total	41,625	30,567	72,192
Share			
Paraisópolis	58.1%	41.9%	100.0%
Água Espraiada	57.6%	42.4%	100.0%
Pirajuçara	57.3%	42.7%	100.0%
Total	57.7%	42.3%	100.0%

Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

Table A.1.6
Age group of household heads, 2022

Field areas	12 to 17 years	1 to 24 years	25 to 39 years to	40 to 59 years	60 years or older	Total
Paraisópolis	124	2,473	8,271	8,364	2,166	21,398
Água Espreiada	103	1,805	7,370	10,370	4,798	24,446
Pirajuçara	139	2,454	8,808	10,696	4,012	26,109
Total	366	6,732	24,449	29,430	10,976	71,953
Share						
Paraisópolis	0.6%	11.6%	38.7%	39.1%	10.1%	100.0%
Água Espreiada	0.4%	7.4%	30.1%	42.4%	19.6%	100.0%
Pirajuçara	0.5%	9.4%	33.7%	41.0%	15.4%	100.0%
Total	0.5%	9.4%	34.0%	40.9%	15.3%	100.0%

Table A.1.7
Household heads by literacy, 2022

Field areas	Can read and not write	Can read and write	Total
Paraisópolis	19,364	2,066	21,446
Água Espreiada	22,297	2,216	24,555
Pirajuçara	23,900	2,246	26,191
Total	65,561	6,528	72,192
Literacy rate			
Paraisópolis	90.3%	9.6%	100.0%
Água Espreiada	90.8%	9.0%	100.0%
Pirajuçara	91.3%	8.6%	100.0%
Total	90.8%	9.0%	100.0%

Table A.1.8
Dwellings by type, 2022

Field areas	Occupied	Vacant	Improvised	Collective	Total
Paraisópolis	21,442	1,412	5	2	22,861
Água Espreiada	24,435	2,491	125	1	27,052
Pirajuçara	26,041	2,266	152	1	28,460
Total	71,918	6,169	282	4	78,373
Share					
Paraisópolis	93.8%	6.2%	0.0%	0.0%	100.0%
Água Espreiada	90.3%	9.2%	0.5%	0.0%	100.0%
Pirajuçara	91.5%	8.0%	0.5%	0.0%	100.0%
Total	91.8%	7.9%	0.4%	0.0%	100.0%

Table A.I.9
Dwellings by type, 2022

Field areas	House	Apartment	unit	Substandard*	Total
Paraisópolis	21,094	299	48	1	21,442
Água Espraiada	23,592	69	683	91	24,435
Pirajuçara	25,289	219	479	54	26,041
Total	69,975	587	1,210	146	71,918
Share					
Paraisópolis	98.4%	1.4%	0.2%	0.0%	100.0%
Água Espraiada	96.6%	0.3%	2.8%	0.4%	100.0%
Pirajuçara	97.1%	0.8%	1.8%	0.2%	100.0%
Total	97.3%	0.8%	1.7%	0.2%	100.0%

Table A.I.10
Population by type of dwelling, 2022

Field areas	House	Apartment	unit	Substandard*	Total
Paraisópolis	57,550	841	125	1	58,517
Água Espraiada	67,808	180	1,961	302	70,251
Pirajuçara	72,884	669	1,375	143	75,071
Total	198,242	1,690	3,461	446	203,839
Share					
Paraisópolis	98.3%	1.4%	0.2%	0.0%	100.0%
Água Espraiada	96.5%	0.3%	2.8%	0.4%	100.0%
Pirajuçara	97.1%	0.9%	1.8%	0.2%	100.0%
Total	97.3%	0.8%	1.7%	0.2%	100.0%

Table A.I.11
Population with access to the public water supply network, 2022

Field areas	With access	Without access	Total
Paraisópolis	58,444	73	58,517
Água Espraiada	69,993	258	70,251
Pirajuçara	74,085	986	75,071
Total	202,522	1,317	203,839
Share			
Paraisópolis	99.9%	0.1%	100.0%
Água Espraiada	99.6%	0.4%	100.0%
Pirajuçara	98.7%	1.3%	100.0%
Total	99.4%	0.6%	100.0%

Source: IBGE. Prepared by: Ex Ante Consultoria Econômica.

Table A.1.12
Population by availability of exclusive-use bathroom, 2022

Field areas	Have access	Do not have access	Total
Paraisópolis	58,493	24	58,517
Água Espreiada	70,156	95	70,251
Pirajuçara	74,986	85	75,071
Total	203,635	204	203,839
Share			
Paraisópolis	100.0%	0.0%	100.0%
Água Espreiada	99.9%	0.1%	100.0%
Pirajuçara	99.9%	0.1%	100.0%
Total	99.9%	0.1%	100.0%

Table A.1.13
Population with access to the public sewerage system or adequate septic tank, 2022

Field areas	Have access	Do not have access	Total
Paraisópolis	54,659	3,858	58,517
Água Espreiada	56,385	13,866	70,251
Pirajuçara	58,202	16,869	75,071
Total	169,246	34,593	203,839
Share			
Paraisópolis	93.4%	6.6%	100.0%
Água Espreiada	80.3%	19.7%	100.0%
Pirajuçara	77.5%	22.5%	100.0%
Total	83.0%	17.0%	100.0%

Table A.1.14
Population by waste disposal, 2022

Field areas	Collected	Others*	Total
Paraisópolis	58,379	138	58,517
Água Espreiada	68,872	1,379	70,251
Pirajuçara	74,475	596	75,071
Total	201,726	2,113	203,839
Share			
Paraisópolis	99.8%	0.2%	100.0%
Água Espreiada	98.0%	2.0%	100.0%
Pirajuçara	99.2%	0.8%	100.0%
Total	99.0%	1.0%	100.0%

METHODOLOGICAL ANNEX 2. FIELD SURVEY METHODOLOGY

I) SURVEY UNIVERSE

The survey universe was defined based on the selection of census tracts by the Client for 3 communities/favelas in São Paulo, as described below:

- 1) **Paraisópolis Community:** 22,629 households distributed across 78 census tracts.
- 2) **Água Espraiada Community** – (Água Espraiada (51) + Cidade Ademar (79)): 19,615 households distributed across 130 census tracts.
- 3) **Pirajuçara Community** – (Pirajuçara (69) + Campo Limpo (51)): 24,197 households distributed across 148 census tracts.

II) SAMPLE

- 1) # of interviews per Community: 443 interviews.
- 2) #of interviews per Tract: 7 interviews.
- 3) Paraisópolis Community: 76 census tracts surveyed.
- 4) Água Espraiada Community: 69 census tracts surveyed.
- 5) Pirajuçara Community: 69 census tracts surveyed.
- 6) # of tracts per Community: 63 tracts. The selection of tracts followed descending population size, from the most populous to the least, until reaching the total of 63. The remaining tracts were designated as “reserve tracts” and were used as needed whenever any of the “primary tracts” in each Community had to be replaced due to safety concerns and/or verification/quality of interviews.

III) DATA COLLECTION

- 1) 29 interviewers were trained to administer the questionnaire via tablet before field deployment.
- 2) Each interviewer conducted 20% or less of the total number of interviews (1,300).
- 3) In addition to the tablet as a working tool, they carried maps of the census tracts to perform the “listing” with the objective of completing 7 interviews per tract.
 - a. Some tracts have **more than 7** interviews due to return visits to the field (“sample boost”) to adjust the profile of children and/or households without sewer connection in the sample of each Community.
 - b. Some tracts have **fewer than 7** interviews due to Quality Control procedures.
- 4) The listings within the tracts began randomly and alternated between the beginning, middle, and end of the tract.

IV) INTERVIEW VERIFICATION

- 1) 20% of the interviews conducted by each interviewer were listened to during fieldwork execution.
- 2) 100% of the interviews had recorded audio.
- 3) 100% of the interview locations were verified by GPS at the moment the electronic questionnaire was opened.

Table A.2.I Field Survey Questionnaire, 2025

Number	Question	Values	Description
Respondent profile			
1	Respondent's gender	1	Male
		2	Female
2	How long have you lived continuously in this community?	01	Less than 1 year
		02	1 year to 2 years
		03	2 to 3 years
		04	3 to 4 years
		05	4 to 5 years
		06	5 to 6 years
		07	More than 6 years
3	Respondent's age	0 to 130	Age (in years)
4	Age group	01	16 to 19 years
		02	20 to 29 years
		03	30 to 39 years
		04	40 to 49 years
		05	50 to 59 years
		06	60 to 69 years
		07	Over 70 years
Resident profile			
5	Number of people living in the household	01	Only me
		02	2 people
		03	3 people
		04	4 people
		05	5 people
		06	6 people
		07	7 people
		08	8 people
		09	9 people
		10	10 people
6	Name of residents		
7	Age of residents	0 to 130	Age (in years)
8	Gender of residents	1	Male
		2	Female
9	Skin color or ethnicity	1	White
		2	Black
		3	Asian
		4	Brown/Mixed race
		5	Indigenous
		9	Not declared

Continues

Continuation

Number	Question	Values	Description
10	Education Level	01	Illiterate
		02	Elementary School I (primary) incomplete
		03	Elementary School I (primary) complete
		04	Elementary School II (middle school) incomplete
		05	Elementary School II (middle school) complete
		06	High School incomplete
		07	High School complete
		08	Higher education incomplete
		09	Higher education complete
		10	Graduate studies incomplete/complete
11	Are you working or looking for a job?	01	Yes, I am employed with a formal contract (CLT)
		02	Yes, self-employed/entrepreneur (people selling goods/services)
		03	I am not working, but I am looking for a job
		04	I am not working and not looking for a job
		05	Student
		06	Retired
		07	On medical leave (INSS)
		08	Other
12	Are you currently studying?	1	Yes
		2	No
13	Do you carry out household chores and care for children or the elderly?	1	Yes
		2	No
14	Who is responsible for most of the household bills?	1	Myself
		99	Someone else — record name
15	Position in the household	01	Person responsible for the household
		02	Spouse/partner
		03	Son/daughter of the responsible person or spouse
		04	Son-in-law or daughter-in-law
		05	Father, mother, stepfather or stepmother, father/mother-in-law
		06	Grandchild or great-grandchild
		07	Brother or sister
		08	Grandfather or grandmother
		09	Other relative or co-resident
16	Total household income bracket	01	Up to BRL 1,518.00 (up to 1 minimum wage)
		02	BRL 1,518.01 to BRL 3,036.00 (more than 1 up to 2 MW)
		03	BRL 3,036.01 to BRL 7,590.00 (more than 2 up to 5 MW)
		04	BRL 7,590.01 to BRL 15,518.00 (more than 5 up to 10 MW)
		05	More than BRL 15,518.01 (more than 10 MW)
		97	No income (do not read)
		98	Does not know (do not read)
		99	Refused/No answer (do not read)
17	Do you or anyone in your household receive or have received Bolsa Família or Auxílio Brasil benefits in the past year?	1	Yes, myself
		2	Yes, someone in the household
		3	Yes, both
		4	No
		98	Does not know (do not read)
		99	No answer (do not read)

Continues

Continuation

Number	Question	Values	Description
Housing			
18	What type of dwelling is this?	1	House
		2	Apartment
		3	Dwelling in a single-room housing unit, tenement or precarious collective housing
		98	Does not know (do not read)
		99	No answer (do not read)
19	What is the predominant material used in the construction of the external walls of this dwelling?	1	Masonry with finishing / wattle-and-daub with finishing
		2	Masonry without finishing
		3	Wattle-and-daub without finishing
		4	Wood suitable for construction (processed timber)
		5	Reused wood
		6	Other material
		98	Does not know (do not read)
		99	No answer (do not read)
20	What is the main source of water supply used in this dwelling?	1	Public water supply network
		2	Deep or artesian well
		3	Shallow well, groundwater or dug well
		4	Spring or fountain
		5	Stored rainwater
		9	Other
21	In the last 30 days, how often was the water supplied by the public network available to this dwelling?	1	Daily
		2	4 to 6 days a week
		3	1 to 3 days a week
		4	Other frequency
22	Does this dwelling have or use a reservoir, water tank, or cistern to store water?	1	Yes
		2	No
		98	Does not know (do not read)
		99	No answer (do not read)
23	Where does the bathroom sewage (toilet or pit latrine) go?	1	Public sewer system, stormwater system
		2	Septic tank connected to the network
		3	Septic tank not connected to the network
		4	Rudimentary cesspit
		5	Ditch
		6	River, lake, or sea
24	What is the (main) destination of household waste?	1	Collected directly by waste collection service
		2	Collected in a dumpster by waste collection service
		3	Burned (on the property)
		4	Buried (on the property)
		5	Dumped in vacant lot or public area
		9	Other destination
25	Is your house located in a flood / inundation area?	1	Yes
		2	No
		98	Does not know (do not read)
		99	No answer (do not read)

Continues

Continuation

Number		Question	Values	Description
26	Is your house close to a polluted river or stream?	1	Yes	
		2	No	
		98	Does not know (do not read)	
		99	No answer (do not read)	
Health				
27	Was anyone in the household absent from their usual activities due to diarrhea or vomiting in the last month?	1	Yes	
		2	No	
		9	Does not know	
28	How many people were absent due to diarrhea or vomiting?	1	1 person	
		2	2 people	
		3	3 people	
		4	4 people	
		5	5 people	
		6	6 people	
		7	7 people	
		8	8 people	
		9	9 people	
		10	10 people	
29	Who was absent due to diarrhea or vomiting? What are their age and gender? Did this person work?	Name		
30	Age	0 to 130	In years	
31	Sex	1	Male	
		2	Female	
32	Did this person work?	1	Yes	
		2	No	
33	Was anyone in the household absent from their usual activities due to dengue in the last month?	1	Yes	
		2	No	
		9	Does not know	
34	How many people were absent due to dengue?	1	1 person	
		2	2 people	
		3	3 people	
		4	4 people	
		5	5 people	
		6	6 people	
		7	7 people	
		8	8 people	
		9	9 people	
		10	10 people	

Continues

Continuation

Number	Question	Values	Description
35	Who was absent due to dengue? What are their age and gender? Did this person work?	Name	
36	Age	0 to 130	In years
37	Sex	1	Male
		2	Female
38	Did this person work?	1	Yes
		2	No
39	Was anyone in the household absent from their usual activities due to pneumonia or flu in the last month?	1	Yes
		2	No
		9	Does not know
40	How many people were absent due to pneumonia or flu?	1	1 person
		2	2 people
		3	3 people
		4	4 people
		5	5 people
		6	6 people
		7	7 people
		8	8 people
		9	9 people
		10	10 people
41	Who was absent due to flu or pneumonia? What are their age and gender? Did this person work?	Name	
42	Age	0 to 130	In years
43	Sex	1	Male
		2	Female
44	Did this person work?	1	Yes
		2	No

Continues

Continuation

Number	Question	Values	Description
45	Has anyone in your family been diagnosed with malnutrition?	1	Yes
		2	No
		98	Does not know
		99	No answer
46	Has anyone in your family been diagnosed with dehydration?	1	Yes
		2	No
		98	Does not know
		99	No answer
Perception of Well-being			
47	Thinking of a scale from 1 to 5, what score would you give to the quality of life of the population in your community?	1 to 5	
48	And also on a scale from 1 to 5, what score would you give to your quality of life?	1 to 5	
49	On a scale from 1 to 5, where 1 = “very concerned” and 5 = “very calm,” how do you assess the risk of water-borne diseases?	1	Very concerned
		2	
		3	
		4	
		5	Very calm
50	On a scale from 1 to 5, where 1 = “Strongly disagree” and 5 = “Strongly agree.” Do you think the Pinheiros River cleanup and sanitation efforts can improve the community’s quality of life?	1	Strongly disagree
		2	
		3	
		4	
		5	Strongly agree
51	How satisfied would you say you are with recreational areas, squares, and parks in the area where you live?	1	Very dissatisfied
		2	Dissatisfied
		3	Neither satisfied nor dissatisfied
		4	Satisfied
		5	Very satisfied
52	How satisfied would you say you are with education services (daycare, school, etc.) in the area where you live?	1	Very dissatisfied
		2	Dissatisfied
		3	Neither satisfied nor dissatisfied
		4	Satisfied
		5	Very satisfied

Continues

Continuation

53	How satisfied would you say you are with waste collection in the area where you live?	1	Very dissatisfied
		2	Dissatisfied
		3	Neither satisfied nor dissatisfied
		4	Satisfied
		5	Very satisfied
54	How satisfied would you say you are with sanitation services in the area where you live?	1	Very dissatisfied
		2	Dissatisfied
		3	Neither satisfied nor dissatisfied
		4	Satisfied
		5	Very satisfied
Sabesp Works			
55	Have you or anyone in your family heard about Sabesp's works for the depollution of the Pinheiros River?	1	Yes
		2	No
		98	Does not know
		99	No answer
56	How important do you think the Pinheiros River cleanup and sanitation work is?	1	Not important at all
		2	Not very important
		3	Neutral
		4	Important
		5	Very important
57	Has anyone in your household worked on Sabesp's projects between 2021 and 2023?	1	Yes
		2	No
		98	Does not know
		99	No answer
58	How often do you engage in outdoor physical activities along the Pinheiros River?	1	Never
		2	Rarely
		3	A few times
		4	Sometimes
		5	Very often
59	Why do you (NEVER / RARELY / ONLY A FEW TIMES) engage in outdoor physical activities along the Pinheiros River?	1	I do not have the habit of practicing outdoor sports
		2	It is difficult to get there by public transportation
		3	I am not used to doing physical activities
		4	It is not safe
		9	Other

Continues

Continuation

Number	Question	Values	Description
	Thinking now about some socio-environmental aspects, I would like to know whether these aspects have improved or worsened in the past 3 years in your community.		
60	Has the water supply improved after Sabesp's works?	5	Improved a lot
		4	Improved slightly
		3	Stayed the same
		2	Got slightly worse
		1	Got much worse
61	Has the bad sewage odor on the streets improved after Sabesp's works?	5	Improved a lot
		4	Improved slightly
		3	Stayed the same
		2	Got slightly worse
		1	Got much worse
62	Has the number of mosquitoes decreased after Sabesp's works?	5	Improved a lot
		4	Improved slightly
		3	Stayed the same
		2	Got slightly worse
		1	Got much worse
63	Has the number of cockroaches and rats decreased after Sabesp's works?	5	Improved a lot
		4	Improved slightly
		3	Stayed the same
		2	Got slightly worse
		1	Got much worse
64	Has there been a reduction in health problems after Sabesp's works?	5	Improved a lot
		4	Improved slightly
		3	Stayed the same
		2	Got slightly worse
		1	Got much worse
65	Has there been a reduction in stomach and intestinal diseases after Sabesp's works?	5	Improved a lot
		4	Improved slightly
		3	Stayed the same
		2	Got slightly worse
		1	Got much worse
66	Has there been a reduction in respiratory problems after Sabesp's works?	5	Improved a lot
		4	Improved slightly
		3	Stayed the same
		2	Got slightly worse
		1	Got much worse

METHODOLOGICAL ANNEX 3. CHARACTERISTICS OF DWELLINGS AND POPULATION OF INFORMAL URBAN COMMUNITIES IN THE SURVEY SAMPLE

This Annex presents the tables containing the characteristics of respondents and dwellings in the informal urban communities surveyed. It also includes the tabulation of responses to the interview questions related to health and well-being.

Table A.3.I
Characteristics of the respondent, 2025

		Community			Total
		Água Espraiada	Pirajuçara	Paraisópolis	
Gender	Male	184	171	178	533
	Female	248	263	256	767
	Total	432	434	434	1,300
Length of residence in the community	Less than 1 year	12	43	8	63
	1 to 2 years	15	13	13	41
	2 to 3 years	18	17	10	45
	3 to 4 years	6	16	8	30
	4 to 5 years	9	7	8	24
	5 to 6 years	13	10	10	33
	More than 6 years	359	328	377	1,064
	Total	432	434	434	1,300
Age group	16 to 19 years	15	21	21	57
	20 to 29 years	74	94	103	271
	30 to 39 years	79	83	97	259
	40 to 49 years	109	92	117	318
	50 to 59 years	73	77	53	203
	60 to 69 years	51	37	35	123
	Over 70 years	31	30	8	69
	Total	432	434	434	1,300
Average age		44.3	42.3	39.2	41.9
Number of residents in the household	1 person	48	66	94	208
	2 people	106	124	112	342
	3 people	128	106	109	343
	4 people	78	86	63	227
	5 people	42	25	38	105
	6 people	19	18	12	49
	7 people	4	9	3	16
	8 people	5	-	2	7
	9 people	-	-	-	-
	10 people	2	-	1	3
	Total	432	434	434	1,300
Total number of residents		1,368	1,272	1,206	3,846
Residents per household		3.2	2.9	2.8	3.0

Source: Favela Diz. Prepared by: Ex Ante Consultoria Econômica.

Continuation

		Community			Total
		Água Espraiada	Pirajuçara	Paraisópolis	
Education	Illiterate	17	22	24	63
	Elementary School I (primary) incomplete	58	81	58	197
	Elementary School I (primary) complete	32	34	23	89
	Elementary School II (middle school) incomplete	52	19	68	139
	Elementary School II (middle school) complete	19	29	28	76
	High School incomplete	81	74	66	221
	High School complete	131	152	113	396
	Incomplete college degree	18	7	29	54
	Higher education complete	22	16	24	62
	Graduate studies incomplete/complete	2	-	1	3
	Total	432	434	434	1,300
Self-declared race	White	115	118	95	328
	Black	88	76	100	264
	Asian	3	6	8	17
	Brown/Mixed race	221	226	219	666
	Indigenous	2	1	8	11
	Refused/Did not answer (Do not read)	3	7	4	14
	Total	432	434	434	1,300
Are you working or looking for a job?	Yes, I am working with a formal contract or CLT	93	102	120	315
	Yes, I am self-employed / an entrepreneur	198	190	200	588
	I am not working but I am looking for a job	38	51	48	137
	I am not working and I am not looking for a job	45	32	40	117
	Student	4	2	2	8
	Retired	48	52	19	119
	On medical leave (INSS)	-	-	2	2
	Other (8)	6	5	3	14
	Others	-	-	-	-
	Total	432	434	434	1,300
Are you studying?	Yes	26	43	33	102
	No	402	389	399	1,190
	Refused/Did not answer (Do not read)	-	-	-	-
	Total	432	434	434	1,300
Do you carry out household chores and care for children or the elderly?	Yes	340	262	317	919
	No	92	172	117	381
	Refused/Did not answer (Do not read)	-	-	-	-
	Total	432	434	434	1,300

Source: Favela Diz. Prepared by: Ex Ante Consultoria Econômica.

Continuation

		Community			Total
		Água Espraiada	Pirajuçara	Paraisópolis	
Position in the household	Person responsible for the household	327	338	340	1,005
	Spouse or partner	53	55	44	152
	Son/daughter of the responsible person or spouse	37	24	24	85
	Son-in-law or daughter-in-law	1	-	1	2
	Father, mother, stepfather or stepmother, father/mother-in-law	9	12	13	34
	Grandchild or great-grandchild	-	-	5	5
	Brother or sister	3	3	2	8
	Grandfather or grandmother	-	2	4	6
	Other relative or co-resident	2	-	1	3
	Refused/Did not answer (Do not read)	-	-	-	-
	Total	432	434	434	1,300
Household income	Up to BRL 1,518.00 (up to 1 minimum wage)	127	177	172	476
	BRL 1,518.01 to BRL 3,036.00 (more than 1 up to 2 MW)	97	136	117	350
	BRL 3,036.01 to BRL 7,590.00 (more than 2 up to 5 MW)	57	72	54	183
	BRL 7,590.01 to BRL 15,518.00 (more than 5 up to 10 MW)	6	6	5	17
	More than BRL 15,518.01 (more than 10 MW)	-	-	-	-
	No income	5	5	6	16
	Does not know (do not read)	31	20	14	65
	Refused/Did not answer (Do not read)	109	18	66	193
	Total	432	434	434	1,300
Receive Bolsa Família or BPC in the past year	Yes, myself	79	79	122	280
	Yes, someone in the household	33	34	22	89
	Yes, both	-	2	5	7
	No	319	317	285	921
	Does not know (do not read)	1	1	-	2
	No answer (do not read)	-	1	-	1
	Total	432	434	434	1,300

Source: Favela Diz. Prepared by: Ex Ante Consultoria Econômica.

Table A.3.2
Characteristics of the dwelling, 2025

		Community			Total
		Água Espaiada	Pirajuçara	Paraisópolis	
Type of dwelling	House	421	423	405	1,249
	Apartment	3	6	19	28
	Dwelling in a single-room housing unit, tenement or precarious collective housing	8	5	10	23
	Does not know (do not read)	-	-	-	-
	No answer (do not read)	-	-	-	-
	Total	432	434	434	1,300
Predominant material used in the construction of the external walls of this dwelling	Masonry with finishing / wattle-and-daub with finishing	371	408	351	1,130
	Masonry without finishing	57	14	74	145
	Wattle-and-daub without finishing	-	2	1	3
	Wood suitable for construction (processed timber)	-	1	1	2
	Reused wood	3	3	4	10
	Other material	1	4	3	8
	Does not know (do not read)	-	2	-	2
	No answer (do not read)	-	-	-	-
	Total	432	434	434	1,300
Has a water tank, reservoir, cistern, or other means for storage water	Yes	266	241	190	697
	No	165	188	244	597
	Does not know (do not read)	1	5	-	6
	No answer (do not read)	-	-	-	-
	Total	432	434	434	1,300
Main source of water supply used in this household	Public water distribution network	430	429	429	1,288
	Deep or artesian well	-	1	-	1
	Shallow well or groundwater well	-	-	-	-
	Spring or natural source	-	-	-	-
	Stored rainwater	1	-	1	2
	Other	1	4	4	9
	Does not know (do not read)	-	-	-	-
	No answer (do not read)	-	-	-	-
	Total	432	434	434	1,300
Frequency with which water from the public distribution network was available to this household	Daily	322	320	320	962
	4 to 6 days per week	10	31	14	55
	1 to 3 days per week	16	59	16	91
	Other frequency	82	19	79	180
	Does not know (do not read)	2	5	5	12
	No answer (do not read)	-	-	-	-
	Total	432	434	434	1,300

Source: Favela Diz. Prepared by: Ex Ante Consultoria Econômica.

Continuation

		Community			Total
		Água Espraiada	Pirajuçara	Paraisópolis	
Destination of bathroom sewage (toilet)	Public sewer system / stormwater system	372	318	392	1,082
	Septic tank connected to the sewer network	28	22	16	66
	Septic tank not connected to the sewer network	11	25	10	46
	Rudimentary septic pit	3	10	1	14
	Ditch	2	31	-	33
	River, lake, or sea	16	28	15	59
	Does not know (do not read)	-	-	-	-
	No answer (do not read)	-	-	-	-
Total		432	434	434	1,300
Main destination of household waste	Collected directly by cleaning services	273	300	330	903
	Collected in dumpsters provided by cleaning services	150	130	101	381
	Burned (on the property)	-	-	1	1
	Buried (on the property)	-	-	-	-
	Dumped in vacant land or public areas	9	4	2	15
	Other destination	-	-	-	-
	Does not know (do not read)	-	-	-	-
	No answer (do not read)	-	-	-	-
	Total	432	434	434	1,300
Dwelling located in a flood / inundation area	Yes	94	47	51	192
	No	338	385	383	1,106
	Does not know (do not read)	-	2	-	2
	No answer (do not read)	-	-	-	-
	Total	432	434	434	1,300
Dwelling located near a polluted river or stream	Yes	223	121	101	445
	No	209	311	333	853
	Does not know (do not read)	-	1	-	1
	No answer (do not read)	-	1	-	1
	Total	432	434	434	1,300

Source: Favela Diz. Prepared by: Ex Ante Consultoria Econômica.

Table A.3.3
Tabulation of respondents' answers, 2025

		Community			Total
		Água Espaiada	Pirajuçara	Paraisópolis	
Absence due to diarrhea or vomiting in the past month	Yes	74	54	86	214
	No	357	376	347	1,080
	Does not know (do not read)	1	4	1	6
	No answer (do not read)	-	-	-	-
	Total	432	434	434	1,300
Absence due to dengue in the past month	Yes	38	43	14	95
	No	393	388	419	1,200
	Does not know (do not read)	1	3	1	5
	No answer (do not read)	-	-	-	-
	Total	432	434	434	1,300
Absence due to pneumonia or flu in the past month	Yes	64	77	73	214
	No	367	356	361	1,084
	Does not know (do not read)	1	1	-	2
	No answer (do not read)	-	-	-	-
	Total	432	434	434	1,300
Number of people absent due to diarrhea or vomiting	0	358	380	348	1,086
	1	55	48	65	168
	2	15	3	14	32
	3	1	2	4	7
	4	3	1	1	5
	5	-	-	2	2
	Total	432	434	434	1,300
Number of people absent due to dengue	0	394	391	420	1,205
	1	34	38	14	86
	2	3	2	-	5
	3	1	2	-	3
	4	-	1	-	1
	Total	432	434	434	1,300
Number of people absent due to pneumonia or flu	0	368	357	361	1,086
	1	47	59	62	168
	2	13	4	9	26
	3	4	10	1	15
	4	-	3	-	3
	5	-	1	1	2
	Total	432	434	434	1,300
Presence of someone in your family diagnosed with malnutrition	Yes	5	9	9	23
	No	425	421	425	1,271
	Does not know (do not read)	1	4	-	5
	No answer (do not read)	1	-	-	1
	Total	432	434	434	1,300
Presence of someone in your family with a diagnosis of dehydration	Yes	15	12	14	41
	No	415	416	420	1,251
	Does not know (do not read)	2	6	-	8
	No answer (do not read)	-	-	-	-
	Total	432	434	434	1,300

Source: Favela Diz. Prepared by: Ex Ante Consultoria Econômica.

Continuation

Rating for the quality of life of the population in the community of Água Espraiada	1	57	-	-	57
	2	45	-	-	45
	3	127	-	-	127
	4	68	-	-	68
	5	135	-	-	135
	Total	432	-	-	432
Rating for the quality of life of the population in the community of Alto Pirajuçara	1	-	22	-	22
	2	-	36	-	36
	3	-	130	-	130
	4	-	111	-	111
	5	-	135	-	135
	Total	-	434	-	434
Rating for the quality of life of the population in the community of Paraisópolis	1	-	-	31	31
	2	-	-	35	35
	3	-	-	136	136
	4	-	-	73	73
	5	-	-	159	159
	Total	-	-	434	434
Rating for YOUR quality of life	1	23	9	20	52
	2	26	25	26	77
	3	99	108	76	283
	4	88	117	105	310
	5	196	175	207	578
	Total	432	434	434	1,300
Assessment of the risk of diseases transmitted by water	Very concerned	189	134	205	528
	Concerned	25	45	37	107
	Neither calm nor concerned	53	79	52	184
	Calm	27	64	34	125
	Very calm	138	112	106	356
	Total	432	434	434	1,300
The depollution and sanitation work on the Pinheiros River can improve the quality of life community?	Very concerned	42	26	27	95
	Concerned	10	5	10	25
	Neither calm nor concerned	18	40	34	92
	Calm	26	55	38	119
	Very calm	336	308	325	969
	Total	432	434	434	1,300
How satisfied would you say you are with recreational spaces, squares, and parks in the area?	Very dissatisfied	109	168	42	319
	Dissatisfied	134	107	100	341
	Neither satisfied nor dissatisfied	57	48	86	191
	Satisfied	94	90	180	364
	Very satisfied	38	21	26	85
	Total	432	434	434	1,300
How satisfied would you say you are with education services (daycare, school, etc.) in the area?	Very dissatisfied	38	123	33	194
	Dissatisfied	57	57	34	148
	Neither satisfied nor dissatisfied	79	55	69	203
	Satisfied	197	180	238	615
	Very satisfied	61	19	60	140
	Total	432	434	434	1,300
How satisfied would you say you are with waste collection services in the area?	Very dissatisfied	26	121	20	167
	Dissatisfied	36	47	36	119
	Neither satisfied nor dissatisfied	30	34	35	99
	Satisfied	254	198	271	723
	Very satisfied	86	34	72	192
	Total	432	434	434	1,300
How satisfied would you say you are with sanitation services in the area?	Very dissatisfied	71	120	80	271
	Dissatisfied	98	83	103	284
	Neither satisfied nor dissatisfied	58	59	79	196
	Satisfied	162	150	147	459
	Very satisfied	43	22	25	90
	Total	432	434	434	1,300

		Community			Total
		Água Espraiada	Pirajuçara	Paraisópolis	
Have you or anyone in your family heard about Sabesp's works for the depollution of the Pinheiros River?	Yes	217	212	188	617
	No	214	218	245	677
	Does not know (do not read)	1	3	1	5
	No answer (do not read)	-	1	-	1
	Total	432	434	434	1,300
How important do you think the Pinheiros River cleanup and sanitation work is?	Not important at all	9	4	8	21
	Slightly important	5	10	6	21
	Neutral	17	11	23	51
	Important	155	108	97	360
	Very important	246	301	300	847
	Total	432	434	434	1,300
Has anyone in your household worked on Sabesp's projects between 2021 and 2023?	Yes	3	10	2	15
	No	428	421	431	1,280
	Does not know (do not read)	1	3	1	5
	Total	432	434	434	1,300
	Never	399	320	392	1,111
How often do you engage in outdoor physical activities along the Pinheiros River?	Rarely	8	31	12	51
	A few times	7	18	10	35
	Sometimes	10	33	15	58
	Very often	8	32	5	45
	Total	432	434	434	1,300
Has the water supply improved after Sabesp's works?	Improved a lot	35	39	47	121
	Improved a little	20	31	68	119
	Remained the same	164	148	138	450
	Worsened a little	110	114	99	323
	Worsened a lot	103	102	82	287
	Total	432	434	434	1,300
Has the bad sewage odor on the streets improved after Sabesp's works?	Improved a lot	83	52	61	196
	Improved a little	40	38	52	130
	Remained the same	138	149	138	425
	Worsened a little	93	105	124	322
	Worsened a lot	78	90	59	227
	Total	432	434	434	1,300
Has the number of mosquitoes decreased after Sabesp's works?	Improved a lot	102	66	63	231
	Improved a little	44	36	45	125
	Remained the same	139	149	145	433
	Worsened a little	83	104	114	301
	Worsened a lot	64	79	67	210
	Total	432	434	434	1,300
Has the number of cockroaches and rats decreased after Sabesp's works?	Improved a lot	124	92	109	325
	Improved a little	43	41	60	144
	Remained the same	128	135	147	410
	Worsened a little	65	98	74	237
	Worsened a lot	72	68	44	184
	Total	432	434	434	1,300
Has there been a reduction in health problems after Sabesp's works?	Improved a lot	53	37	42	132
	Improved a little	39	31	55	125
	Remained the same	206	194	199	599
	Worsened a little	75	105	84	264
	Worsened a lot	59	67	54	180
	Total	432	434	434	1,300
Has there been a reduction in stomach and intestinal diseases after Sabesp's works?	Improved a lot	53	43	52	148
	Improved a little	30	39	44	113
	Remained the same	214	191	197	602
	Worsened a little	78	85	87	250
	Worsened a lot	57	76	54	187
	Total	432	434	434	1,300
Has there been a reduction in respiratory problems after Sabesp's works?	Improved a lot	56	33	53	142
	Improved a little	37	22	38	97
	Remained the same	201	214	201	616
	Worsened a little	74	100	89	263
	Worsened a lot	64	65	53	182
	Total	432	434	434	1,300

Source: Favela Diz. Prepared by: Ex Ante Consultoria Econômica.

