



BRK Ambiental and Instituto Trata Brasil present

Women & Sanitation



Presentation

Access to treated water and sewage services are human rights recognized for years by the United Nations. Recently, this topic has been brought to the spotlight when the issue of gender equality has been jointly focused with the issue of sanitation. The 33rd Session of the General Assembly of the United Nations Human Rights Council, which was held on July 27, 2016, dealt specifically with this. According to UN Special Rapporteur, Brazilian Léo Heller, gender equality is a fundamental principle of human rights that has not always been respected in urban development policies. In the rapporteur's view, transformative action is needed to achieve gender equality with regard to the right to the regular provision of treated water and the collection and treatment of sewage. The main ideas and conclusions of this report can be seen in the United Nations (2016).

Gender inequalities occur at every stage of a woman's life, from her childhood to her old age. That is why it is so important to pay attention to the special needs of women with regard to the right to water and to the sanitary sewage in the different phases of their lives. It is fundamental to note that gender inequality in access to water and sewage services also affects other human rights, such as women's right to health, security, adequate housing, education and food.

Equality of public policies requires consideration of the material and strategic needs of women.

This includes both the practical needs of women (such as of menstrual hygiene) and gender stereotypes and customs. Due to the role played by women in domestic and family care, lack of water affects women's lives more intensively than men. The United Nations report (2016) highlights the fact that women perform unpaid work (domestic and care) three times as much as men do. Thus, as caregivers, women are most affected when family members become ill as a result of inadequate access to water, sewage and hygiene. Also because of this role, women are in greater physical contact with contaminated water and with human waste when the sanitation infrastructure is inadequate.

The present study analyzes, from several complementary points of view, the issue of women and sanitation in Brazil. First, the profiles of the contemporary Brazilian woman are traced according to the data from the National Survey by Continuous Household Sample of 2016 (PNADC). The identification of these profiles not only helps the understanding of Brazilian women, but also helps to capture the heterogeneity within this population group, a recommendation, also, of the approach proposed in the United Nations report. This approach allows the identification of the most vulnerable minorities and their specific conditions of sanitation, health and insertion in the labor market.

Subsequently, Chapter 2 investigates the access of Brazilian women to basic sanitation equipment. It identifies the existence of still high deficits. About 1.6 million women were still living in houses without exclusive-use bathrooms in 2016. In the same year, more than 15 million Brazilian women still did not receive treated water in their homes and there were 12 million women who had access to the general water distribution network, but the frequency of water delivery was unsatisfactory. The number of women residing in housing without sewage collection reached the figure of 26.9 million. This means that one in four Brazilian women still lived in a precarious situation from the point of view of access to basic sanitation.

Chapter 3 of the study investigates how sanitation shortages have compromised the health of Brazilian women and have influenced their lives. Lack of sanitation has led to the occurrence of infectious gastrointestinal diseases that, depending on severity, have caused women to move away from their routine activities, kept them on bed rest or hospitalized. In extreme cases, these infections associated with poor sanitation led to death. This analysis is based on data from the National Health Survey (PNS) of 2013, which identified the occurrence of 7.9 million cases of withdrawal of women from their routine activities due to diarrhea or vomiting. Of this total, 3.6 million women were bedridden because of these infections.

According to data from the Unified Health System (SUS), there were 353,500 admissions of women in the network and almost 5,000 deaths due to gastrointestinal infections associated with lack of sanitation.

The occurrence of these diseases not only affects the productivity of women in their economic activities, with a compromise of their income, but also reduces their potential for performance in the studies. In order to understand and measure these phenomena, Chapter 4 of this study deals with the education and labor market information of the PNADC 2016 and data from the National High School Examination (ENEM) of that year. The analyzes identify the basic sanitation among the determinants of school delay, performance in studies and the remuneration of women in Brazil.

Finally, the study addresses how the lack of sanitation directly affects women's lives in terms of how they organize their time between activities and how the lack

of access to sanitation limits their income potential in the economy. In a broad sense, this final chapter of the study assesses how the lack of basic sanitation limits the well-being of women, compromising their health, education and domestic and economic activities. The estimated hours of Brazilian women which are wasted due to gastrointestinal diseases and, in the case of women engaged in economic activities, the income they no longer receive because of the diseases associated with lack of sanitation are presented.

Viewed from a different angle, these estimates also quantify the potential welfare gains that could be obtained with the improvement of sanitation, that is, they indicate the increase in income and the greater availability of hours of rest or leisure that the Brazilian women would have if access to sanitation were universal in Brazil. Besides increasing the number of hours that can be spent on rest, leisure, work and education, universalization would decisively affect productivity and income, allowing a high number of women to leave the poverty condition.

5

1. The Brazilian Woman

16

2. Women and Sanitation in Brazil

25

3. Access to Sanitation and the Health of Women

33

4. The Effects of the Lack of Sanitation in the Lives of Women

44

5. The Impacts of Universalization of Sanitation on Women

50

6. Main Conclusions





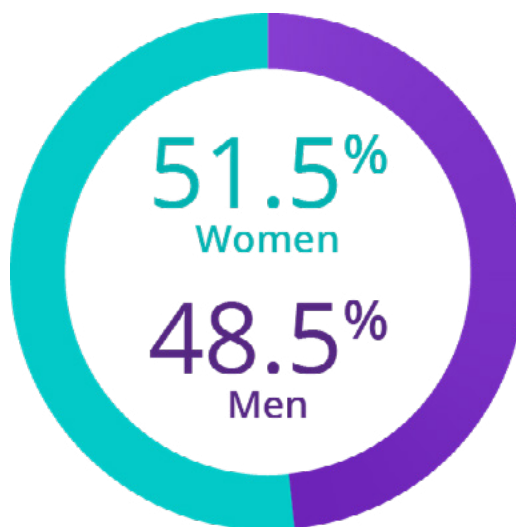
1. The Brazilian Woman

The Brazilian population totaled 205.5 million people in 2016 according to the projections of the IBGE National Household Sample Survey (PNADC). In that year, there were 105.9 million women and 99.6 million men, representing 51.5% and 48.5% of the Brazilian population, respectively. The Brazilian female population has its own characteristics and sometimes different from those presented by the male population. To trace a profile of Brazilian women, this chapter describes the characteristics of the Brazilian female population.

Spatial Distribution

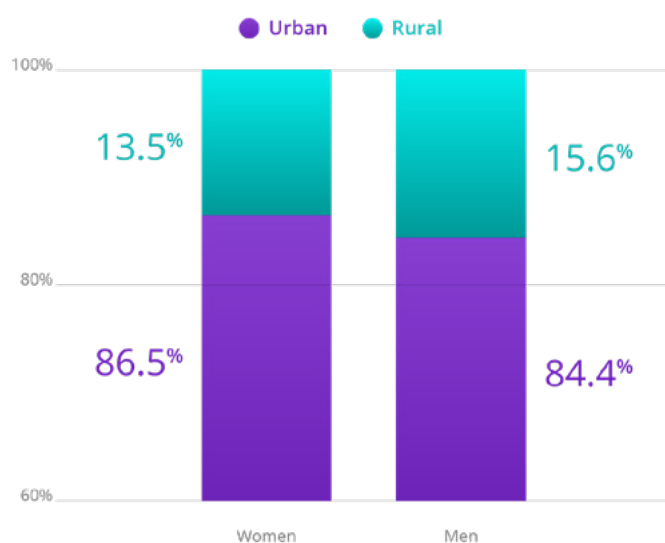
Brazilian women lived, in the great majority, in the cities. Of the total 105.9 million women, 91.6 million (or 86.5%) lived in urban areas. The country's rural areas have housed a female population of 14.3 million, less than the male population of 15.6 million.

Graph 1.1
Distribution of the Brazilian population by gender,
2016



Source: IBGE, 2017 Elaboration: Ex Ante Economic Consulting

Graph 1.2
Distribution of population by household and gender, 2016

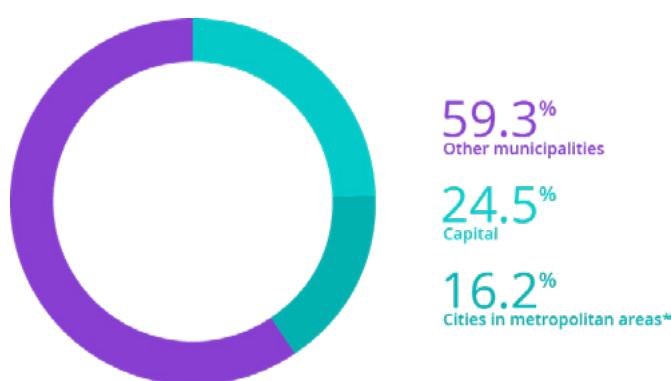


Source: IBGE, 2017 Elaboration: Ex Ante Economic Consulting

In 2016, 24.5% of Brazilian women lived in state capitals and in the Federal District. This was equivalent to a population of 25.9 million people.

Considering the inhabitants of other municipalities in the metropolitan regions, it is estimated that 43.1 million women (40.7% of the total) live in metropolitan areas of Brazil. The other 62.3 million women (59.3% of the total) lived in the countryside municipalities of the states.

Graph 1.3
Place of household, female population, 2016



Source: IBGE, 2017 (*) Except the capital. Elaboration: Ex Ante Economic Consulting

According to IBGE estimates, the Southeast region of Brazil had about 44.8 million women in 2016, corresponding to 42.3% of the total of women in the country. In this region were the states with the three largest female populations in the country: São Paulo, with 23.3 million women, Minas Gerais, with 10.8 million and Rio

de Janeiro, with 8.7 million. Considering only urban areas, the female population of the Southeast of Brazil reached almost 42 million people, equivalent to 45.8% of the total of women in the country living in urban areas. Considering only the rural areas, the female population of the Southeast of Brazil totaled only 2.8 million women, equivalent to only 19.5% of the national total living in rural areas.

The region with the second largest female population was the Northeast, with 29.4 million women, or 27.8% of the total. In this region, the predominance on urban and rural areas are reversed. Northeastern women living in urban areas totaled 22.4 million people, which accounted for only 24.4% of the total number of women living in urban areas in the country. Those living in rural areas reached a contingent of 7 million people, corresponding to almost half of the rural female population of the country.

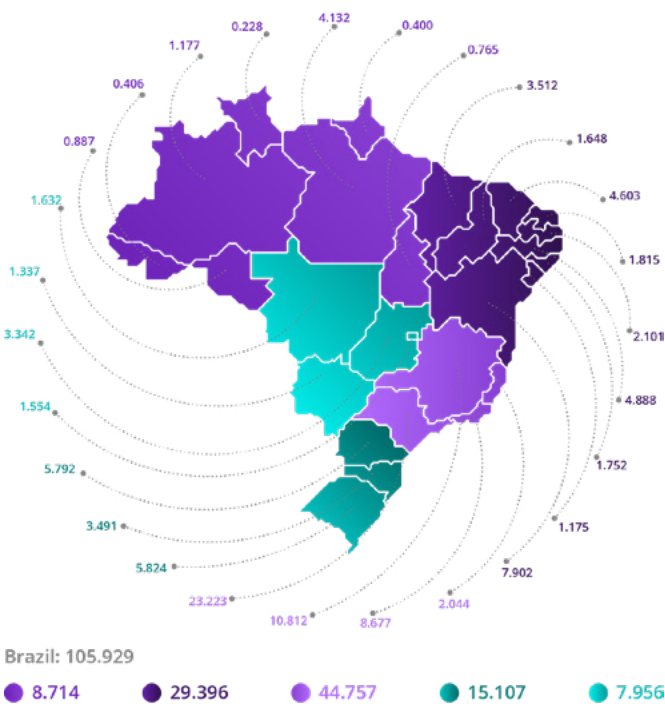
The South, North and Midwest regions accounted for 14.3%, 8.2% and 7.5% of the country's female population in 2016 respectively. The predominance of urban female populations were relatively higher in the Midwest and Southern regions. In the North, the weight of urban female population was lower in relative terms.

The participation of women in the total population of Brazilian states fluctuated little: Paraíba had the greater participation of women in the population (52.8%) and Rondonia the smaller participation (49.9%). In rural areas, however, there was a greater variation in the rates of participation of women in populations. While in Amazonas, only 44.4% of the rural population were women, in the state of Paraíba, that percentage reached 50% in 2016.

Age Distribution

Of the 105.9 million Brazilian women, 20.5 million were children and young people up to 14 years of age, corresponding to 19.4% of the total women in 2016. Women aged 15 to 29 years accounted for 22.8% of the female population. The great concentration occurred in the group of women aged between 30 and 59 years, which had a population of 44.6 million people (42.1% of the total). Women over the age of 60 represented 15.6% of the country's female population in 2016.

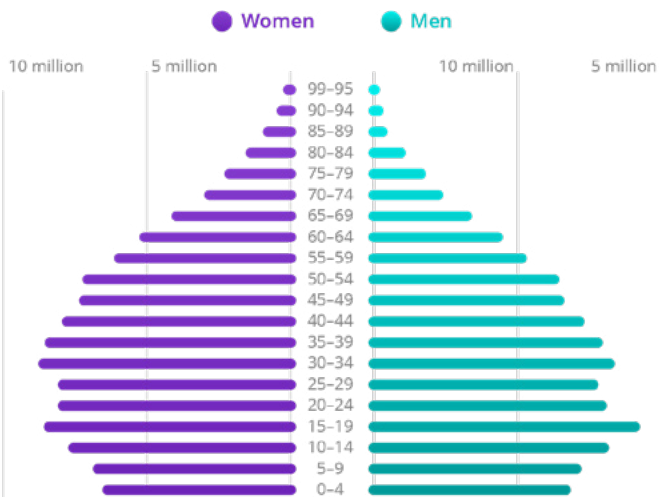
Map 1.1
Spatial distribution of women, in millions of people, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

It is important to note that the Brazilian female population was concentrated in older age groups than the male population. In 2016, the male population exceeded the female population up to the age group of 15 to 19 years old. From this range, women represent more than 50% of the population, reaching a share of more than 70% in ages over 95 years.

Graph 1.4
Age pyramid by gender, 2016



Source: IBGE, 2017 Elaboration: Ex Ante Economic Consulting

Brazilian women had a greater longevity than men and, consequently, a higher average age. In 2016, according to PNADC data, the average age of the female population was 35.7 years, while the average age of the male population was only 33.6 years. This indicates that women were, on average, 2.1 years older than Brazilian men.

Women living in urban areas had a higher average age than women in rural areas: 36.1 years versus 33.4 years in 2016. In the capitals of the Brazilian states, the average age was even higher (37.3 years).

Table 1.1
Average age by gender and area, in years, 2016

	Women	Men	Average
Urban	36.1	33.7	34.9
Rural	33.4	33.3	33.4
Average	35.7	33.6	34.7

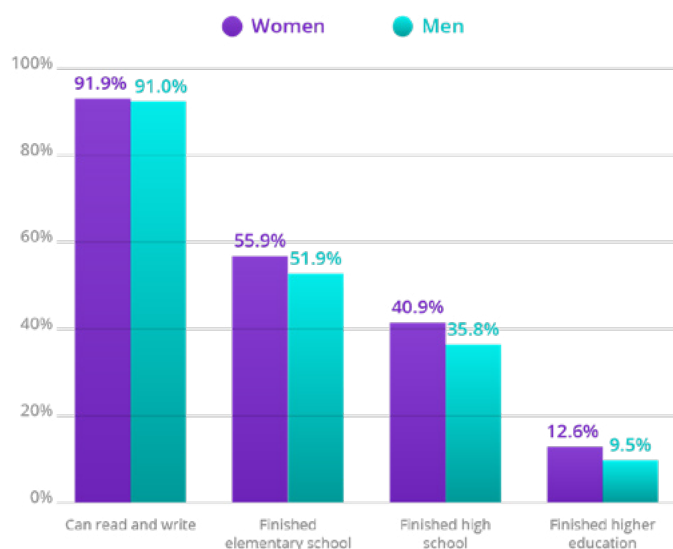
Source: IBGE, 2017 Elaboration: Ex Ante Economic Consulting

Education

According to data from the PNADC of 2016, 91.5 million declared that they could read and write, which represented 91.9% of the 99.6 million female respondents.¹ Despite this, the advancement of this population in terms of

education was still relatively slow. By 2016, only 55.6 million women had completed elementary education, equivalent to 55.% of the total of 99.6 million women aged 5 years or older in the country. The percentage of women who completed high school was even lower, at 40.9%. The female population who completed higher education was 12.6 million in 2016, corresponding to 12.6% of the female population that responded to the survey.

Graph 1.5
Level of instruction by gender, in (%) of the population, 2016



Source: IBGE, 2017 Elaboration: Ex Ante Economic Consulting

In comparison with men, women had higher educational levels. The number of illiterate men was 8.4 million whereas only 8.1 million women reported not being able to read and write. The number of men who completed elementary school was 48.2 million, while among women there were 55.6 million. The difference in education increased even more when the numbers of people who achieved high school diplomas were compared: 33.3 million men versus 40.7 million women. The number of women completing higher education (12.6 million) is also higher than the number of men with this degree (8.8 million).

This difference between genders is associated with the profile of the generations.

Looking only at the young population aged 5 to 19, it can be seen that the percentages of men and women attending school in 2016 were close, being slightly higher in the male population: 66.4% (men) versus 65.1 % (women). For people 60 years of age or older, the participation of

individuals without full elementary school in the total population of men and women was very close. The same occurred when the frequencies of men without a high school diploma are compared to that of women without it.

Therefore, the gender distinction between men and women is concentrated in the 20-59 age groups, that is, in the population that was born between 1957 and 1996 and was adult in 2016. For the population aged 20-29, for example, the relative frequency of men without full high school education was 39.2% in 2016. In the same year, the relative frequency of women in this condition was only 28.6%, indicating a difference of more than 10 percentage points between the two groups. This indicates that women born between 1987 and 1996 reached higher levels of education.

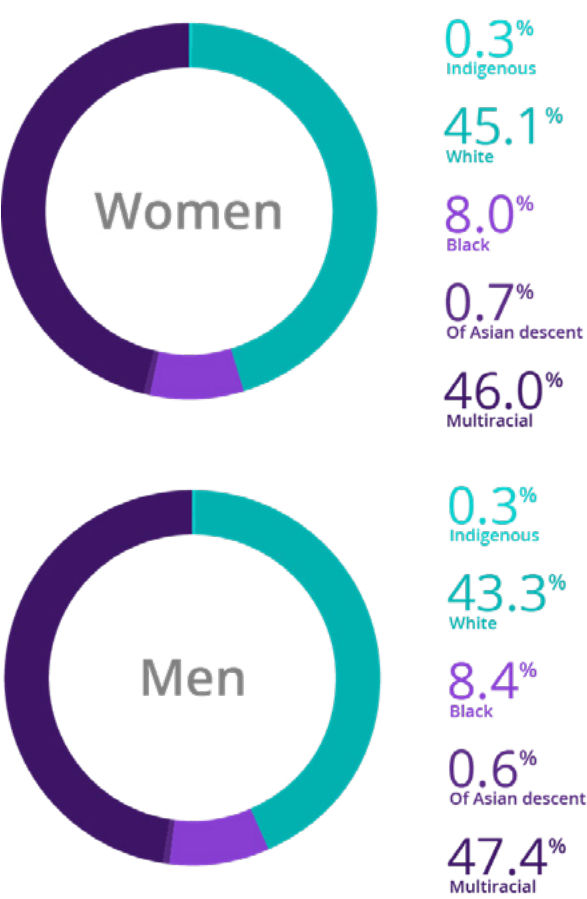
Data from PNADC indicate that in 2016, 25.4 million women were attending some regular course. Considering the total number of women of school age (over 5 years), the enrollment rate reached 25.5%. That is to say that one in four women was studying at the time of the survey. In men the enrollment rate was 27.2%, almost two percentage points above that of women.

Race

In 2016, about 8.5 million Brazilian women declared themselves black, which corresponded to 8% of the Brazilian female population. 48.7 million Brazilians declared themselves to be multiracial (46.0% of the total) and 47.8 million women declared themselves white (45.1% of the total). The female self-declared of Asian descent population reached 710,700 people (0.7% of the total) and the self-declared indigenous population, 272,100 people (0.3% of the total).

It is important to note that male self-reported black and multiracial population is higher than female. In contrast, white self-reported population is lower among men than among women.

Graph 1.6
Population distribution by race, 2016

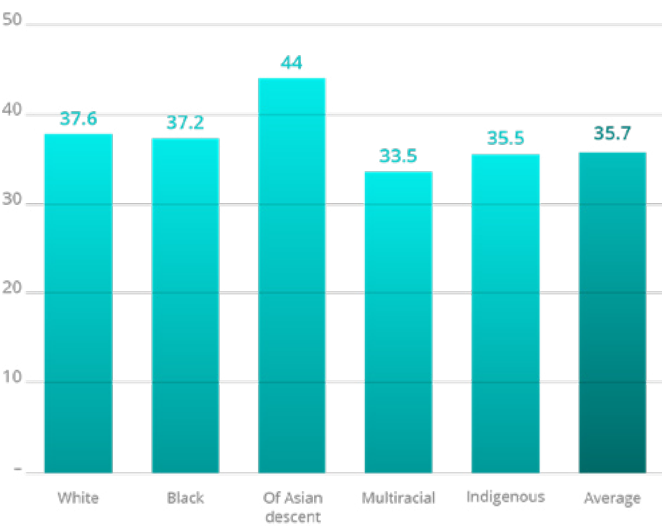


Source: IBGE, 2017 Elaboration: Ex Ante Economic Consulting

Another important difference in race was the average age of the population groups. The average age of the self-declared multiracial women (33.5 years) was significantly lower than the average age of the self-declared white

(37.6 years) or black (37.2 years). The self-reported women of Asian descent had the highest average age among the groups: 44 years of age. Indigenous women were 35.5 years old on average. Something similar happened with the male population, for which the average ages of the self-declared multiracial (31.9 years) and the indigenous self-declared (31.7 years) were even lower than those of self-declared white men (35.1 years) and blacks (34.9 years).

Graph 1.7
Average age of women, by race, 2016

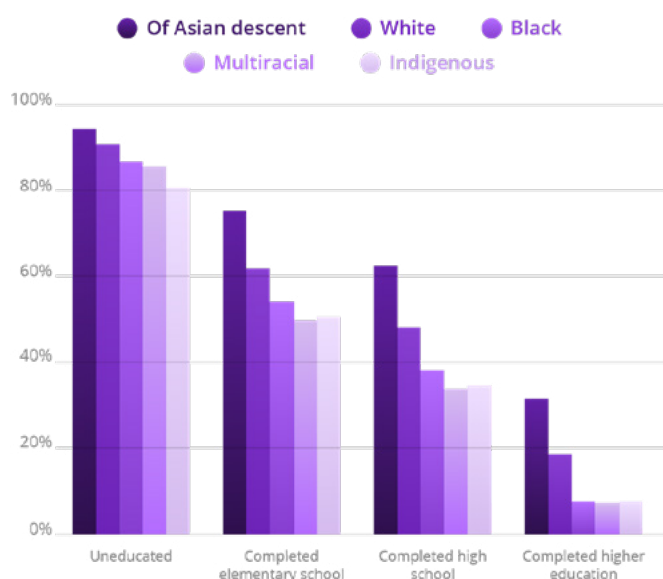


Source: IBGE, 2017 Elaboration: Ex Ante Economic Consulting

The education of self-declared of Asian descent and white women is significantly higher than that of self-reported black and multiracial women. While illiteracy rates are less than 10% in the first two groups, in the black and multiracial population the rates were 13.2% and 14.4% in 2016.

Among indigenous self-declared women, the illiteracy rate was close to 20%. On the other hand, the frequency of women with a complete higher education is significantly higher in the groups of self-declared women of Asian descent (31.5%) and white women (18.6%) than in the self-reported black groups (7.6%) and browns (7.3%).

Graph 1.8
Women's level of education, by race, in (%) of the population, 2016

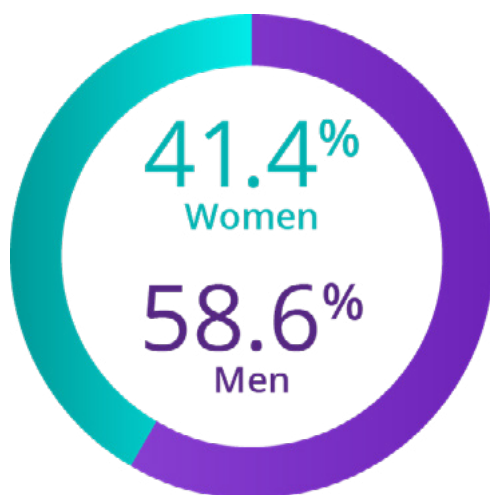


Source: IBGE, 2017 Elaboration: Ex Ante Economic Consulting

Responsibilities

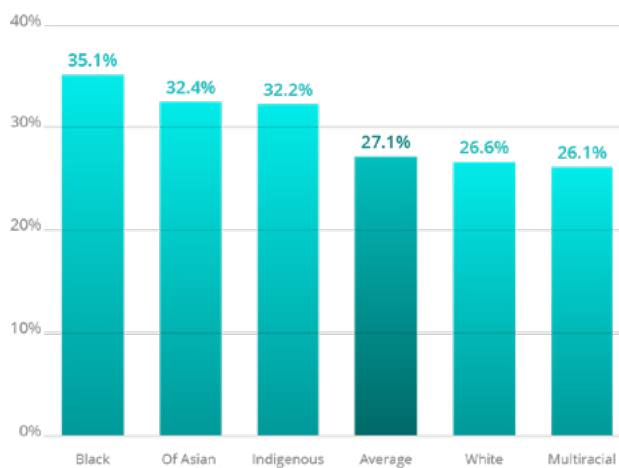
By 2016, PNADC data indicate that 28.7 million women were responsible for the household, that is, they headed their households. Thus, women headed 41.4% of the households in the country. The average ratio of the number of women in charge of the household to the total number of women reached 27.1% in that year. It is worth mentioning that the rate was higher among self-reported black women (35.1%), women of Asian descent (32.4%) and indigenous women (32.2%). Self-reported white and multiracial women had rates of 26.6% and 26.1%, respectively.

Graph 1.9
Heads of households by gender, (%) of the total



Source: IBGE, 2017 Elaboration: Ex Ante Economic Consulting

Graph 1.10
Women's household head, rate by race, 2016

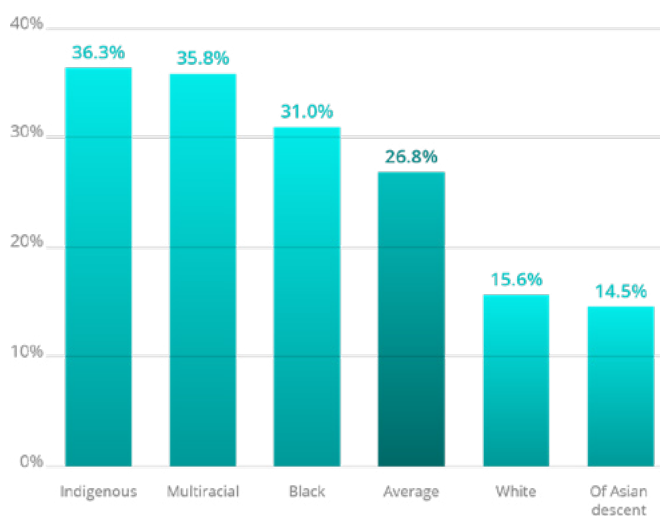


Source: IBGE, 2017 Elaboration: Ex Ante Economic Consulting

Approximately 30% of women over 15 years of age had children or stepchildren living in their houses.

These women totaled 25.7 million mothers who assisted in the care of 42.4 million children or underage stepchildren. This was equivalent to an average of 1.65 child or stepchild per mother. In rural areas, this average was even higher: 1.87 children or stepchildren per mother. Adding to the contingent of 5.3 million grandparents who lived with their grandchildren or great-grandchildren, almost 30 million women split their time as students, workers, housewives or retirees with caring for children, step children, grandchildren and great-grandchildren.

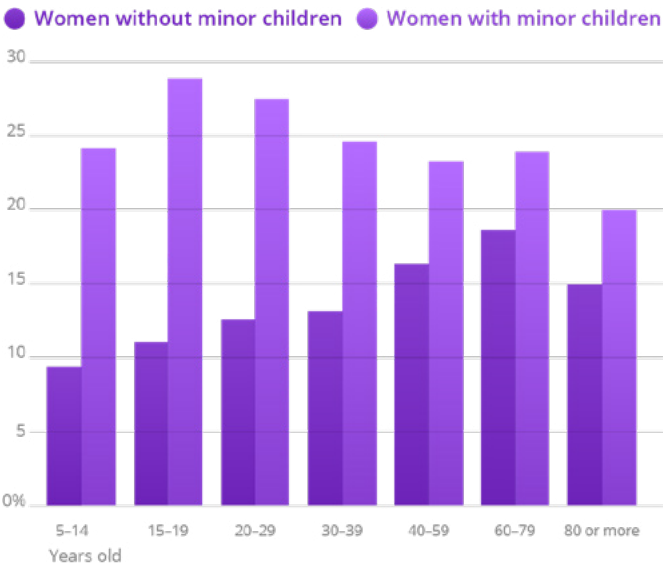
Graph 1.11
Frequency of mothers* by race, among women belonging to the poverty group



Source: IBGE, 2017 (*) with minor children Elaboration: Ex Ante Economic Consulting

The PNADC of 2016 registered for the first time the dedication of Brazilians to care for people and domestic work and the time spent in these activities in the population over 5 years of age. The data indicate that 28.1% of Brazilian women reported having dedicated themselves to the care of people who lived in the same house as them. The care involved assistance in the health, education, transportation or leisure of children, the elderly, the sick or people with special needs. In addition to the residents, 3.6% of women aged 5 years and over stated that they had dedicated themselves to the care of relatives who lived elsewhere. These rates were significantly higher than men who dedicated time to people care.

Graph I.12
Dedication to care and housework, women with and without children, in hours / week



Source: IBGE, 2017 Elaboration: Ex Ante Economic Consulting

There was also a high dedication to housework, which involved activities such as: cooking, serving and washing dishes; cleaning or maintenance of clothing and shoes; make small repairs or maintenance of the home, car, appliances or other equipment; cleaning or tidying up the home, garage, yard or garden; taking care of the organization of the home (pay bills, hire services, guide employees, etc.); shopping or searching prices for goods to the home; and taking care of domestic animals. According to the PNADC, 83.3% of Brazilian women over 5 years of age report having engaged in domestic work in their own homes and 2.5% in the homes of relatives. In the male population, these frequencies were much lower: respectively 65.5% and 0.7%.

Table I.2
Frequency of persons having domestic and people care activities, by gender and location, 2016

Where	Type of help	Men	Women	Average
At home	People care	19.0%	28.1%	23.7%
At home	Domestic services	65.5%	83.3%	74.7%
In the house of relatives	People care	1.4%	3.6%	2.5%
In the house of relatives	People care	0.7%	2.5%	1.6%

Source: IBGE, 2017 Elaboration: Ex Ante Economic Consulting

It is worth mentioning that the average time spent in personal care and housework performed at home or in relatives’ homes was higher among women than among men. On average, women spent 20.0 hours per week on these activities, while men spent only 10.7 hours per week. The greater frequency of women with dedication to these activities and the longer dedication time resulted in a very uneven distribution: 71.5% of the total time devoted to personal care and domestic work performed at home or in the homes of relatives was incumbent on Brazilian women and only 28.5% on men.

Another finding revealed by the IBGE survey was the greater overload on mothers and grandmothers. Considering only mothers with underage children, the time spent on these activities reached 24.7 hours a week on average. Younger mothers, who had children on average also younger, spent more time caring for people and domestic activities – in the case of mothers aged 15 to 19 years, the time devoted to care and housework reached 28.8 hours a week on average. Women over 14 years of age, but without underage children, on the other hand, devoted less time: 14.9 hours a week on average.

Job Market

In addition to heads of household, mothers or grandmothers who spend hours caring for family members, women have been

highly engaged in the labor market. According to PNADC data for 2016, there were 86.9 million Brazilian women over 14 years of age. Of these women, 45.2 million were part of the labor force (52.0% of the total). Of this group, 86.9%, or 39.3 million women, were employed and 13.1%, or 5.9 million women, were unemployed. Of the 41.7 million women out of the workforce, it is worth noting that there were 4 million

people who could potentially belong to the workforce. This means that the female labor force had a potential to increase by almost 9% without the need for population growth.

Table 1.3
People in the workforce, by gender and situation, 2016

		Men	Woman	Average
In the workforce	Occupied	51,937,457	39,254,014	91,191,470
In the workforce	Unoccupied	5,924,295	5,930,808	11,855,103
In the workforce	Subtotal	57,861,751	45,184,821	103,046,573
Out of the workforce	Occupied	2,427,068	4,001,462	6,428,531
Out of the workforce	Unoccupied	19,511,508	37,725,409	57,236,917
Out of the workforce	Subtotal	21,398,576	41,726,872	63,665,448
	Total	79,800,328	86,911,693	166,712,021

Source: IBGE, 2017 Elaboration: Ex Ante Economic Consulting

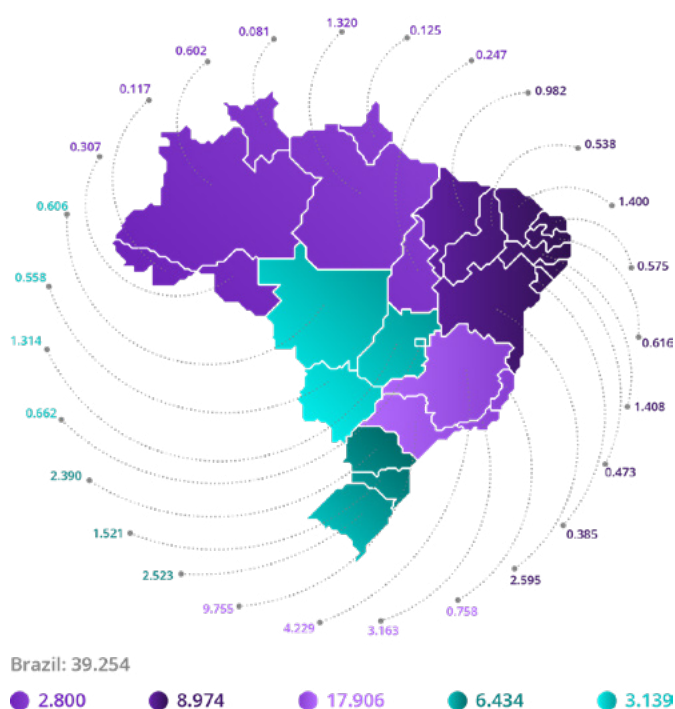
The situation of men in the labor market was very different. Of the men over 14 years of age in 2016, 72.5% belonged to the labor force, which equated to 57.9 million people. Of this group, 51.9 million men were employed, indicating an unemployment rate of only 10.2%; a lower value, therefore, than that of the unemployment rate in the female population (13.1%). The number of men out of the workforce, but with the potential to work, was 2.4 million, a figure lower than that of women.

These facts explain why women accounted for only 43.8% of the total workforce in the country and 43.0% of employed persons (men and women). It also justifies the fact that there was a tendency for women to increase their participation in the Brazilian labor force: 62.2% of the workforce that could be part of the labor force in a short period of time was female.

From the regional point of view, it should be noted that in the Midwest, South and Southeast of the country, the percentage of women belonging to the labor force varied between 55.0% and 56.0% of the female populations in each region. In the Northeast and North regions, these shares were smaller: 44.7% and 49.4% of the women. A similar situation occurred when the occupation rate was

observed: it was higher in the South (91.1%), Midwest (88.4%) and Southeast (86.5%) regions.

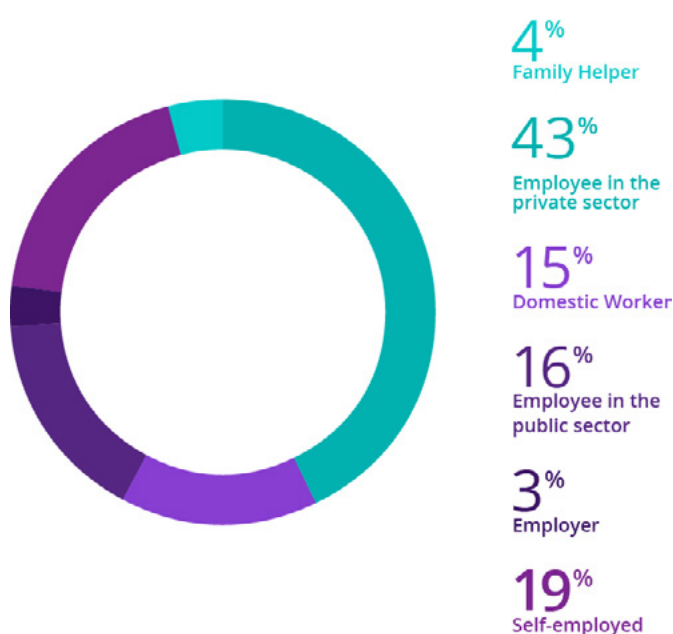
Map 1.2
Regional distribution of employed women, in millions of people, 2016



Source: IBGE, 2017 Elaboration: Ex Ante Economic Consulting

Of the women employed in the Brazilian economy in 2016, 43.1% (16.9 million) were employed in private sector companies, 19.0% (7.5 million) were self-employed and 16.4% (6.4 million) were government employees (including administration, health and education). There were only 1.3 million women entrepreneurs (3.3% of all women in the workforce), which represented only 30% of all employers in the country (men or women).

Graph I.I3
Distribution of employed women by employment situation, 2016

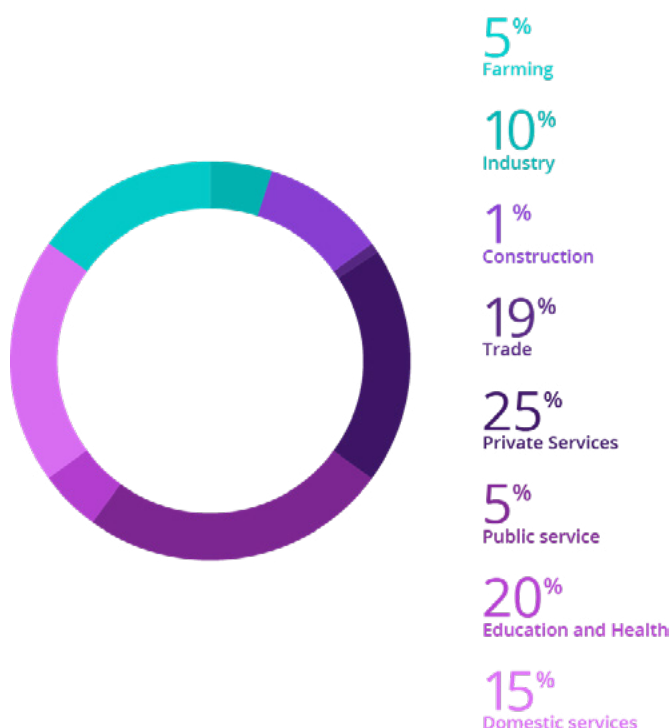


Source: IBGE, 2017 Elaboration: Ex Ante Economic Consulting

It is worth mentioning the high participation of domestic workers and auxiliary family workers in the female labor force. In 2016, 5.7 million women were houseworkers (14.5% of the total employed women) and 1.4 million women worked as auxiliary family workers (3.6% of all employed women). Such careers in male labor force were significantly lower, 0.9% and 1.5%, respectively.

Considering the distribution of women employed by the economic sector, there is a strong concentration in the activities of private sector (25.2%), educational and healthcare (20.4%), commercial (18.9%) and industrial (10.1%). Considering participation of men and women in these sectors, women's participation was relatively high: private services (41.8%), education and healthcare (76.1%), commercial services (42.2%) and industrial (34.5%). In domestic services, women's participation in the total workforce exceeded 90% in 2016.

Graph I.I4
Distribution of employed women by sector of economic activity, 2016



Source: IBGE, 2017 Elaboration: Ex Ante Economic Consulting

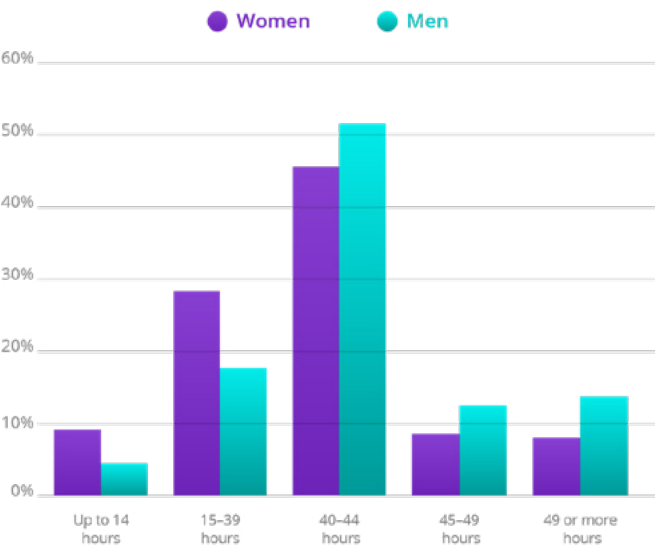
According to PNADC data for 2016, most women worked with between 40 and 44 hours a week. There was also a high proportion (28.3% of all women) who worked in shorter days, from 15 to 39 hours in the week. On average, women ended up having a shorter average working day compared to men, which was in part due to greater dedication to domestic activities and caring for people.

In 2016, the average remuneration of women's work was R\$ 1,826.35. Women who worked more than 49 hours in the week achieved a higher remuneration of R\$ 3,048.41. In sectoral terms, the highest average remuneration was obtained in construction companies (R\$ 3,521.64), where there is a small number of women employed, but with a higher predominance of positions with a high technical level (engineering and architecture). In the public service, a segment in which the participation of women in the workforce is high, the remuneration of women was R\$ 3,452.91 and in education and health activities, R\$ 2,576.03.

It should be noted that, for practically all work segments and working hours, women received lower pays than male workers. On average, the difference was 22.9% less for women, suggesting the occurrence of strong gender

inequality in the labor market. This point will be discussed in more detail in Chapter 4 of the report.

Graph I.15
Distribution of employed persons by weekly workload, men and women, 2016

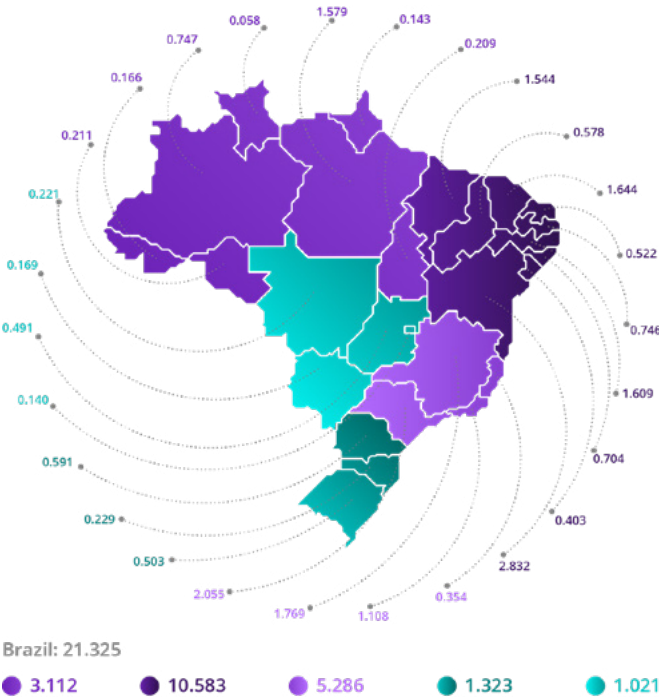


Source: IBGE, 2017 Elaboration: Ex Ante Economic Consulting

Poverty

Gender inequality is added to other characteristics of the country in the formation of a society with high levels of poverty. In order to estimate the number and profile of poor women, the criterion of relative social class was adopted, which is used in much of the literature on the subject and which guides social policies in a considerable number of countries. This criterion establishes classes based on the per capita income of the households. Five economic classes are considered, each housing 20% of the Brazilian families. In the first class are the poorest families and people who, in the case of Brazil, had a per capita household income of less than R\$ 325.00 per month in 2016. This was equivalent to an income of R\$ 10.68 per person per day (this monthly amount was higher than the extreme poverty line suggested by the World Bank, which was R\$ 133.70 per person, but slightly lower than the broader poverty line definition, also suggested by the World Bank, and which was R\$ 387 per person in 2016.)

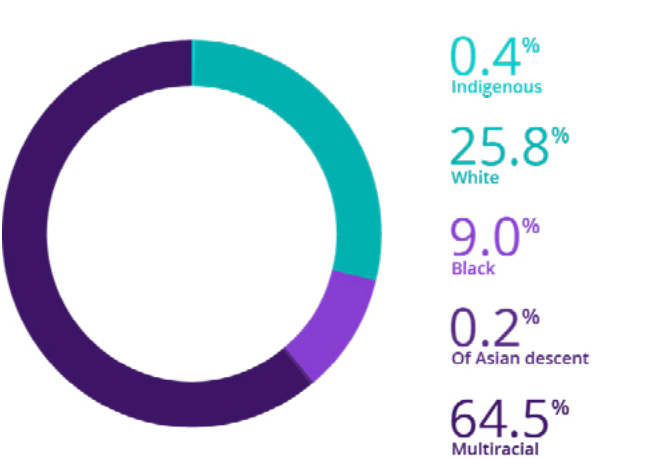
Map I.3
Number of women below the poverty line in millions of people, 2016



Source: IBGE,2017. Elaboration: Ex Ante Economic Consulting

Based on this criterion, it is estimated that there were 21.325 million women and 20.028 million men below poverty, totaling 40.353 million poor by 2016. This means that the participation of women in the Brazilian poor was greater than that of men: 51, 6% versus 48.4%, respectively. Nearly 60% of the female population in poverty was under 29 years of age, indicating a higher incidence among Brazilian girls. In fact, about 34% of all women under 14 years of age and 30% of women aged 15 to 19 years were from poor families.

Graph I.16
Self-reported race distribution of women below the poverty line, 2016



Source: IBGE, 2017 Elaboration: Ex Ante Economic Consulting

The incidence of women in poverty is particularly high in the populations of self-reported black, multiracial and indigenous women. In these groups, there were almost 3/4 of the Brazilians in poverty: 15.766 million out of a total of 21.325 million women (73.9%). Among black, multiracial and indigenous women in poverty, the largest share (44.3%) was young people under 30 years of age. The incidence of poverty among younger age groups confirms this trend: 36.4% of young black girls, 42.0% of young multiracial girls and 48.5% of young indigenous girls lived in households below the poverty line in 2016.



2. Women and Sanitation in Brazil

The IBGE's National Household Sample Survey (PNADC), in addition to the characteristics of Brazilians, regularly investigates their housing conditions. In the part of the questionnaire related to housing issues, there are questions about the form of access to water, the existence of plumbing inside the home, the existence of a bathroom for exclusive use of domicile and the form of drainage of the sewage. In the edition of the 2016 survey, two matters of special sanitation interest were included. For households supplied by the general water distribution network, or by well and spring with pipeline, the IBGE asked if the supply was daily, or if it occurred with interruptions. The IBGE also asked if the home had a water tank or reservoir.

This chapter of the study is dedicated to analyzing how Brazilian women's access to sanitation was. In this analysis, conditions are considered in the various regions of the country, in urban and rural areas, in the metropolitan regions and in the capitals of the Federation units. The conditions of access to sanitation by age group, declared race, level of education and income class of Brazilian women are also investigated. In addition to PNADC data, some statistics on sewage treatment from the National Sanitation Information System (SNIS) of the Ministry of Cities are presented.

Access to Treated Water

In 2016, according to data from the PNADC, 90.8 million women report living in homes that received water through a general distribution network, corresponding to 85.7% of the female population. The frequency of women receiving treated water was higher in urban areas (93.7% of the population); in rural areas, only 34.7% of the women lived in homes connected to the general water distribution network. The capitals of the Federation units and the Federal District formed the group of cities with the best coverage: 95.2% of the women received treated water in their homes. Statistics by region, area and capital are presented in Table A.1 of the Statistical Annex.

That year, 15.2 million women (or 14.3% of the population) reported not receiving treated water in their homes. This constituted a deficit of sanitation services, which was particularly high in the North (39.3% of the population) and Northeast (20.0% of the population). In the North, there are states with relatively low deficit in the access to treated water, such as Roraima (11.5% of the population), Tocantins (12.9% of the population) and Amazonas (25.4% of the population), and there are those with high deficits - Rondonia (55.9% of the population), Para (47.6% of the population), Acre (46.4%

Map 2.1
Number of women without water supply through general network, per thousand people and (% of female population), 2016



Graph 2.1
Women's access to the general water distribution network, by age group, 2016

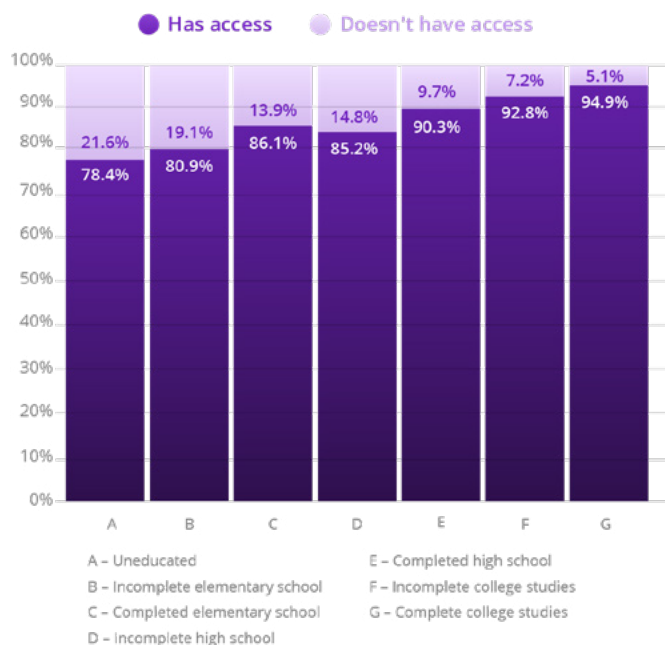


Graph 2.2
Access by women to the general water distribution network, by declared race, 2016



According to IBGE estimates, the lack of access to treated water was higher in the female population with lower schooling. In the group of uneducated women, the share without access to the water distribution system reached 21.6% of the population. In the group of women who completed higher education, the incidence of women in the treated water deficit was only 5.1% of the population.

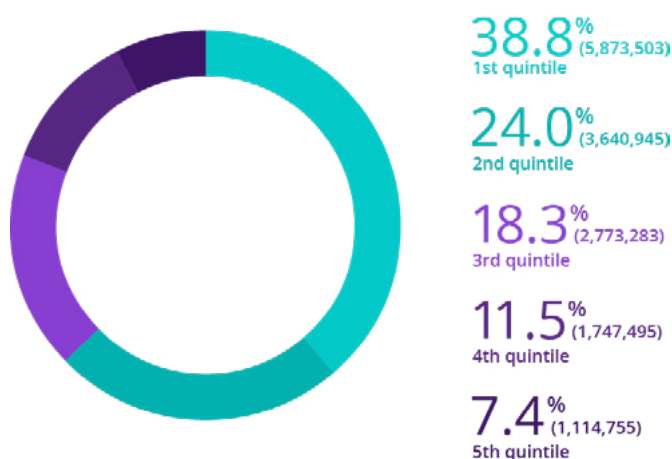
Graph 2.3
Women's access to the general water distribution network, by level of education, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

The incidence of women without access to the treated water distribution system was particularly high among the poorest income classes. Among the households that belonged to the poorest 10% of the country, the incidence of women without access to treated water reached 31.9% of the population, while among the 10% richest households in the country, the incidence was of only 4.2%. With regard to this group, it is worth mentioning that, for the most part, they were women living in houses on remote farms. For that reason, in 2016, 38.8% of the women without access to the treated water distribution system belonged to the first quintile and 24.0% to the second quintile of the per capita household income distribution in Brazil.

Graph 2.4
Distribution by income class of the access deficit to the general water network of the female population, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

Regularity in Supply

Besides the lack of access to the water distribution system, the lack of regularity in the water supply also affected the quality of life of the population. Irregular water supply can be as harmful as the lack of access itself, as deprivation, even if temporary, has health consequences. For this reason, the guidelines of the Federal Government's National Plan for Basic Sanitation (Plansab) only consider as adequate the system that guarantees the uninterrupted supply of treated water through a general distribution network, in the case of urban housing, or well, spring or cistern, with internal conduit, in the rural households. Only the daily supply of water is considered uninterrupted. The consideration that adequate is the daily delivery is based, on the one hand, on the recommendation that the Brazilian houses have, on average, 466 liters of water supply (1 In engineering terms, a minimum of 157 liters of water per inhabitant is recommended. (200 liters for apartments and 150 liters for houses). Considering the national average of 2.97 inhabitants per household in 2016, there is a need of 466 liters per household) and, on the other hand, on the fact that the average consumption in the country, through the supply networks, was 477 liters per day per household in 2016, according to information from the National Sanitation Information System (SNIS) of the Ministry of Cities. It should also be considered that a significant part of the Brazilian housing (10.3 million, or 14.9% of the total housing in the country) did not even have a water tank or reservoir according to PNADC data for 2016.

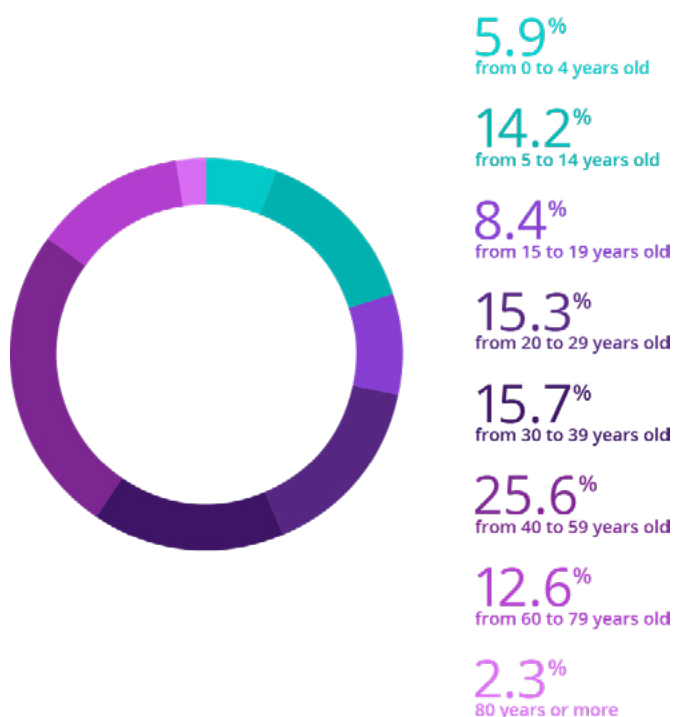
PNADC statistics for 2016 indicate that of the 90.8 million Brazilian women living in housing connected to the general water distribution network, only 78.8 million women reported receiving water on a daily basis. This means that only 74.4% of Brazilian women had regular access to treated water, a proportion 11.4% lower than that of women living in houses connected to the general water distribution network.

As indicated by statistics by region, area and capital, which are presented in Table A.2 of the Statistical Annex, the greatest differences occurred in the metropolitan regions, where the percentage of women with access to the general water distribution network was 88.6% and that of women who received regularly treated water in their homes of 70.2% - a difference of 18.4 percentage points. In regional terms, considering all the areas, the situation of the Northeast stands out. In this region, the percentage of women with access to the general water distribution network was 80.0% and that of women who received regularly treated water in their homes of only 53.2%, indicating a difference of 26.8 percentage points. The states with the greatest differences between the two coverage rates were Pernambuco (42.8 percentage points), Paraíba (37.9 percentage points) and Rio Grande do Norte (34.3 percentage points).⁽²⁾ In Paraíba and Rio Grande do Norte, most of the differences came from outside the metropolitan areas. In Pernambuco, on the other hand, the problem was concentrated in the metropolitan region: there, the percentage of women with access to the general water distribution network was 89.4%, and women receiving treated water regularly in their homes of only 39.4%, indicating a difference of 50 percentage points.) The situation in the State of Amazonas also draws attention, since the difference between the percentage of women with access to the network and that of the female population receiving regular water was 31.6 percentage points.

Statistics show that by 2016, 12 million women lived in homes connected to the general water distribution network, but water was not regularly delivered to their homes. This corresponded to 13.2% of the Brazilian female population. According to data from the PNADC, in 40% of these cases, water was distributed between 4 and 6 days in the week, 45.7%, between 1 and 3 days in the week and in 14.2% of cases, regularity was less than 1 day per week.

Graph 2.5

Distribution by age group of women who do not receive water regularly, 2016

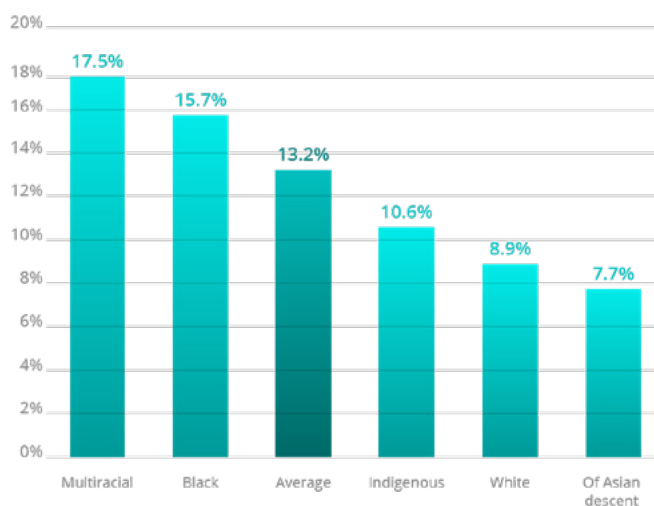


Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

The age distribution of these 12 million shows a strong concentration among adult women aged between 20 and 59 years. This age group concentrated 56.6% of women with access to the general network, but without regular supply of water. Women of up to 19 years old accounted for 28.5% of these cases and women over 60 years old accounted for 14.9%.

Graph 2.6

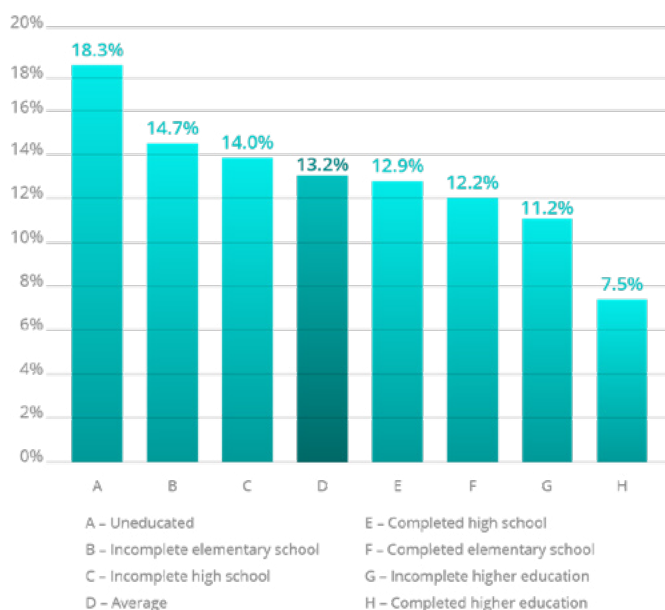
Share of the female population that does not receive regular water, by race declared, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

As in the case of lack of access to the general distribution network, the incidence of irregular deliveries is higher among self-declared multiracial women (17.5% of the total) and black women (15.7%). These two groups accounted for 67.8% of the 12 million women with irregular access to treated water. The incidence in the group of self-declared white women was only 8.9% of the total of this population and of the self-reported women of Asian descent, of 7.7%.

Graph 2.7
Share of the female population that does not receive regular water, by level of education, 2016



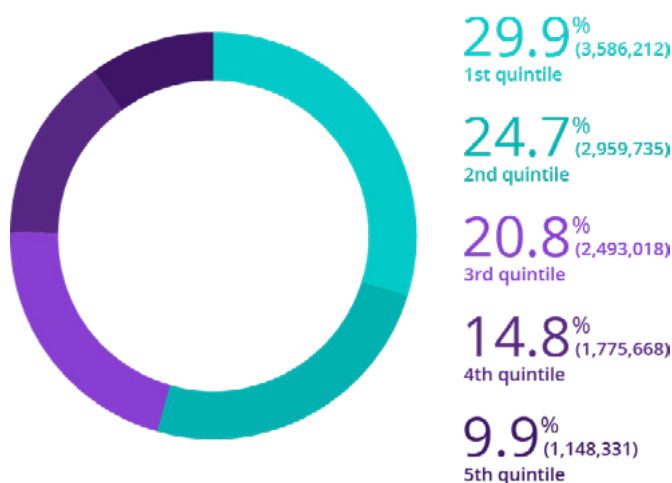
Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

Something similar occurred in the distribution of these women by level of education. As in the case of the simple lack of access to the general distribution network, the incidence of network access with irregular deliveries was also higher among women with lower levels of education. The percentage of people with access to a network that provided irregular deliveries reached 18.3% of uneducated women. This percentage fell to 7.5% in the case of women with a higher education degree.

The PNADC statistics also reveal the concentration of these cases in the lower economic classes. About 30% of the 12 million women who reported living in households with access to the general water distribution network, but receiving water with interruptions, belonged to households in the first quintile of household income distribution per capita. Other 25% belonged to the second quintile, indicating that almost 55% of these women were among the poorest 40% of the Brazilian population. Among women who belonged to the first quintile

of the per capita household income distribution, the incidence of persons with irregular supply was 16.8%, while among the richest women, who were in the fifth quintile of income distribution, the incidence was of only 5.6%.

Graph 2.8
Distribution by income class of the female population that does not receive water regularly, 2016

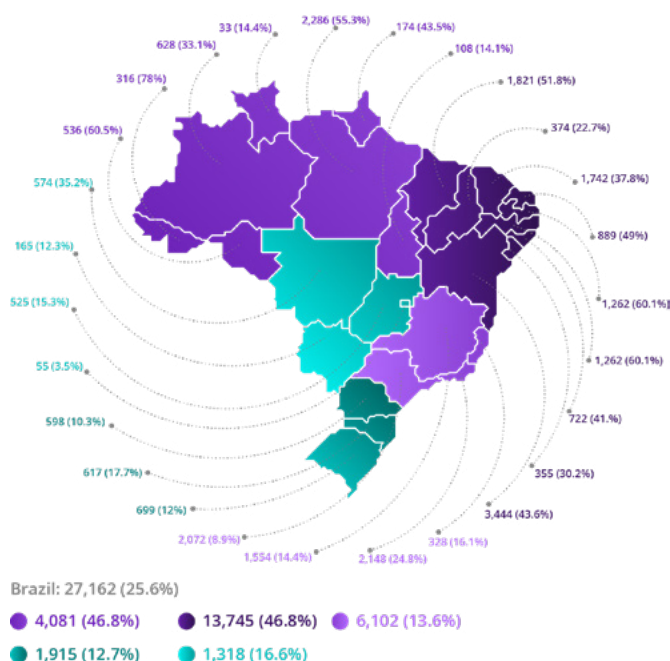


Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

Consideration of irregular supply as a deficit corrects estimates of the number of women with access to treated water services to more realistic levels. As shown in Map 2.2, the number of women in the deficit zone of regular access to treated water reached 27.2 million by 2016. This indicates that one in four women either had no access to treated water or did not receive regular access to it. This proportion reached almost one in two women in the North and Northeast regions of Brazil. In the female population, the Brazilian states with the greatest relative water deficits were: Acre (78.0%), Pernambuco (64.3%), Rondonia (60.5%), Paraíba (60.1%), Pará (55.3%), Maranhão (51.8%), Rio Grande do Norte (49.0%), Amapá (43.5%) and Alagoas (41.2%). In absolute terms, it is worth noting that the water deficit due to access or regularity in the female population of the Brazilian Southeast was still very high: in Rio de Janeiro there were more than 2.1 million women in this situation, in São Paulo, more than 2 million, and in Minas Gerais, more than 1.5 million.

Map 2.2

Number of women with no regular water supply, per thousand people and (% of female population), 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

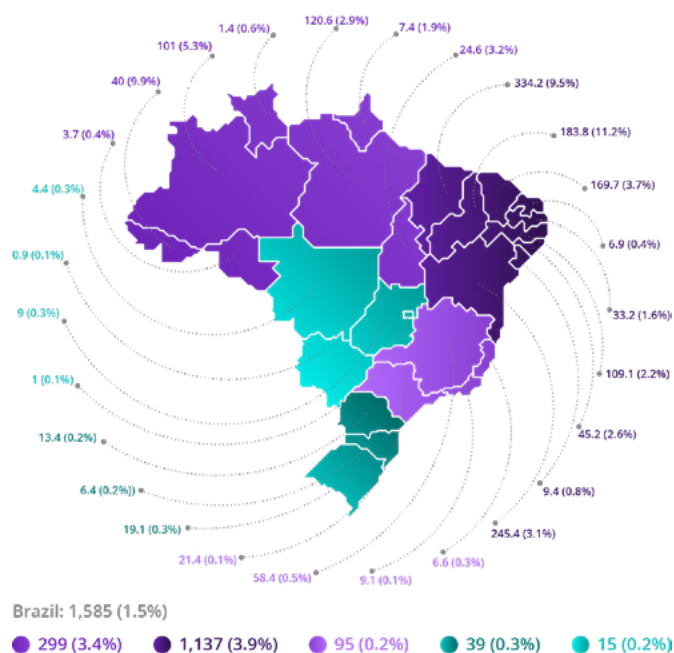
Sewage System

The lack of a bathroom in the home is the most primary of the problems associated with sewage. This problem afflicted 1.585 million Brazilian women in 2016, according to PNADC data.

As Map 2.3 points out, there was a huge concentration of this phenomenon in the Northeast, which accounted for 71.7% of Brazilians in this condition. In the region, the incidence rate of women living in households without a bathroom reached 3.9% of the female population in that year. The situation was also serious in the North, where the incidence rate was 3.4%. The number of people in the North of Brazil under these conditions reached almost 300,000 women, representing 18.8% of the national total of women in housing without bathroom. (3 The Northeast and North rates of women with no bathroom for exclusive use in the household are close to the averages found in less developed Latin American countries such as Panama and Honduras. The Instituto Trata Brasil study (2017) presented international indicators of access to sanitation.)

Map 2.3

Number of women without a bathroom in the household, in a thousand people and (% of the female population), 2016

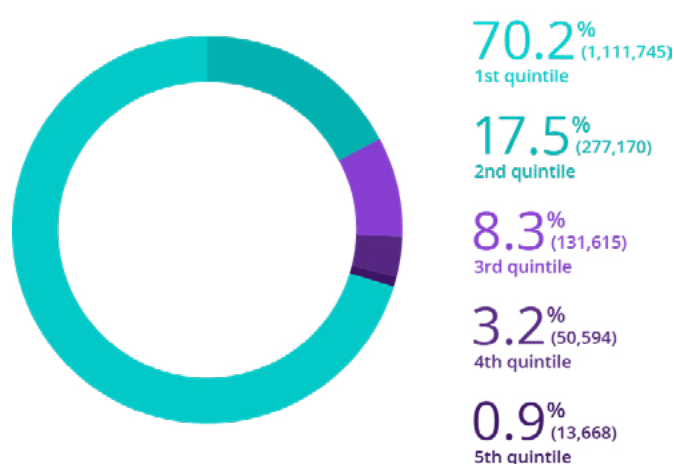


Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

Women without a bathroom in the household lived mostly in homes that belonged to the first quintile of the per capita household income distribution of 2016. In this income class, were 1,121 million women, which represented 70.2% of Brazilian women in these conditions. The incidence rate of women without a bathroom for exclusive use of the household in this income class reached 5.2% of the women in the first quintile of the household income distribution per capita.

Graph 2.9

Distribution by income class of the female population that does not have a bathroom in the house, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

For the people who lived in homes with bathrooms, the question that arises is the adequacy of the collection of residential sewage. Again, based on the guidelines of the National Plan for Basic Sanitation (Plansab), it is considered adequate housing that is connected to the general network of sewage collection (urban areas) or septic tank (rural areas). The households where sewage waste goes to a rudimentary pit not connected to the general network, to ditches or are dumped directly into rivers and lakes or into the sea are inadequate.

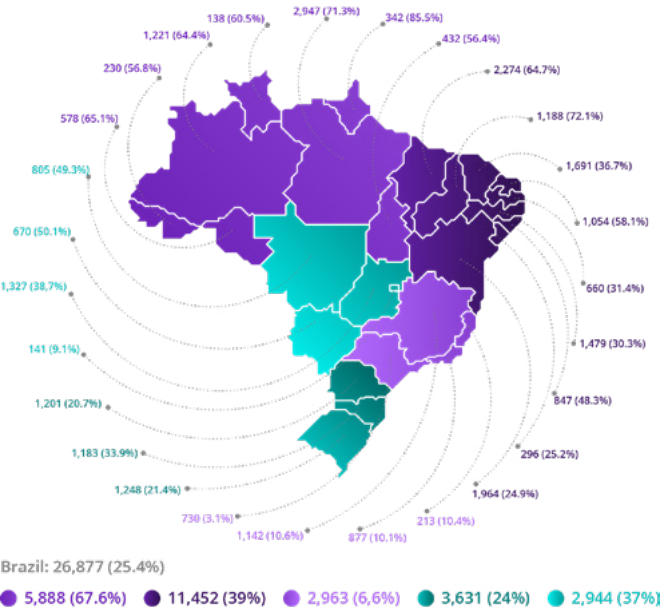
In 2016, only 79.1 million women (or 74.6% of the 105.9 million Brazilian women) lived in housing where the sanitation disposal system was considered adequate. This indicates that one in four Brazilians did not have an adequate system, a frequency similar to water inadequacy (due to lack of access to the system or interruption). Table A.4 of the Statistical Annex details these statistics by region.

Due to the fact that, in rural areas, adequacy is achieved with smaller investments and depends only on the decision of the residents themselves, the adequacy indexes seem to be higher in the Brazilian countryside than the indexes registered in the cities. In the rural areas of the country, 81.0% of the women lived in housing with adequate sanitary disposal. In urban areas, only 73.6% of the women lived in homes with adequate disposal. As a result, the absolute and relative deficit of sanitary disposal affected more the inhabitants of the urban areas of the country: in 2016, there were 24.2 million women in inadequately-disposing houses in Brazilian cities and 2.7% rural areas. The metropolitan areas concentrated 32.5% of the female and urban population without access to the general sewage collection network and the other cities of the country, 67.5%. This indicates that the problem afflicted relatively the small and medium Brazilian cities that did not belong to metropolitan regions. In these areas, one in three women lived in an urban residency without sewage collection through the general network.

In 2016, 26.9 million women (or 25.4% of the female population) reported living in homes without adequate sewage disposal. This constituted another deficit of sanitation services, also high in the North (67.3% of the population) and Northeast (39.0% of the population). In the North region, there are states with deficits in access to adequate sanitary disposal relatively low, as were the cases of Tocantins (56.4% of the population) and Acre (56.8% of the population), and there are those with relatively high deficits- Para (71.3% of the population) and Amapa (85.5% of the population). In the Northeast, the states that were most advanced in the process

of universalizing the collection of sewage were Bahia, with a deficit of 24.9% of the population, and Sergipe, with a deficit of 25.2% of the female population. The deficits were higher in Piaui and Maranhao, where respectively 72.1% and 64.7% of the female population lived in households without adequate sanitary sewage.

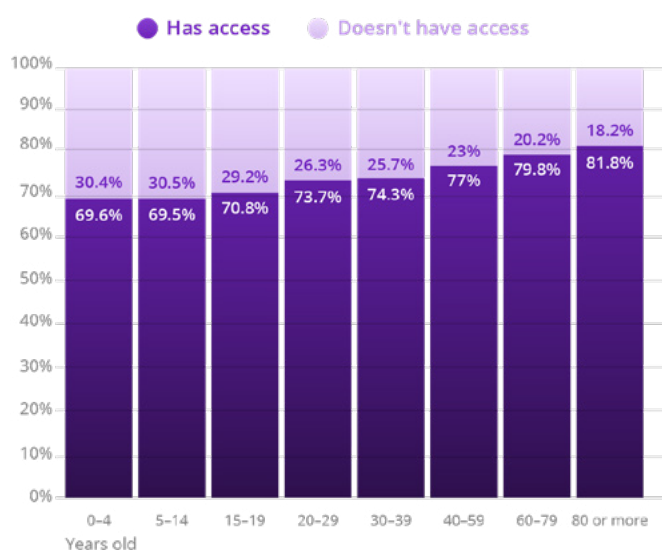
Map 2.4
Number of women without sewage collection, in thousand people and (% of female population), 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

The 2016 PNADC found that lack of access to an adequate form of sanitary disposal was more frequent among children. Among women up to 4 years of age, 69.6% lived in housing with adequate disposal conditions and 30.4% in houses with inadequate disposal of sewage. Among women older than 80 years, the adequacy was achieved by 81.8% of the female population and the inadequacy affected 18.2% of the people.

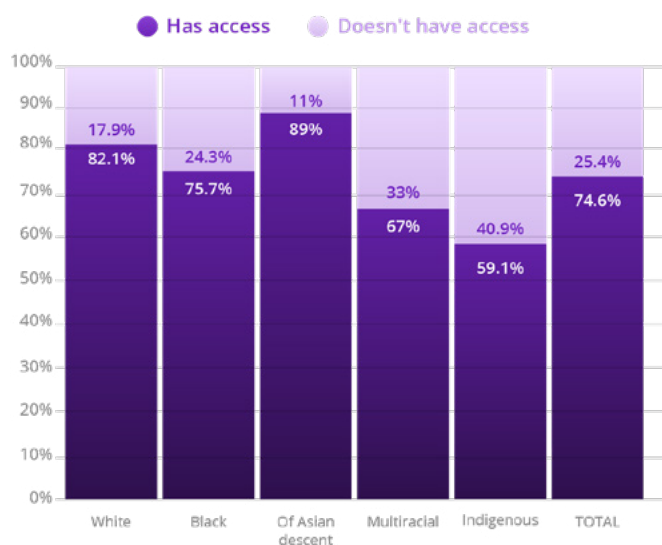
Graph 2.I0
Women's access to the sewage collection system, by age group, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

The adequacy levels of the sanitary sewage were higher in the white female population or in the Asian descending population. Adequate sanitary sewage deficits were, consequently, relatively minor. Among self-reported white women, 17.9% did not live in homes with adequate sewage and among self-reported of Asian descent, only 11.0%. On the other hand, the deficits were higher among self-reported multiracial, indigenous and black women: in these groups, the incidence of inadequate sanitation was 24.3%, 33.0% and 40.9% of the respective female populations.

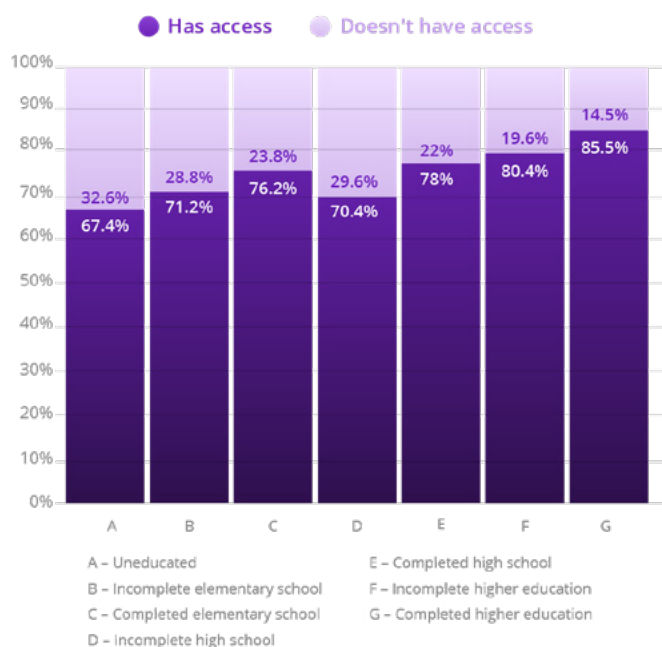
Graph 2.II
Women's access to the sewage network by self-declared race, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

In line with what happened with access to treated water, the lack of proper disposal conditions has further afflicted women with lower income and lower levels of education. Among uneducated women, the sanitation deficit reached 32.6% of the population, while the rate was only 14.5% among women with higher education in 2016. In the group of women who belonged to the first quintile of the distribution of per capita household income, the incidence rate of women in housing without adequate sanitary disposal reached almost 40%. Among the richest women, who belong to the fifth quintile, the incidence was only 12.7%. For this reason, the poorest women accounted for 31.7% of the female population in the deficit of adequate sanitary sewage and the richest, for only 9.9% of the total.

Graph 2.I2
Women's access to the sewage collection system, by educational level, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

Finally, it is worth mentioning that, in addition to the lack of adequate sanitary sewage, a large part of the sewage collected in the general networks was not properly disposed, because it did not receive treatment before disposal in the environment. For this untreated portion, collection only served to move sewage away from residences. According to preliminary data from SNIS 2016, only 74.1% of the sewage collected in the country received treatment before disposal. The remaining 25.9% of the collected sewage was discarded in natura in rivers, lakes or in the sea.

Considering the volume of water billed by the operators (of water or water and sewage) in each region, the volume of treated

Deprivation Profile

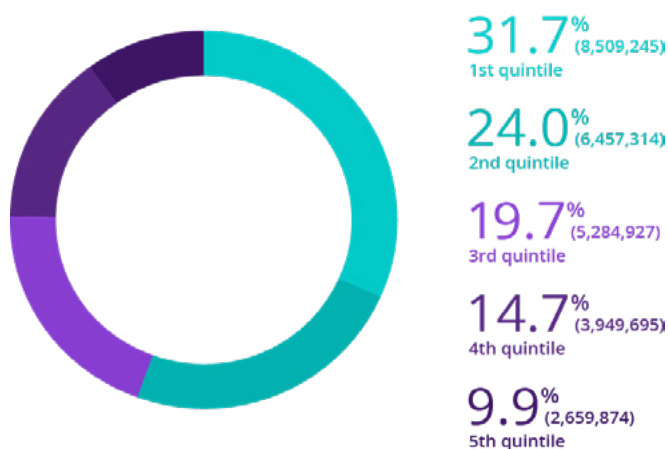
Map 2.5
Sewage treatment deficit: (%) of the volume of billed water that is not collected and treated, 2016



from more detailed econometric analysis that sought to identify the determinants of the sanitation deficit. These analysis, set out in detail in the Methodological Appendix of this study, allow to separate the partial effects of each analyzed dimension, considering that some characteristics in general occur simultaneously - for example, indigenous and black self-declared women have, on average, lower education, and more often belong to poorer families.

The analyzes confirmed some correlations that make it possible to trace more likely profiles of deprivation. In summary, the woman without adequate access to treated water belonged to a family among the poorest 30% of Brazil, she had low education - mostly had incomplete primary education -, she was adolescent or young (less than 40 years old), lived in metropolitan areas of the country or in rural areas. The woman without access to adequate sewage services had a similar profile, with the distinction that she lived in urban areas of the countryside of the country.

Graph 2.I3
Distribution of the access deficit to the sewage collection system by income class, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

These aspects give a very marked social connotation to the issue of access to basic sanitation in Brazil, not only in the income aspect, but also in the precariousness of services, precisely in the most vulnerable social groups. The conclusions also raise several issues ranging from effective access to treated water to heterogeneous management capacity among the medium and small municipalities of the country. Finally, the analysis suggest that the impacts of lack of sanitation on women's lives may occur more frequently in specific groups of the female population. Therefore, these consequences of deprivation of sanitation need to be analyzed in greater detail, a task that will be developed in the next chapters of the study.



3. Access to Sanitation and Health of Women

Lack of sanitation has immediate implications on the health and quality of life of women living in environmentally degraded areas. The lack of treated water has a direct impact on health, especially that of younger women and older women, as it increases the incidence of gastrointestinal infections. The lack of sewage collection and treatment services, even when access to treated water is provided, is the cause of another part of gastrointestinal infections and mosquito-borne diseases. The most serious problems occur next to rivers and contaminated streams or in streets where open sewage runs - which runs in ditches and gutters. But pollution of water reservoirs and springs, which have its water quality deteriorating over the years, also affects the health of Brazilian women.

This chapter examines the incidence of infectious gastrointestinal infections in Brazilian women, the evolution of these indicators and the severity of gastrointestinal infections - which lead to bed rest, hospitalizations and deaths. Finally, the partial effect of lack of sanitation on the incidence of infectious gastrointestinal infections in women is analyzed.

Absence Due to Diarrhea

The National Health Survey (PNS) of the Brazilian Institute of Geography and Statistics (IBGE) has produced very

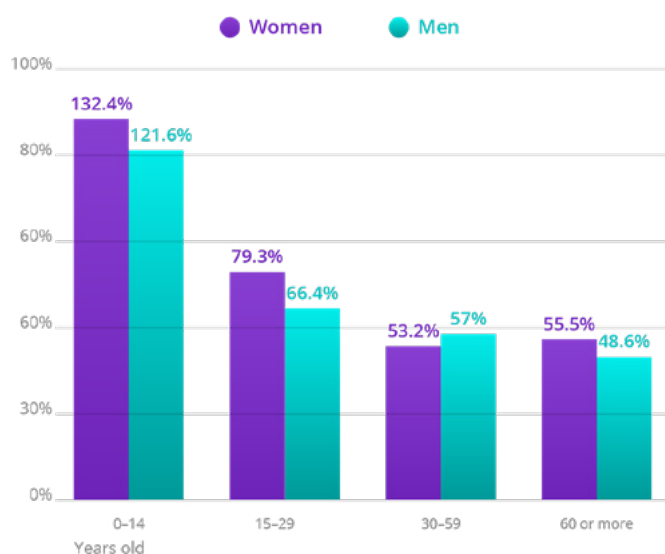
detailed information on the health of women in 2013, which makes it possible to compare the health problems that afflicted the Brazilian female population with the socioeconomic characteristics of women. Among the points analyzed, the survey asked a representative sample of men and women if there were any leaves from routine activities in the two weeks prior to the date of the interview, the reason for the absences and for how many days the interviewees were away. Based on this information, it is possible to evaluate the incidence of departures from routine activities due to diarrhea or vomiting in the Brazilian female and male populations.

In 2013, according to PNS data, 576,213 people indicated that they had taken a leave from their routine activities due to diarrhea or vomiting (presumed gastrointestinal infections). Of this total, 304,076 were women (or 52.8% of the total) and 272,137 were men (or 47.2% of the total). Based on these data, it is estimated that there were 7,906 million cases of diarrhea or vomiting absences among women throughout the year 2013.⁽¹⁾ It is important to note that the same woman may have withdrawn from her activities for more than one occasion over a year.)

In 2013, 86.1% of the female population away from their activities due to diarrhea or vomiting lived in urban areas of the country and only 13.9% in rural areas. In the capitals of

The North and Midwest regions registered incidence rates higher than 75 cases per thousand women. In the North, the results of Amapá and Tocantins, with a tax incidence of 122.6 and 116.5 cases per thousand women, respectively, were the highest. In the Midwest region, the case of Mato Grosso do Sul stood out, with 115.7 cases per thousand women. It is worth mentioning the relatively poor index of the state of Santa Catarina, which had 112.6 cases per thousand women, a rate 52% higher than Brazil's average.

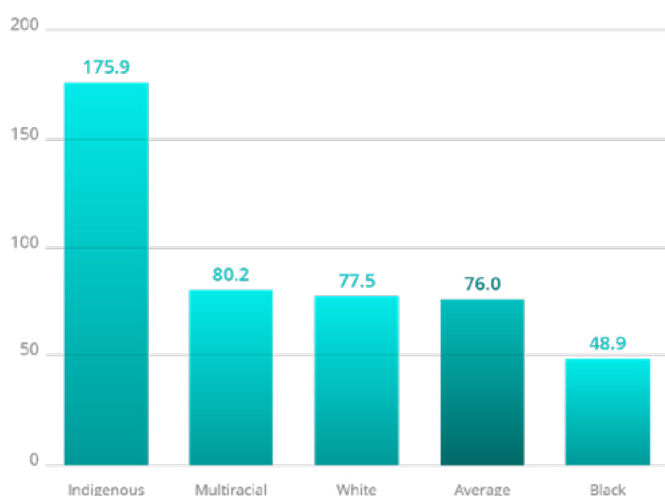
Graph 3.1
Incidence of leaves due to diarrhea or vomiting in the population, by gender and age group, in cases per thousand inhabitants, 2013



Source: IBGE, 2015. Elaboration: Ex Ante Consultoria Econômica.

The incidence of diarrhea or vomiting was extremely high in the female indigenous population. In this group, there were 175.9 cases per thousand women in 2013. The population of multiracial self-reported women also had a high rate: 80.2 cases per thousand women. The rate was relatively lower among black self-reported women, a group in which the incidence was only 48.9 cases per thousand women.

Graph 3.2
Incidence of absences due to diarrhea or vomiting in the female population, by declared race, in cases per thousand inhabitants, 2013

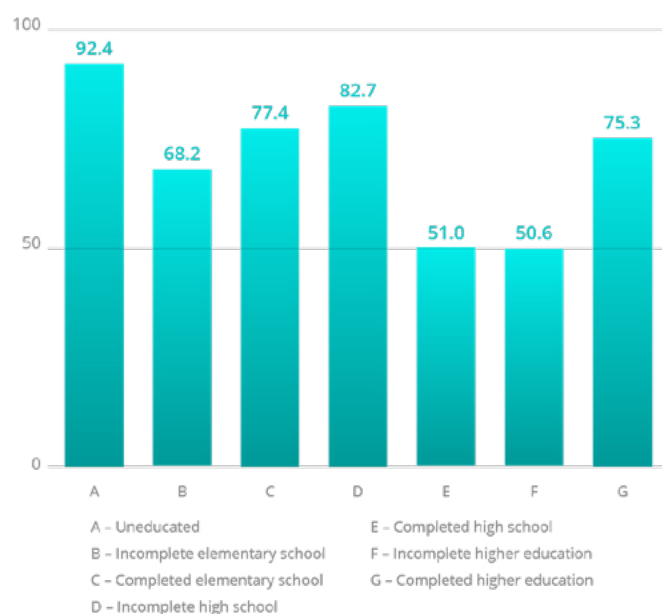


Source: IBGE, 2015. Elaboration: Ex Ante Consultoria Econômica.

In the distribution by level of education, the incidence rate

was higher among women without education, a category that registered 92.4 cases per thousand women. The second group with the highest rate was women with incomplete high school education, with 82.7 cases per thousand people. It is worth noting that the incidence of diarrhea or vomiting was also high among women who completed college. In this group there were 75.3 cases per thousand women in 2013.

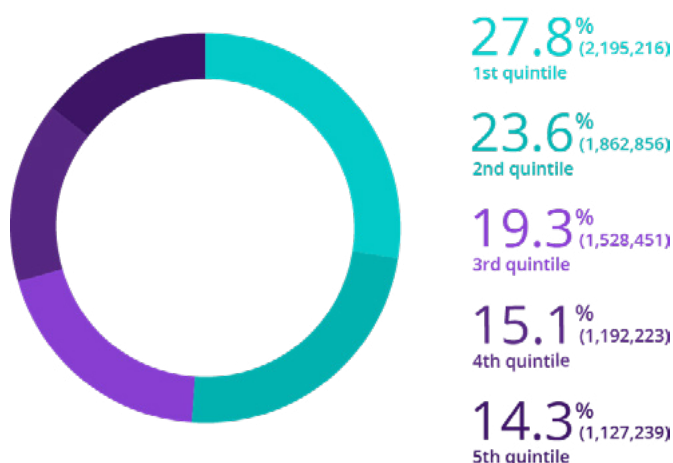
Graph 3.3
Incidence of absences due to diarrhea or vomiting in the female population, by level of education, in cases per thousand inhabitants,



Source: IBGE, 2015. Elaboration: Ex Ante Consultoria Econômica.

Of the total of 7.906 million cases of absences due to diarrhea or vomiting among Brazilian women, those living in households in the first quintile of household income distribution per capita accounted for 2.195 million cases, or 27.8% of the total of cases. In the second quintile, there were 1.863 million cases, or 23.6% of the total. In relative terms, it is worth mentioning that the incidence rate was higher in the third quintile, where there were 83.1 cases per thousand women. This is explained by the fact that in this class of household income there is a high proportion of elderly women (retired or pensioners) or who work in the labor market.

Graph 3.4
Distribution by income class of absences due to diarrhea or vomiting in the female population, 2013



Source: IBGE, 2015. Elaboration: Ex Ante Consultoria Econômica.

Severity of Infections

According to the National Health Survey (PNS) of IBGE, in the 7.906 million cases of women on leave due to diarrhea or vomiting during the course of 2013, women were away from their activities for 3.48 days on average. This implied the occurrence of 27,506 million days of absences from routine activities over a year. If they had not contracted gastrointestinal infections, these women could work, study, or simply rest during the time they became ill.

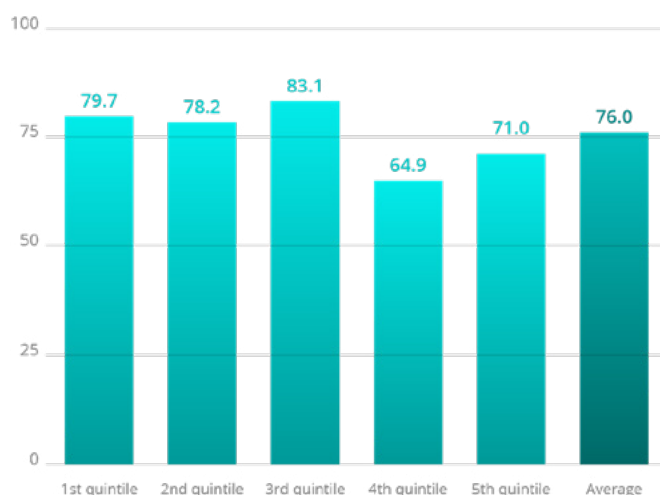
Compared to the male population, it is worth mentioning that the average number of days of absence of women due to diarrhea or vomiting was higher. In the group of men, departures for this reason lasted 3.15 days on average. Thus, the female population accounted for 55.3% of the total days of leave and the male population, for only 44.7%.

Of the women who stepped away from their routine activities due to diarrhea or vomiting, 3.608 million were bedridden for at least one day during their leave. This means that in 45.6% of the cases of withdrawal the infections were severe enough to require bed rest. In this statistic of infection severity, the male indices were also smaller: only 40.7% of the men who had withdrawn from their routine activities due to diarrhea or vomiting became bedridden.

The incidence rate of women bedridden due to diarrhea or vomiting was 34.7 per thousand people. In rural areas, the incidence rate was higher (44.8 per thousand women)

and in urban areas, the lowest (33.1%). Table A.6 of the Statistical Annex shows the statistics per unit of the Federation, areas and regions.

Graph 3.5
Incidence of absences due to diarrhea or vomiting in the female population, per quintile of per capita household income distribution in cases per thousand inhabitants, 2013

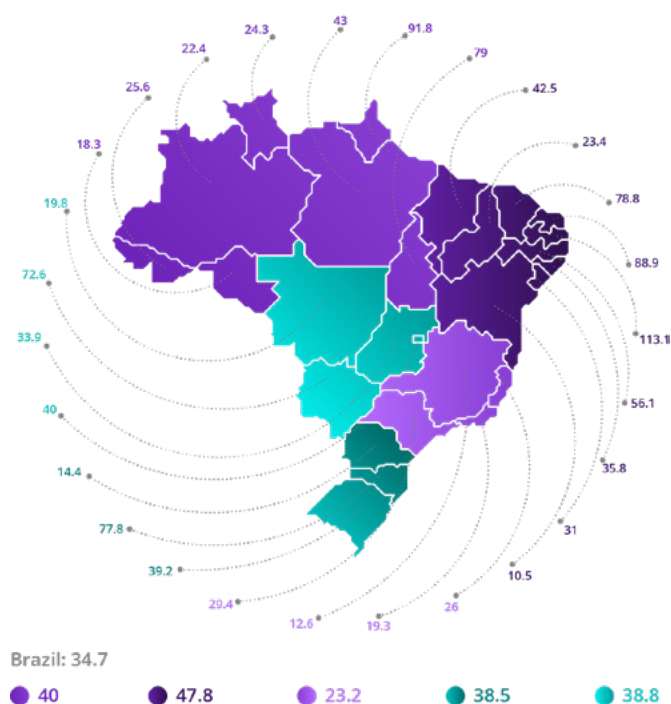


Source: IBGE, 2015. Elaboration: Ex Ante Consultoria Econômica.

The incidence of women in bed due to diarrhea or vomiting was relatively higher in the Northeast and North regions of the country: respectively 47.8 and 40.0 cases per thousand women. The lowest incidence was in the Southeast and South regions of Brazil, which recorded rates of respectively 23.2 and 38.5 cases per thousand women. In the case of the Southern region, statistics from the state of Santa Catarina again draw attention: the incidence of women in bed was 77.8 per thousand people, a rate 109.4% higher than the average of the region itself.

Map 3.2

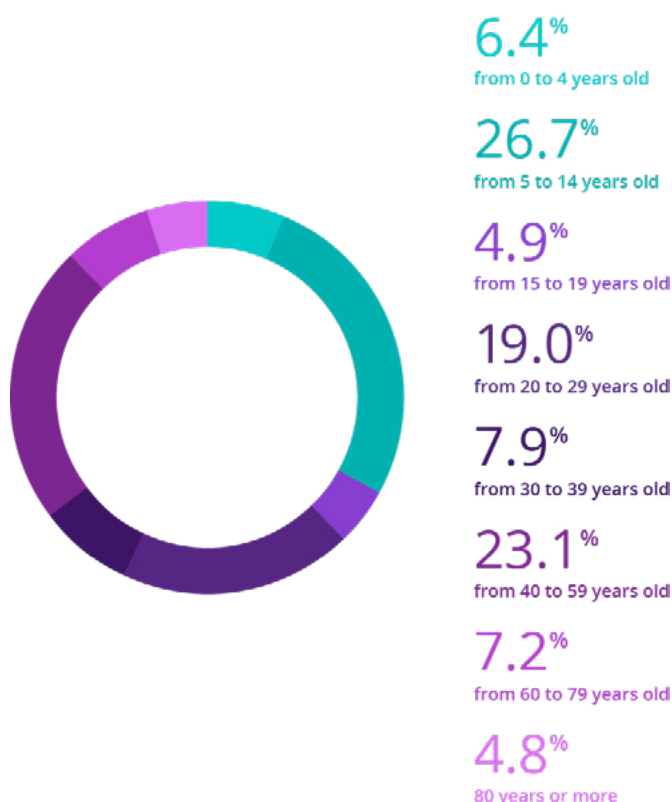
Incidence of women bedridden by diarrhea or vomiting in the female population, in cases per thousand people, 2013



The highest frequency of cases of diarrhea or vomiting occurred among women up to 14 years of age (33.2% of total cases). Young women, aged 15-29 years, accounted for 23.8%, those aged between 30 and 59 years, for 31.0% of the cases, and women over 60 years old, for 12.1%. Although they have a smaller participation, it is worth mentioning that the proportion of women who are absent from their activities due to diarrhea or vomiting and have been bedridden is very high: the proportion was almost 9 out of 10 women in the year 2013.

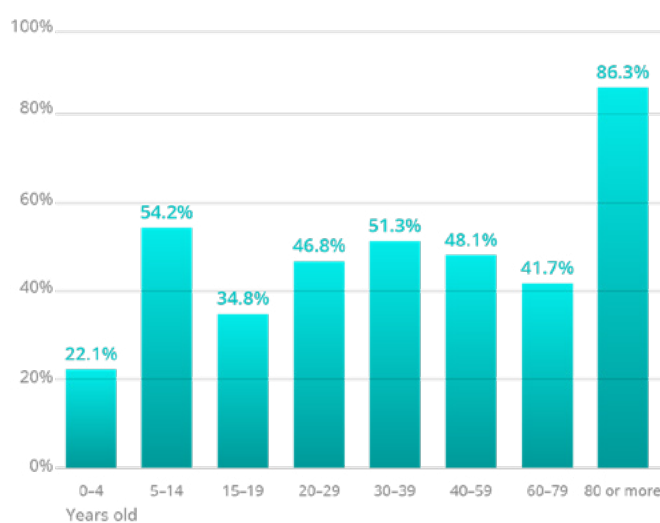
Graph 3.6

Distribution of women who are bedridden due to diarrhea or vomiting, by age group



Graph 3.7

Portion of the female population on leave from diarrhea or vomiting that was bedridden, by age group, 2013

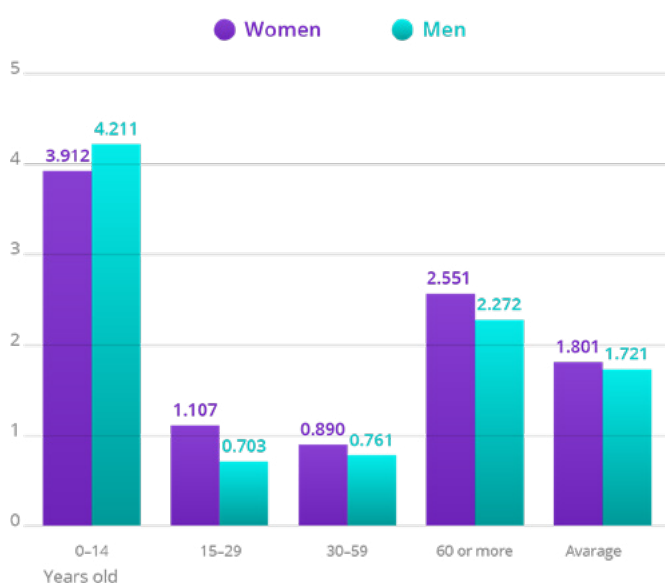


According to data from the Unified Health System database (DATASUS), there were 353,503 hospitalizations due to

infectious gastrointestinal diseases in SUS network hospitals in 2013. Of the total number of hospitalized patients, 187,308 (53.0% of the total) were women and 166,195 were men (47.0% of the total). Table A.7 of the Statistical Annex shows the number of women hospitalized for infectious gastrointestinal diseases in the hospitals of the SUS network in 2013, per unit of the Federation, area and capital, which allows comparisons with the statistics of absences and of women who were bedridden. Table A.8 of the Statistical Annex brings the same hospitalization information, but for 2016.

Statistics show an incidence of 1,801 admissions per thousand women in 2013, a figure higher than that of the male population (1,721 per thousand men). For all age groups, with the exception of the younger age groups (up to 14 years of age), hospitalization rates were higher among women. The data show that the women were on average 3 days hospitalized, indicating a total of 563.2 days of hospitalization in SUS network hospitals in 2013.

Graph 3.8
Incidence of hospitalizations due to diarrhea or vomiting in the population, by gender and age group, in cases per thousand inhabitants, 2013

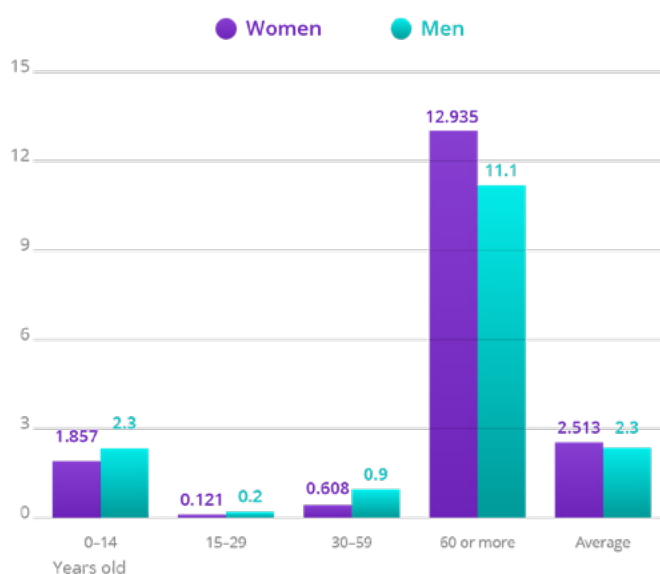


Source: DATASUS and IBGE, 2015. Elaboration: Ex Ante Consultoria Econômica.

Also according to DATASUS statistics, 4,809 deaths were recorded due to gastrointestinal infections in the country in 2013. Of this total, 2,614 deaths were among women (54.4% of the total). The majority of these deaths occurred in the older population, despite the fact that these diseases were more frequent in the young: 73.7% of the deaths were in women over 60 years of age, while 15.2% of the deaths were in girls who were up to 14 years of age.

The mortality rate due to infectious gastrointestinal diseases was higher among women than among men. In 2013, 2.5 women died for this reason in every 100 thousand people. In the male population, the mortality rate was 2.3 people per 100,000 men. Considering the age groups, the highest proportion of deaths occurred in the female population over 60 years of age: 12.9 persons per 100,000 women. Mortality among young women was also high in comparison to the average: 1.9 deaths per 100,000 girls up to 14 years of age.

Graph 3.9
Incidence of deaths due to diarrhea or vomiting in the population, by gender and age group, in cases per 100 thousand inhabitants, 2013



Source: DATASUS and IBGE, 2015. Elaboration: Ex Ante Consultoria Econômica.

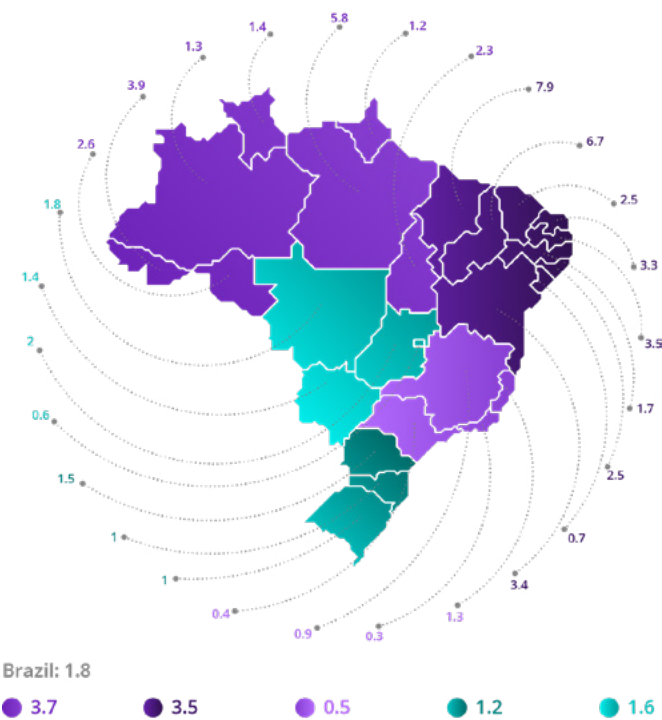
The mortality rate was particularly high in the Northeast and North regions, with incidence of 3.9 and 2.8 deaths per 100,000 women. In the North of the country, the highest rates were observed in Amazonas and Roraima: 4.9 and 5.5 deaths per 100,000 women. In the Northeast, the states with the highest incidences of deaths due to infectious gastrointestinal diseases were Alagoas (7.0 deaths per 100,000 women) and Pernambuco (5.5 deaths per 100,000 women).

Sanitation and Health

The adverse consequences of lack of sanitation on the health of the population are severe, but the advancement of the distribution of treated water and the collection and treatment of sewage bring visible results. According to data from the 2003 National Household Sample Survey, 20.1 million women did not have access to the general water distribution network, equivalent to 22.1% of the country's

female population. At the time, 49.4 million women had no access to sewage collection in their homes, almost 55% of the Brazilian female population. By 2016, the number of Brazilians without access to treated water had fallen to 17.2 million, which indicated a relative water deficit of 16.3% of the female population. In relative terms, the drop in the number of Brazilians without access to sewage collection services was higher, from 15.5 percentage points, from 54.4% in 2003 to 38.9% in 2016. This means that, despite the strong population growth observed in the period, the number of Brazilians without adequate sewage collection in 2016 (41.2 million women) was lower than in 2003.

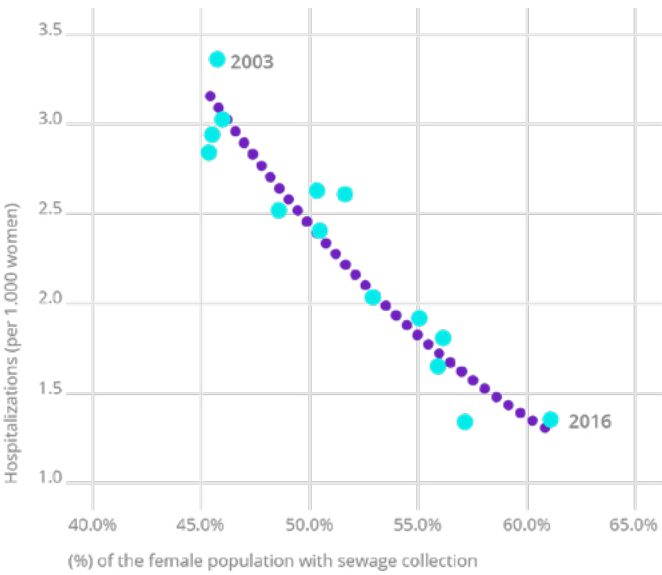
Map 3.3
Incidence of women hospitalized in the SUS network for diarrhea or vomiting in the female population, in cases per thousand people, 2013



Source: DATASUS. Elaboration: Ex Ante Consultoria Econômica.

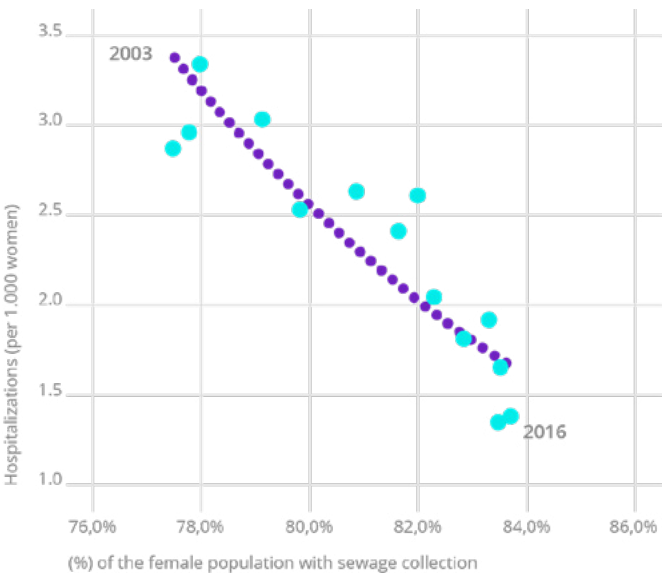
Graph 3.10 shows, for the female population, the evolution of the sewage collection coverage in the country and the incidence of gastrointestinal infections that resulted in hospitalization in the SUS between 2003 and 2016. Each year, with an increase in the share of the female population served by the sewage collection system, the hospitalization rate (hospitalized per thousand women) fell systematically. Graph 3.11 shows the expansion of the population with access to treated water and the systematic reduction of the incidence rate of gastrointestinal infections.

Graph 3.10
Gastrointestinal admissions* and female population with access to the sewage collection system, 2003 to 2016



Source: IBGE, several years and DATASUS (*) Female population hospitalized in SUS hospitals for ICD 10: Cholera, shigellosis, amebiasis, diarrhea and presumed infectious gastroenteritis, other infectious intestinal diseases. Elaboration: Ex Ante Consultoria Econômica.

Graph 3.11
Gastrointestinal admissions* and female population with access to the treated water service, 2003 to 2016

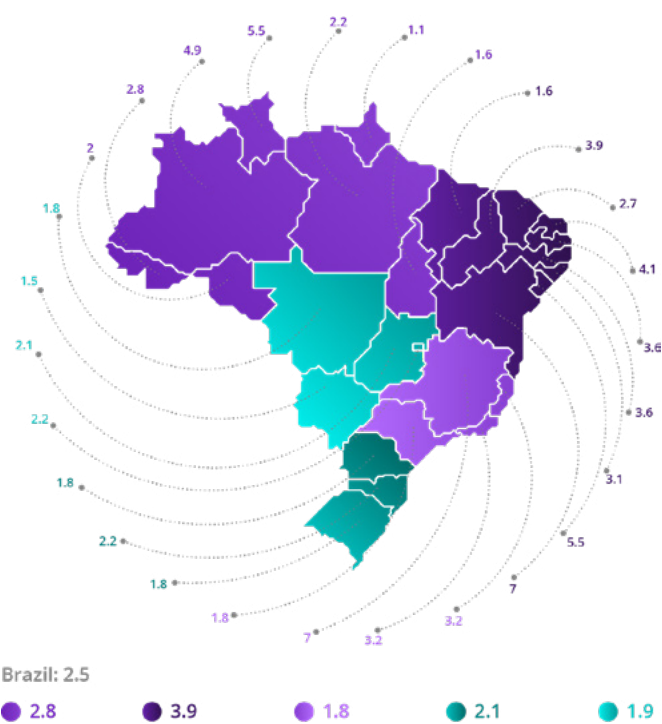


Source: IBGE, several years and DATASUS (*) Female population hospitalized in SUS hospitals for ICD 10: Cholera, shigellosis, amebiasis, diarrhea and presumed infectious gastroenteritis, other infectious intestinal diseases. Elaboration: Ex Ante Consultoria Econômica.

Data from the National Health Survey of 2013 (IBGE, 2015), which details a wide range of information on Brazilian women, corroborate the negative relationship between access to sanitation and the absence from daily activities due to diarrhea or vomiting. It was found that the probability of occurrence of withdrawal from daily activities due to

diarrhea or vomiting was negatively correlated with access to sewage and treated water services. The greater the access to these services, the lower the probability of absence due to gastrointestinal disease. It is worth mentioning that the regression analysis also identified that the probability of withdrawal due to infectious gastrointestinal disease is significantly lower among men than among women - see details in the Methodological Annex.

Map 3.4
Deaths of women due to diarrhea or vomiting in the female population, in cases per 100,000 people, 2013



Source: DATASUS. Elaboration: Ex Ante Consultoria Econômica.



4. The Effects of the Lack of Sanitation in the Lives of Women

As seen in the previous chapter, the occurrence of gastrointestinal infections led to the absence of Brazilian women from their routine activities. Depending on the severity, the infections led to bed rest or hospitalization. In more acute cases, it was the cause of death. But in all cases, infections have alienated women from their study and from their economic or domestic activities, and have increased their hours dedicated to the health care of relatives (children, spouses, parents, etc.). In this sense, infections associated with lack of basic sanitation have affected the lives of women of all ages, races and social classes, with effects on their present and future income and on the hours available for rest or leisure. In other words, the lack of sanitation brought losses of well-being to Brazilian women.

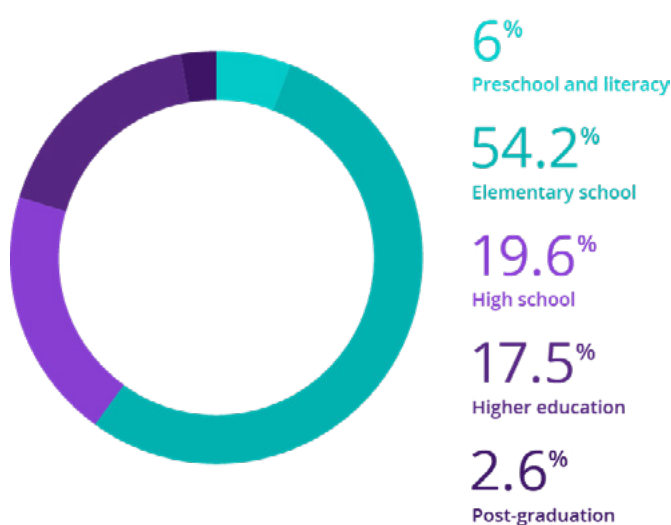
This chapter of the study examines the impacts of poor sanitation on the lives of women students and those engaged in paid economic activities. The analysis is developed based on data from the National Continuous Household Sample Survey (PNADC) of 2016 and the National High School Examination (ENEM) of 2016. In order to facilitate the exposition and understanding, the chapter is organized according to the participation of women as students or as persons engaged in economic activity. However, it should not be forgotten that there are women who, in their daily lives, regularly carry out these activities together.

Dedication to Studies

In 2016, according to PNADC data, there were 25.373 million women attending regular courses. That means that one in four women was studying in that year. In the North, Northeast and Midwest regions, where the female population was relatively younger, the percentages of total females that were studying were higher. The frequency statistics for courses are shown in Table A.11 of the Statistical Annex, by unit of the Federation, region and household region.

Just over half (54.2%) of the female population that was studying in 2016 attended elementary school and another 6.0% were in pre-school or literacy courses. This indicates that 6 out of 10 students attended basic curriculum courses. In addition to this group, about 20% of students were enrolled in high school. The other fifth part of the Brazilian students was attending higher education, including undergraduate and postgraduate courses (specialization, master and doctorate).

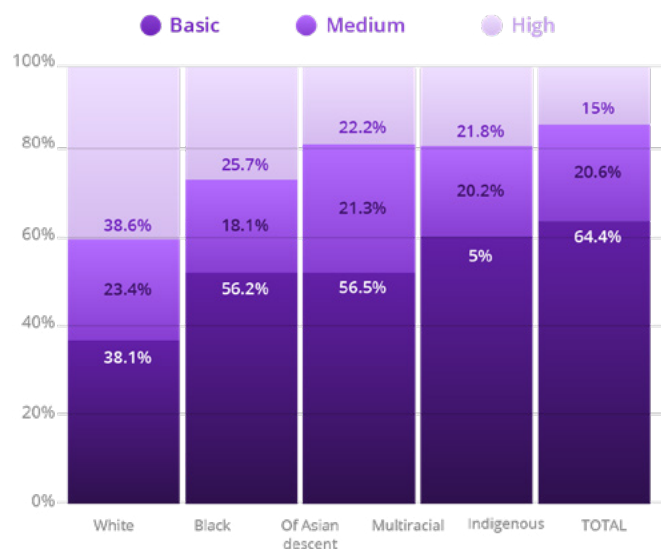
Graph 4.1
Distribution of Brazilian students by course, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

It is important to note that, even considering the current structures to encourage the inclusion of vulnerable social groups in higher education, the participation of black or indigenous women was still very small. Only 15.0% of multiracial self-reported students were attending college. The majority (64.4%) attended basic education (elementary, pre-school and literacy). Among the self-taught black and indigenous students the situation was similar. Among the self-declared of Asian descent students, the situation was different: 38.6% were attending higher education courses and only 38.1% were in elementary education. These data show that the progression in the teaching of black and indigenous Brazilian self-declared women was much smaller than the progression of those who declared themselves white and of Asian-descent.

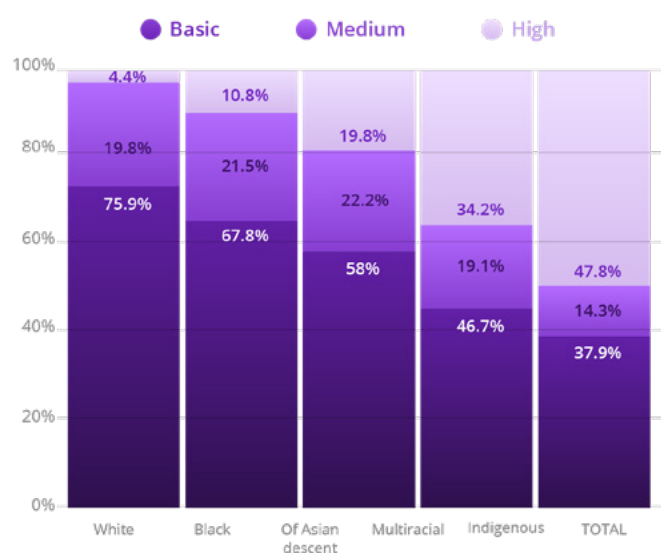
Graph 4.2
Distribution of Brazilian students by course level and self-declared race, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

The progression in education was also significantly lower among students who belonged to the poorest 20% of the country. In this per capita household income class, 3 out of 4 students were enrolled in basic education, and only 4.4% of students attended higher education. Among the students who belonged to the richest 20% of the Brazilian population, the situation was totally different: almost half of the students were in higher education courses and only 37.8% of the women were enrolled in elementary education.

Graph 4.3
Distribution of Brazilian students by course level and income distribution quintile, 2016

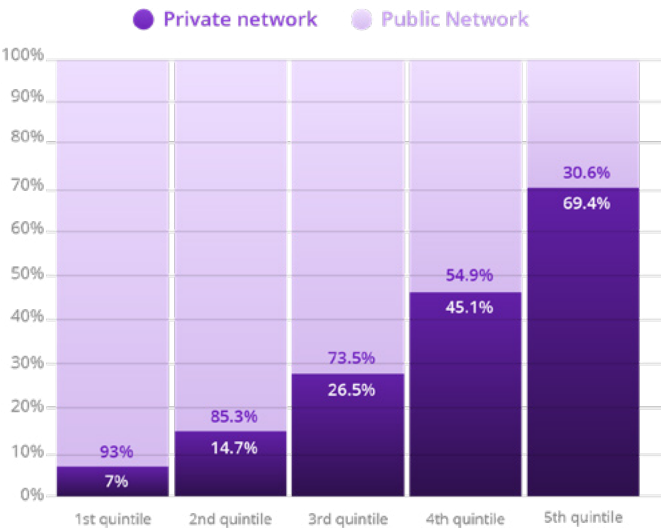


Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

Another striking difference between classes is participation in public and private schools. Among students who were among the richest 20% of the Brazilian population,

attendance in private schools reached almost 70%. Among students who were in the poorest 20% of the Brazilian population, 93.0% attended public schools.

Graph 4.4
Distribution of Brazilian students by educational network and quintile of income distribution, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

The conditions of these students’ homes, in particular the conditions of access to basic sanitation, had an effect on their school performance and progression in the study. Several Brazilian studies have sought to establish and evidence these relationships. The study of the Center for Social Policies (CPS-FGV, 2008), on one hand, evaluated the effect of basic sanitation on school achievement, understood as the rate of progression in education. The Instituto Trata Brasil study (2017), on the other hand, evaluated the effect of access to sanitation on school delay based on information from the 2015 PNAD (IBGE, 2016). School delay was defined as the difference between schooling reached by school-age people and the number of years of study they could have considered their respective ages.

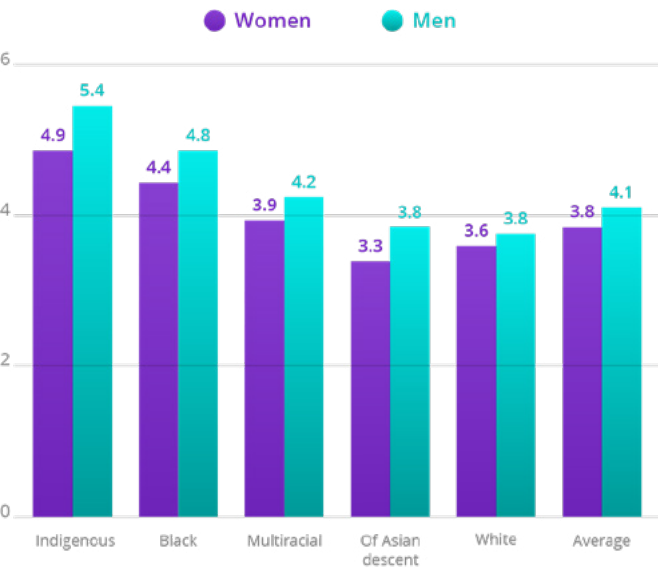
The statistical analysis developed in this study on sanitation and Brazilian women complements and deepens these assessments by identifying the effect of access to sanitation on school delay and school performance of the female population in Brazil. Students being behind in school years is considered a problem because it conditions the performance of younger people in their economic activities, signaling a lower potential for increased productivity and pay for future generations. But there is another more immediate effect of the lack of sanitation on Brazilian women who are students: sanitation interferes with the chances of progression to higher

education and the qualification of young women who have recently entered the labor market. This is because sanitation affects school performance in terms of grades.

The analysis of the effect of sanitation on the delay was developed based on information from the PNADC of 2016 (IBGE, 2017). In the present study, the population aged between 5 and 19 years old was considered to be of school age. For this age group, the school delay was calculated, with its determinants investigated through statistical models. The statistics on the school lag of the female population are presented in regional detail in Table A.12 of the Statistical Annex.

Indicators of school lag in Brazil show strong gender and racial inequality among Brazilian youths by 2016. In general, women had a lower school delay than men (3.8 years versus 4.1 years), indicating that women , on average, were less behind in the studies than men. On the other hand, it is seen that self-reported indigenous, black or brown women had much higher levels of school delay than white or yellow self-declared women. This fact reflects, at least in part, the differences that were identified in the progression in teaching among Brazilian students.

Graph 4.5
School delay by gender and self-declared race, in years, 2016

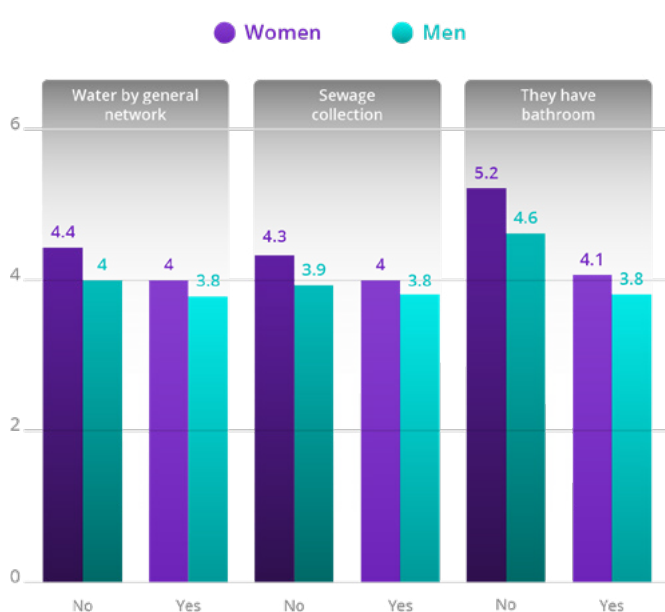


Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

But there are other factors that interfere in the determination of school lag. When comparing the averages of school delay of people living in households with access to sanitation, whether they are girls or boys, with the average of people living in homes

without access to sanitation, it's possible to note the importance of this basic infrastructure in the life of young Brazilians. Young people receiving in their homes water distributed through the general network had lower averages of school delay. Those who lived in residences with sewage collection also had lower averages of school delay. The biggest difference was seen in the case of the existence of bathroom for exclusive use in the household. On average, young women living in houses with exclusive-use bathrooms had 1.2 years of school delay less than those living in homes without a bathroom. In percentage terms, the difference in this case reached 17.6%.

Graph 4.6
School Delay by Gender and Availability of Infrastructure Services, in Years, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

The statistical model developed in this study, which is presented in detail in the Methodological Annex, isolated the effect of sanitation on school delay in the young population of the country. It was found that the children and young people who lived in areas without access to sewage collection services had, on average, a school delay 1.5% higher than those who lived in places with sewage collection. Those who lived in areas without access to the water distribution network had, on average, a school delay 1.1% higher than that of children and young people living in areas with access to the general water supply network. Among young people living in homes without a bathroom, the expected school delay was 7.3% higher than the average for young people living in bathrooms.

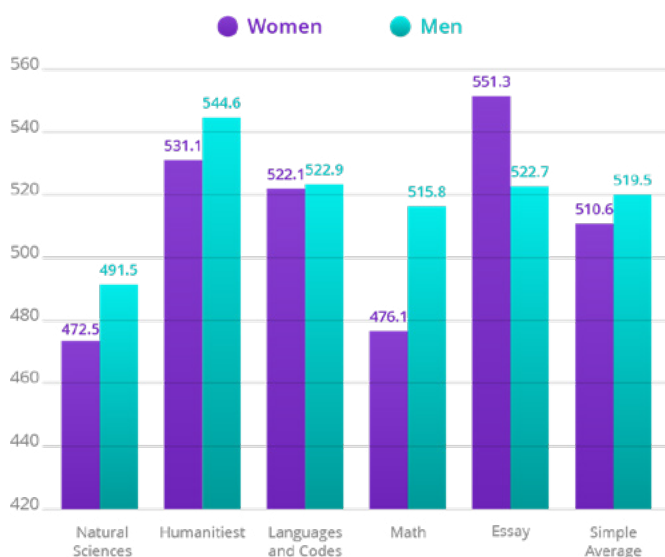
One consequence of this finding is the fact that women, children or youth, without access to basic sanitation will be

less educated than others when entering the labor market. Since schooling positively affects the productivity and income of female workers (1 For each additional year of study, Brazilian female workers have, on average, a 4.8% increase in their remuneration. This aspect will be discussed in more detail in the next section), a lower level of schooling will mean a loss of productivity and job remuneration. On the other hand, if a student who does not have access to sanitation services is given access to sanitation services, a reduction of up to 10% in school delay is expected, allowing an increase in schooling. Thus, access to sanitation has the potential to raise the productivity of future generations of workers, with a positive effect on their pay.

In order to analyze the issue of school performance, the present study on the Brazilian women analyzed the results of the National High School Examination (ENEM) of 2016. In this analysis, the results of the ENEM tests were used in a database containing information on almost 8.4 million students enrolled in that year's exam. Of this total, 4.263 million young people were set aside that followed the criteria: (i) they completed the exam and scored in all tests, (ii) were not enrolled as 'trainees' and (iii) were between 15 and 29 years old, that is, that they would possibly seek vacancies in higher education or would seek a placement in the labor market in 2017.

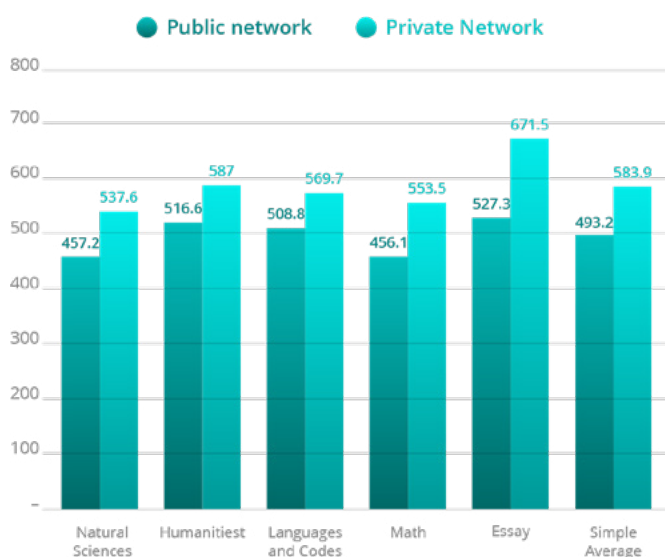
Of the total number of young people analyzed, 2.423 million were women (56.8% of the total) and 1.840 million were men (43.2%). What stands out first is the fact that women had lower scores on average than the young men in the four objective tests of ENEM - Natural Sciences, Humanities, Languages and Codes and Mathematics. In the math test, the difference between genders reached almost 40 points. However in the essay writing, women had superior performance: on average, their grades were 28.6 points above that achieved by men. Nevertheless, considering the simple average of the five grades, the women registered an average score 8.9 points lower than the average of the men. Map 4.1 shows the average scores of women by region of the country in the ENEM of 2016. Another fact that draws attention is the difference of performance between the students of the public network and the private network of schools. Those enrolled from the public school system had an average grade of 493.2 points while those from the private school network averaged 583.9 points. There was, therefore, a difference of 90.7 points between the two groups. The largest differences were recorded in the essay writing, a test in which the enrollees coming from the public network had an average that was 144.2 points below the average of those coming from the private network, and in the math test, in which the difference reached 97.4 points.

Graph 4.7
Grades in the ENEM, by race and gender, 2016



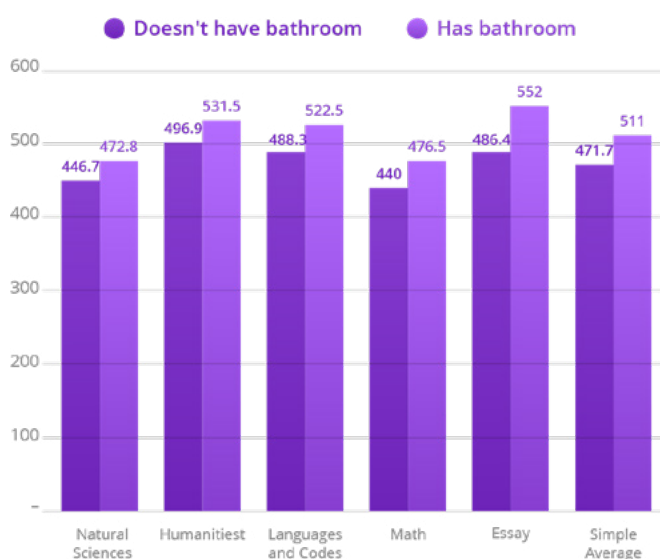
Source: INEP, 2017. Elaboration: Ex Ante Consultoria Econômica.

Graph 4.8
Grades in the ENEM tests, by test and school network, female population, 2016



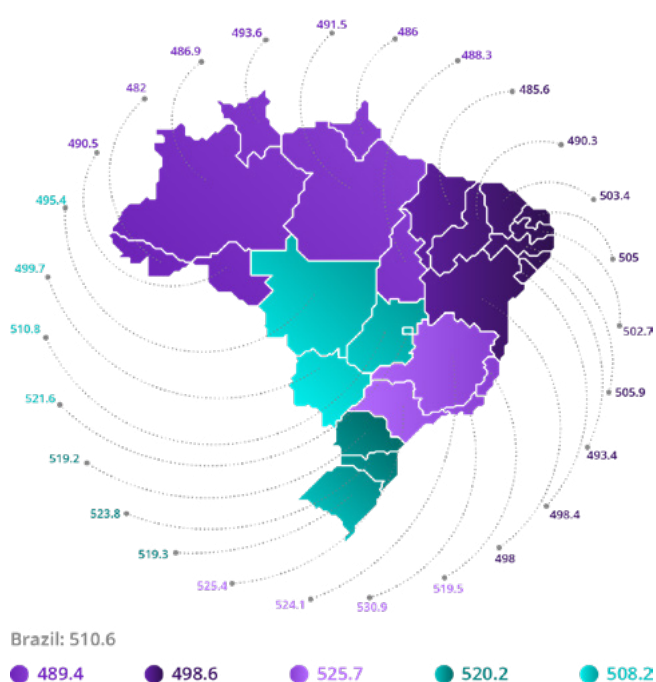
Source: INEP, 2017. Elaboration: Ex Ante Consultoria Econômica.

Graph 4.9
Grades in the ENEM tests, by test and availability of bathroom, female population, 2016



Source: INEP, 2017. Elaboration: Ex Ante Consultoria Econômica.

Map 4.1
Average grade* obtained in the National High School Examination, female population, 2016



Source: INEP, 2017 (*) Simple average of the four objective tests and the essay. Elaboration: Ex Ante Consultoria Econômica.

Observing the data, access to sanitation again is a determining variable. Considering only the female population, all the averages of women living in houses without a private bathroom were below the averages of women living in bathrooms. Again, the biggest differences occurred in the essays (-65.6 points) and math test (-36.5 points).

In order to confirm this relationship, and to calculate the partial effect of basic sanitation on the average performance of those enrolled in the exam, statistical models were developed for the determinants of ENEM scores, by test and for the mean of the tests. The models, which are presented in detail in the Methodological Annex, in addition to the existence of a bathroom at home, take into account various information about the students: gender, place of residence, type of school that they attended, high school they attended, age, declared race, education levels of their parents, family income range and the existence of a washing machine in the house. The existence of a washing machine, in the present context, functions as a proxy to identify homes that have a piped water network and which have electricity (two pre-conditions for the appliance to function).

The estimated partial effects prove some of the ideas developed earlier. The female population analyzed performed slightly lower than the male population. Those enrolled at public schools also presented inferior performance and the highest grades were obtained by young people aged 16 or 17 years old. Among women, self-reported black and multiracial had lower scores than self-reported white and of Asian descent; the indigenous had even lower grades. As expected, grades increased according to per capita household income class and parental schooling levels. People who lived

in houses without a bathroom or without a washing machine had much lower scores than those who lived in houses with a bathroom or a washing machine. These effects were even more intense in the case of women.

Table 4.1 shows the expected differences in grades relative to the ENEM average considering the female gender, the self-declared race, and the availability of bathroom and washing machine in the household. Estimates show that, considering the other factors as constant, a woman is expected to have a score of 9 points lower than the average of the exam. If this woman resides in a house without a bathroom, she is expected to have a score of 45.7 points lower than the average of the examination. If this woman resides in a house without a washing machine, the mark should be 31.0 points lower than the average. In case the woman does not have a bathroom or washing machine in her house, she is expected a 67.7 point lower than average score. In the case of self-reported black, multiracial or indigenous women these differences are extremely high.

Table 4.1
Differential scores obtained by women* on the ENEM 2016 in relation to the average, by test and self-declared race

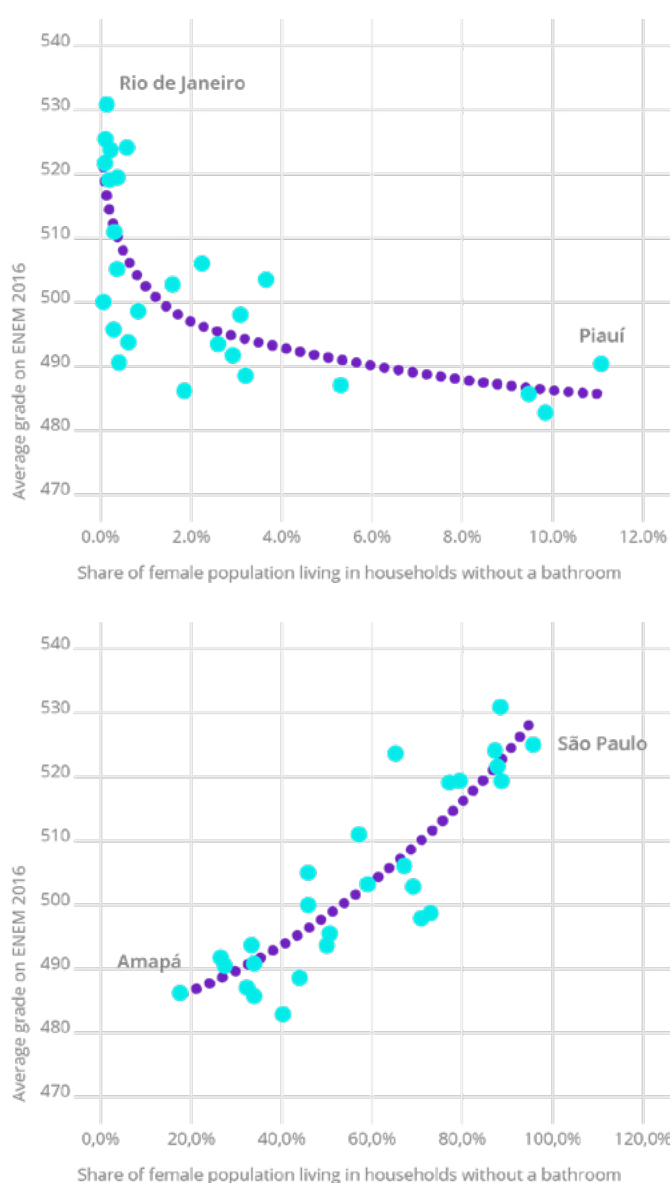
	Natural Sciences	Humanities	Languages and Codes	Math	Essay	Sum
Women*	-13.2	-6.9	4.6	33.9	40.3	9.0
Women who live at a home without a bathroom	-15.7	-13.9	-3.3	-35.3	22.5	-45.7
Women who live in households without a washing machine	-16.8	-11.3	1.1	-35.4	31.5	-31.0
Black self-declared women	-22.7	-11.5	-1.2	-51.4	31.4	55.4
Black self-declared women who live at a home without a bathroom	-25.2	-18.5	-9.1	-52.8	13.5	-92.1
Black self-declared women who live in households without a washing machine	-26.4	-15.9	-4.7	-53.0	22.5	-77.4
Multiracial self-declared women	-20.4	-13.2	-1.9	-44.3	31.0	-48.8
Multiracial self-declared women who live at a home without a bathroom	-22.9	-20.2	-9.7	-45.8	13.2	-85.4
Multiracial self-declared women who live in households without a washing machine	-24.1	-17.6	-5.3	-45.9	22.1	-70.8
Indigenous self-declared women	-29.9	-26.2	-14.7	-58.9	2.1	-127.6
Indigenous self-declared women who live at a home without a bathroom	-32.4	-33.2	-22.5	-60.4	-15.7	-164.2
Indigenous self-declared women who live in households without a washing machine	-33.6	-30.6	-18.2	-60.5	-6.8	-149.6

Source: INEP, 2017 (*) Women aged between 14 and 29 years old. Elaboration: Ex Ante Consultoria Econômica.

This analysis reveals that school performance is affected by sanitation conditions, which interfere even more intensely with Brazilian girls and young women. As the national examination grades are used both for the selection of students in public higher education (SISU) and for the granting of scholarships in the federal programs of development programs - University for All Program (Prouni) and Student Funding Program (FIES) , it can be concluded that lack of sanitation has a negative effect on women's chances of progressing to free public higher education.

Graph 4.10

Grades in the tests of the National Examination of High School and access to sanitation, units of the Federation, female population, 2016



Source: INEP, 2017 and IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

The correlation between the averages obtained by women in each unit of the Federation and the sanitation conditions in

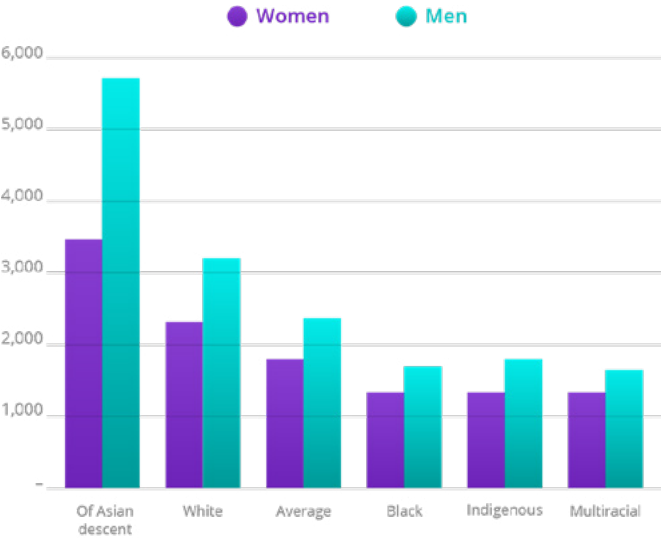
these regions reinforces this idea: in areas where there was a greater proportion of women living in houses without a bathroom, the expected averages of ENEM scores were also lower. On the other hand, in areas where there was a greater proportion of women with access to sewage collection services, the expected averages of the ENEM scores were higher.

Economic Performance

The economic life of Brazilian women is also strongly influenced by access to basic sanitation. As it was presented in Chapter 1 of this study, there were 39.3 million women employed in Brazil in 2016. That was equivalent to 86.9% of the female labor force. The unemployment rate, as mentioned earlier, reached 13.1% of the workforce, a higher proportion than men. The highest rates of unemployment in the female population were registered in the Northeast and North regions of the country. In the Southeast of Brazil, the unemployment rate reached 13.5% of the female labor force. In this result, the high unemployment rates in the metropolitan areas of the states weighed heavily: around the Southeast capitals unemployment rates were between 16.4% and 18.2% of their respective female labor forces. Table A.13 of the Statistical Annex details these statistics by region of the country.

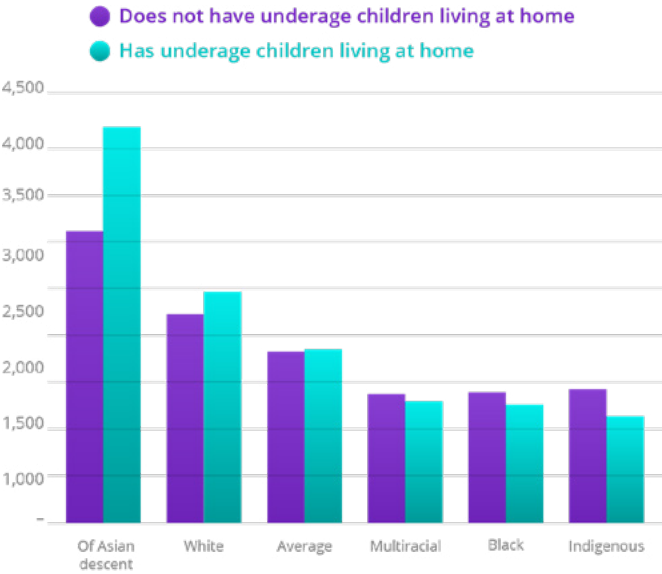
The remuneration of all occupations in economic activities carried out by Brazilian women reached an average of R\$ 1,826.35 per month in 2016. As shown in Table A.14 of the Statistical Annex, the levels of remuneration were higher in the South and Midwest regions of the country. However, in the South, the sums received were more homogeneous; in the Midwest, the high average sum resulted from the relatively high salaries paid in Brasília. The average remuneration earned in the capitals of the Brazilian states was 39.2% higher than in the other areas. The capitals of the Southeast registered higher salaries than the country's average, followed by the capitals of the South and Midwest regions.

Graph 4.11
Average monthly salary, by gender and self-declared race, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

Graph 4.12
Average monthly salary, by gender and maternity status, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

The most striking point in Table A.14, however, is the existence of a large pay gap between men and women. On average in the country, women received a remuneration of 22.9% less than that of men in 2016. It is worth mentioning that the pay gap between men and women is high in all areas (urban or rural, in the capitals or in the interior) and in all Brazilian states. There have been rare cases where women have earned the same or more than men.

These large pay gaps are at the heart of the issue of gender inequality in the country. One striking feature is the fact that

the pay gap between men and women is greater among the populations of self-declared of Asian descent and white people. In these cases, the gaps between the incomes of men and women reach 39.3% and 27.1%, respectively. In black or multiracial self-reported populations, income gaps are around 20%.

Table 4.2
Expected salary of women living in households without sanitation compared to those living in households with sanitation, Brazil, 2016

	Water treated by general network *	Collection of sewage by general network	Bathroom for exclusive use
White	-29.7%	-23.3%	-62.8%
Black	-24.4%	-23.1%	-63.2%
Of Asian descent	-30.3%	-40.7%	-82.0%
Multiracial	-23.6%	-20.2%	-59.3%
Indigenous	-16.3%	-16.9%	-59.9%
Employees in the private sector	-28.2%	-28.5%	-54.8%
Domestic Workers	-25.7%	-22.4%	-60.1%
Employees in the public sector	-29.7%	-24.5%	-27.1%
Business Women	-34.4%	-28.3%	-70.3%
Self-employed	-34.7%	-32.9%	-70.3%
Average	-26.5%	-21.9%	-61.3%

Source: IBGE, 2017(*) With regular supply. Elaboration: Ex Ante Consultoria Econômica

Considering only the female population, it was noted that there were strong differences between the remuneration of women with and without children or underage step children living in their homes. However, the differences varied widely according to race. In self-declaring Asian-descent women's groups, women with children or stepchildren living with them earned more than those who did not have children

or stepchildren living together. Something similar, but on a smaller scale, was observed in the group of white self-declared women. Among the self-reported black, multiracial and indigenous women, the highest wages were among the groups of women without children or stepchildren living with them. These facts suggest that motherhood has different effects on the remuneration of women in different groups.

Table 4.3

Expected salary of men living in households without sanitation in relation to those living in households with sanitation, Brazil, 2016

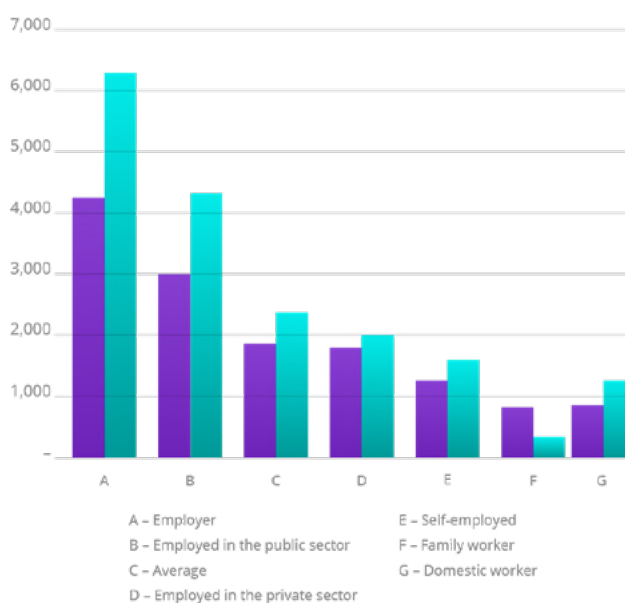
	Water treated by general network *	Collection of sewage by general network	Bathroom for exclusive use
White	-37.4%	-29.0%	-66.7%
Black	-29.0%	-30.7%	-66.9%
Of Asian descent	-36.2%	-45.2%	-79.7%
Multiracial	-33.7%	-26.1%	-63.6%
Indigenous	-30.3%	-37.5%	-65.8%
Employees in the private sector	-34.6%	-32.1%	-63.5%
Domestic workers	-26.2%	-23.8%	-51.4%
Employees in the public sector	-30.4%	-28.5%	-67.5%
Businessmen	-33.4%	-31.4%	-65.8%
Self-employed	-39.7%	-32.6%	-65.1%
Average	-34.9%	-27.9%	-65.3%

Source: IBGE, 2017(*) With regular supply. Elaboration: Ex Ante Consultoria Econômica

Again in the comparison between genders, it is observed that the differences occur in almost all types of occupation, that is, it is not a phenomenon restricted to the spectrum of the private work relations. The average remuneration of Brazilian women entrepreneurs was 32.8% lower than that of men in the same occupation. For self-employed women, the differential reached 21.5%. Even in the public career, where labor relations are governed by distinct rules, women earned 30.9% less than men.

Graph 4.13

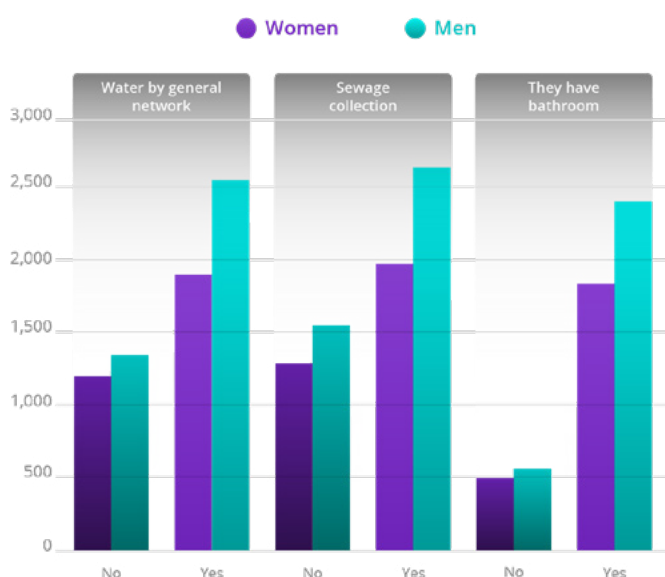
Monthly average salary, by gender and type of occupation, 2016



Source: IBGE, 2017 (*) Includes banked and CLT servers. Elaboration: Ex Ante Consultoria Econômica.

According to data from the PNADC of 2016, access to sanitation was once again a variable that determines the differences. Considering only the female population, the average remuneration of women residing in housing without access to treated water was 36.9% lower than that of women living in households with access to this service. The female population living in housing without sewage collection through the general network earned, on average, 34.8% less income than women who lived in homes connected to the general sewage collection network. The absence of a bathroom had an even greater influence: the average remuneration of women who lived in houses without a private bathroom was 73.2% lower than that of women who lived in houses with bathrooms.

Graph 4.14
Monthly average salary, by gender and access to sanitation, 2016



Source: IBGE, 2017 (*) Includes banked and CLT sworkerservers. Elaboration: Ex Ante Consultoria Econômica.

To find the factors explaining the huge pay gaps and to calculate the partial effect of sanitation on women's income, statistical models were developed based on the PNADC data for 2016. The models, which are presented in detail in the Methodological Annex, have taken into account a large body of information about people and their households to explain the average hourly pay of the individuals in the sample. Regarding the characteristics of the houses, the location (state, area and region), the materials of the walls and roofs, the sanitation conditions (adequate water, sewage collection and bathroom existence) and the trash collection system were observed. Regarding the characteristics of the people, the gender, age, declared race, education, type of occupation, economic sector of the person in question, the person's role in the household (head, spouse, etc.) and, in the case of women, the fact that she is a mother with underage children or stepchildren.

The partial effects corroborate the ideas developed in several studies in the Brazilian and international literature and show the existence of very high pay gaps. Taking as reference two persons with similar characteristics who live in equal conditions, but who differ in gender, the income gap between men and women is estimated: in 2016, the expected income of the female population was 22.9% lower than that of the male population. Among women, the self-reported blacks, multiracial and indigenous observed much lower wages than the self-declared white and of Asian descent. As expected, schooling positively affected earnings and age had a positive

but decreasing effect.

With regard to sanitation, the results reinforce the findings of the Instituto Trata Brasil study (2017). People who lived in houses without a bathroom saw an average remuneration 21.5% lower than that of people living in houses with a bathroom. The lack of sewage collection reduced the average pay by almost 7% and the lack of adequate access to treated water by 3.1%. One person, regardless of gender, living in a house without a bathroom, without water and without sewage collection should expect an income almost 32% lower than that of a person living in a house with treated water, sewage collection and bathroom.

Table 4.2 shows the expected remuneration differences between women living in households without access to basic sanitation and those living in housing with access to basic sanitation, considering the self-reported race and the occupation situation. Estimates show that, with the remaining factors staying constant, it is expected that a woman living in a non-bathroom household will have a 61.3% lower income than a woman living in house with a bathroom of exclusive use. In the case of a woman living in housing without sewage collection, the expected remuneration is 21.9% lower than that of women residing in housing with access to the general sewage collection network. If the woman does not have treated water in her house, she can expect a remuneration of 26.5% less than that of the female population residing in houses with regular water supply through the general network.

Among men, there are also large differences in expected remuneration according to the availability of sanitation in housing. For example, for the male group, the absence of treated water reduces expected income by 34.9%. In the case of the absence of sewage collection in the household, the expected remuneration difference is 27.9%. The absence of a bathroom in the house reduces the expected remuneration of a man by 65.3%.



5. The Impact of Universalization of Sanitation on Women

This study analyzed, from several points of view, the issue of women and sanitation in Brazil. Firstly, the profiles of contemporary Brazilian women and their access to basic sanitation equipment according to the National Survey by Household Sample Continuation (PNADC) were shown. It was identified the existence of still high deficits. About 1.6 million women were still living in homes without exclusive-use bathrooms in 2016. This was an extreme situation that exposed women's health and safety. In the same year, more than 15 million Brazilian women still did not receive treated water in their homes and there were 12 million women who had access to the general water distribution network, but the frequency of water delivery was unsatisfactory. Therefore, there were 27 million women who did not receive regular water in their homes. In 2016, the number of women residing in housing without sewage collection reached a similar figure (26.9 million). This means that one in four Brazilian women still lived in a precarious situation from the point of view of access to basic sanitation.

The deprivation of sanitation has compromised women's health and has had unfolding effects on their lives. Lack of sanitation has led to the occurrence of infectious gastrointestinal diseases that, depending on severity, have

caused women to move away from their routine activities, bedridden or hospitalization. In extreme cases, these infections associated with poor sanitation led to death. In 2013, as indicated in the chapter that analyzed data from the National Health Survey (PNS), 7.9 million cases of women's withdrawal due to diarrhea or vomiting were identified. Of this total, 3.6 million women were bedridden because of these infections. In that same year, according to data from the Unified Health System, there were 353,5 thousand admissions of women in the network and almost 5 thousand deaths due to gastrointestinal infections associated with lack of sanitation.

Lack of sanitation has directly affected women's lives, altering the way they have organized their time between activities and limiting their income potential in the economy. In a broad sense, the lack of basic sanitation has limited the well-being of women, compromising their health, education and domestic and economic activities.

In this final chapter of the study, we present estimates of hours of Brazilian women which are wasted due to gastrointestinal diseases and, in the case of women engaged in economic activities, the income they no longer receive due to diseases associated with lack of sanitation. Viewed

from a different angle, these estimates also quantify the potential welfare gains that could be obtained with the advancement of sanitation, that is, indicate the increase in income and the greater availability of hours of rest or leisure that the Brazilian women would have if the access to sanitation was universal.

+ Rest and Leisure Time

Based on the determinants factors of absences from routine activities due to diarrhea or vomiting, it is possible to estimate the time Brazilian women lost with these diseases in 2016. For that, data from the PNADC of that year were also used, which allowed to infer the weight of those hours in the allocation of hours of the female population of the country. According to methodology detailed in the Methodological Annex, it is estimated that there were 9.309 million absences due to diarrhea or vomiting in 2016, which indicated an incidence of 81.4 cases per thousand women. This estimate of incidence rate is higher than that estimated in 2013 (76.0 cases per thousand women) due to the increase in the proportion of women living in houses with irregular water supply. This increase occurred both in the Southeast and in the Northeast of the country, areas that were severely affected by the water crisis from 2014 to 2016.

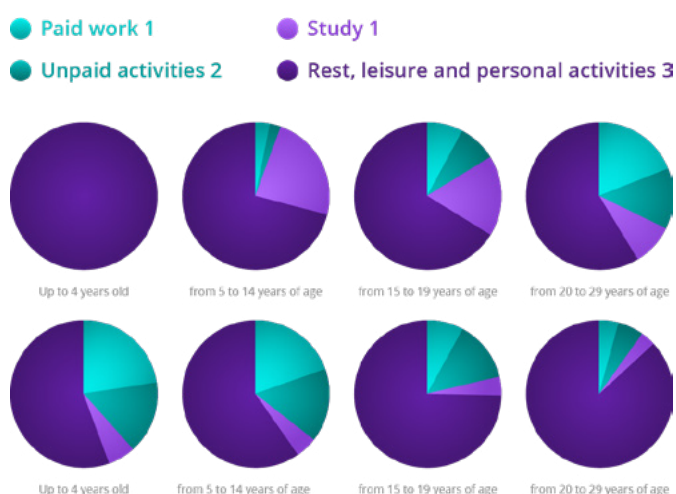
The statistical model developed to estimate days of leave due to diarrhea or vomiting, which is detailed in the Methodological Annex, indicated that, on average, each leave compromised 3.86 days of the affected women in 2016. In the younger age group (0 to 4 years of age), it was estimated that they were almost 5 days away from routine activities. This number fell to less than 3 in the range of women between the ages of 20 and 29 and then increased again, reaching a maximum of 5.12 days in the age group of women between 60 and 79 years old. Thus, 9.309 million cases of diarrhea or vomiting leave meant 35.945 million days of absence of women from routine activities due to infectious gastrointestinal diseases. In total, it is estimated that 862.7 million hours of absence or 8.1 hours per Brazilian.

The questions that naturally arise from this observation are: what was compromised on those days and hours of absence? Which women lost more hours? What did they fail to do? The answers to these questions go through the observation of how women have distributed their time between activities in the different phases of their lives. Women who were students lost hours at school or home-

based student activities. Women who worked outside the home lost hours of production. In the case of women who cared for their relatives, if they became ill and unable to care for them, relatives suffered, and if the relatives were sick, caregivers spent more of their rest, leisure, or personal activities time taking care of the rest of the household.

Figure 5.1 shows the allocation of Brazilian women's hours between different activities in 2016. PNADC data do not allow to detail all the activities carried out by women during the course of a day, but give a very accurate distribution of economic activities and unpaid work. The hours of one week were spent with: (i) paid work, including the length of time from home to work; (ii) unpaid activity, including the time spent on production for consumption by the family, time devoted to voluntary work, and that spent on household chores and people care; (iii) the time devoted to the study (1 The calculation of the time devoted to the study took into account the minimum journey in elementary and high school education of 800 hours over 200 days in the year - Federal Law 9.394 / 1996. A similar load was assumed for higher education. The transportation time from home to the school was estimated based on PNAD data); and (iv) time spent with rest, leisure, and personal activities - including food, personal hygiene, personal shopping, sports, entertainment, dating, sleeping, time spent with health, etc.

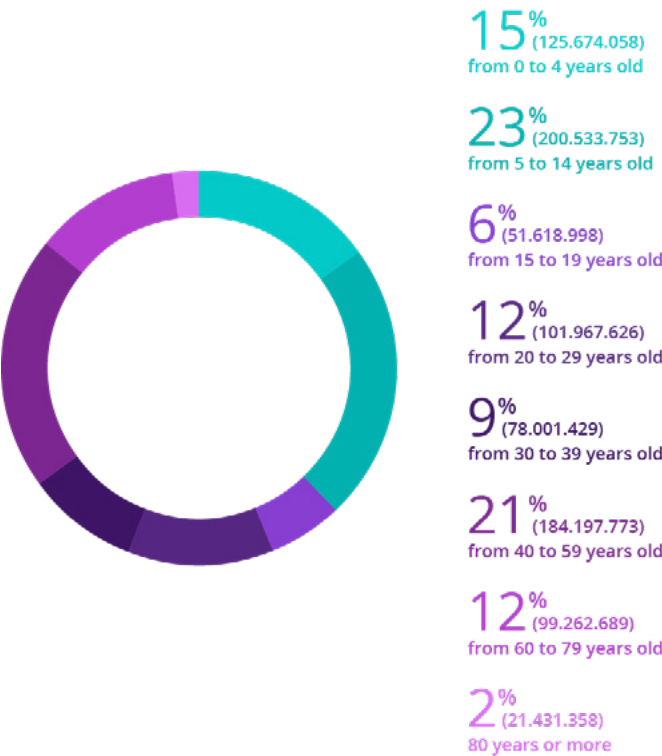
Figure 5.1
Allocation of hours of Brazilian women between different activities, by age group, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica. / (1) Includes transportation time from the home to the workplace or study; (2) Volunteer work, domestic activities and caring for people; (3) Includes food, personal hygiene, personal shopping, sports, entertainment, dating, sleep time, time spent with health etc.

Statistics show that the time spent with education decreases as the age increases, and the time spent with economic activities increases up to a certain age and then decreases. Girls, for example, spent most of their time between rest, leisure, and personal activities and studies. Women between the ages of 30 and 39 were the most economically engaged and women between the ages of 40 and 59 were the most engaged in unpaid activities.

Graph 5.1
Distribution by age group of hours of absence from diarrhea or vomiting, female population, 2016

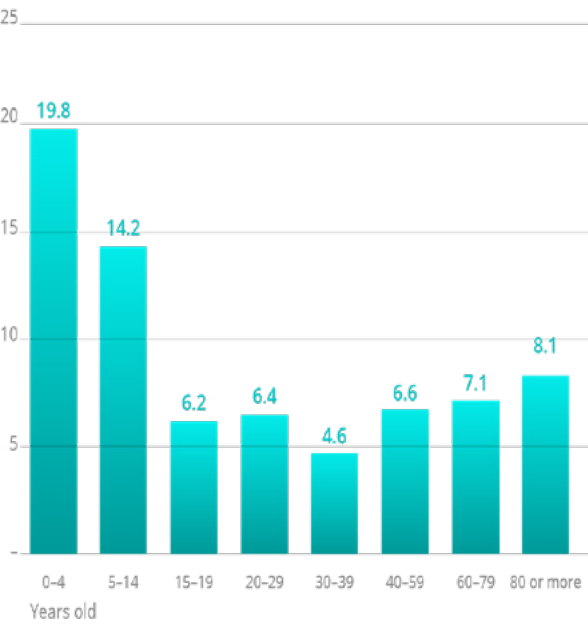


Sources: IBG E 2017, Elaboration: Ex Ante Consultoria Econômica.

Combining the information in Figure 5.1 with estimates of days of absence by age group, we reach the distribution of the impacts of diarrhea or vomiting distress in the activities carried out by women in their various phases of life. It is estimated that the majority of absences occurred among young women, with 37.8% among girls aged up to 14 years and 17.8% among girls aged 15-29 years old. Women in the 30-59 age group accounted for 30.4% of diarrhea or vomiting leaves and women over 60 years of age, accounting for 14.0% of the total. In per capita terms, young women were also the ones who spent the most hours on leave. In the female population up to 4 years of age, it is estimated that in 2016 almost 20 hours per girl were wasted because of the lack of sanitation. In the group of girls between 5 and 14 years old, the loss was also great, of more than 14 hours per girl. After this age group the incidence

of absences and the number of lost hours fall, returning to grow in the age groups of the elderly.

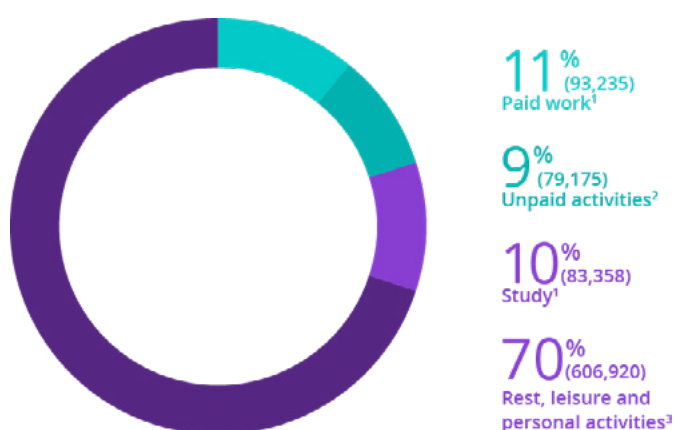
Graph 5.2
Hours per capita wasted with absences from diarrhea or vomiting, by age group of women, 2016



Sources: IBG E 2017, Elaboration: Ex Ante Consultoria Econômica.

As a consequence of this distribution, it is inferred that absences due to diarrhea or vomiting have affected the hours of rest, leisure and development of women’s personal activities more intensely. Of the total 862.7 million hours of leave, 70.4% were concentrated in these activities, compromising the well-being of the female population that would be obtained with the activities as eating, personal hygiene, personal shopping, sports, entertainment, sleep time, time spent caring for their health or simply with rest. In addition, 83.358 million hours of study and 172.410 million hours of paid or unpaid labor activities of the Brazilian female population were wasted due to diarrhea or vomiting. These sums corresponded respectively to 9.7% and 20.0% of total hours of absence associated with lack of sanitation.

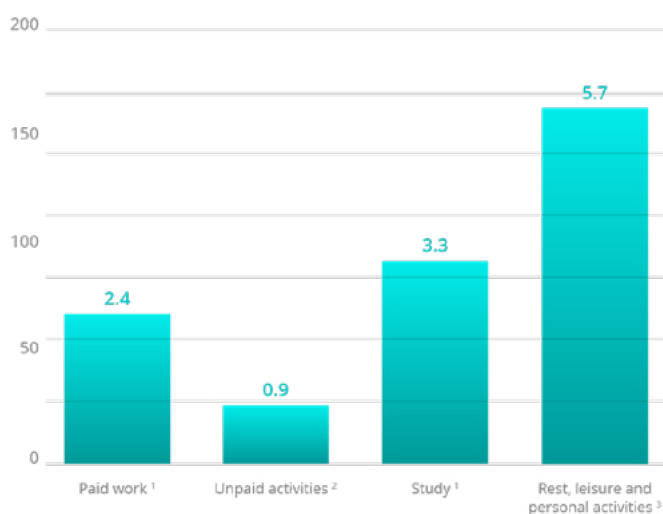
Graph 5.3
Distribution of hours of leave by diarrhea or vomiting of the female population, by activity, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica. / (1) Includes transportation time from the home to the workplace or study; (2) Volunteer work, domestic activities and caring for people; (3) Includes food, personal hygiene, personal shopping, sports, entertainment, dating, sleep time, time spent with health etc.

In per capita terms, there were 2.4 hours of paid work per year of the 39.254 million women employed in the country's labor force and 0.9 hours per year of the 84.870 million Brazilians who performed unpaid activities - voluntary work, domestic activities and personal care with family members. For each of the 25.554 million Brazilian women studying in 2016, there was a loss of 3.3 hours of study in the year. The almost 106 million Brazilian women lost, on average, 5.7 hours of rest, leisure and development of personal activities.

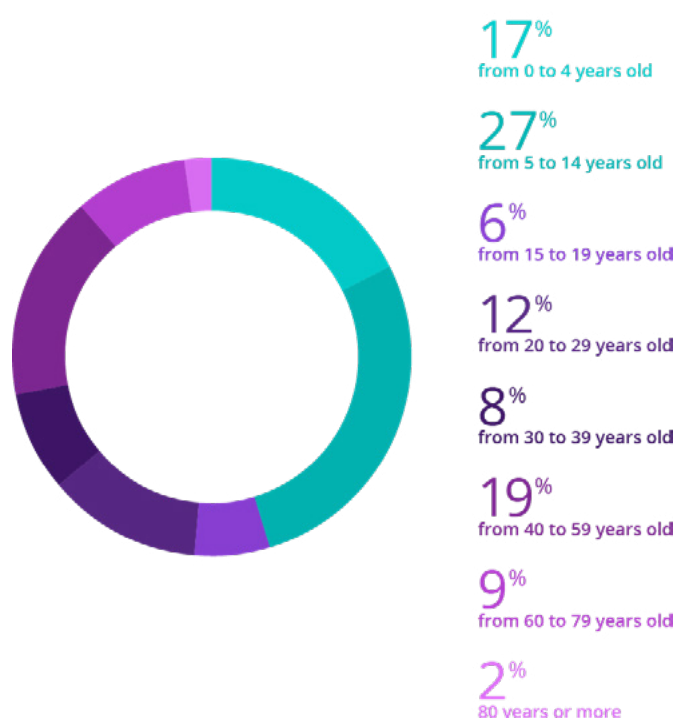
Graph 5.4
Hours per capita wasted with absences from diarrhea or vomiting, by age group of women, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica. / (1) Includes transportation time from the home to the workplace or study; (2) Volunteer work, domestic activities and caring for people; (3) Includes food, personal hygiene, personal shopping, sports, entertainment, dating, sleep time, time spent with health etc.

If access to sanitation was universal, on the other hand, Brazilian women would stop wasting part of those hours away from their routine activities. Based on the statistical models developed in this study, it is estimated that total absent hours due to infectious gastrointestinal diseases associated with lack of sanitation would fall from 862.7 million per year to 790.5 million per year. This indicates a potential reduction of 72.2 million wasted hours with these health problems. The reduction of waste translates into welfare gains for Brazilian women. Of this total, there would be 7.248 million hours of work, 7.471 million hours of study, 6.026 million hours of unpaid activities and 51.451 million hours of rest, leisure and personal activities. The most important of all: half the reduction in wasted hours would be appropriated by young women up to the age of 19.

Graph 5.5
Distribution by age group of reduction of leave due to universalization of sanitation, female population, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

+ Income and – Poverty

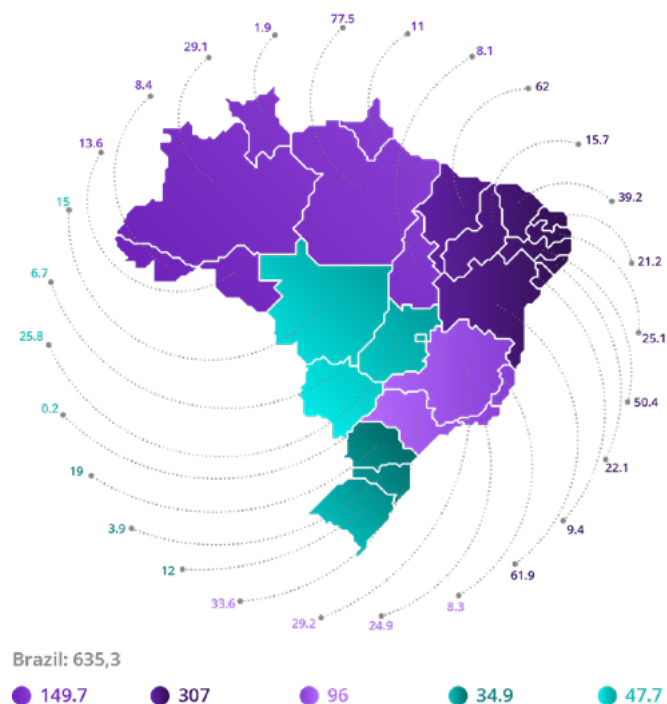
Women lost more than time due to the lack of access to sanitation. In 2016, women lost income in economic activities, and girls ended up with more school lag than would exist if access to sanitation were universal, as discussed in Chapter 4 of this study. According to the statistical model of productivity determination, a woman living in a residence without regular access to treated water received an average of 3.6% less remuneration than a woman who had access to this service. The lack of sewage collection reduced the average wages of women by 6.1% and the lack of a bathroom in the house decreased it by 23.0%. Women living in housing without regular access to water, without restroom and without sewage collection had their income diminished by almost 1/3 in relation to women with full access to basic sanitation.

Considering the sanitation deficits presented in Chapter 2 and the remuneration structure analyzed in Chapter 4, it can be inferred that universal access to basic sanitation would bring a rise in income of 1.5% on average. The average remuneration of Brazilian women would increase from R\$ 1,826.35 per month to R\$ 1,853.10 - considering 2016 prices. This is equivalent to an increase in income of R\$ 321.03 over a year by Brazilian woman. This increase comes from productivity gains that women would have due to a lower incidence of absences caused by infectious gastrointestinal diseases associated with lack of sanitation.

The individual amount seems small, but when multiplied by the number of women in the country, its impact would be enormous. As shown in Table A.15 of the Statistical Annex, the earnings of Brazilian women would reach R\$ 12.127 billion per year. More than half of these gains would occur in the North and Northeast of the country, where access to basic sanitation was more precarious in 2016. In these regions there were, respectively, 19.7% and 32.8% of women's income gains that could be obtained with universal access to sanitation. Of this income, almost 1/4 would be in the capitals of the Brazilian states and in Brasilia. But a large portion (49.3%) would arise in the urban areas of the Brazilian medium-sized cities that are not capital cities and do not belong to metropolitan regions. It would therefore be a gain with great capillarity, which would favor the reduction of regional inequalities.

Map 5.1

Number of women who would leave poverty due to universalization of sanitation, in thousand people, 2016



Source: IBGE, 2017. Estimates: Ex Ante Consultoria Econômica.

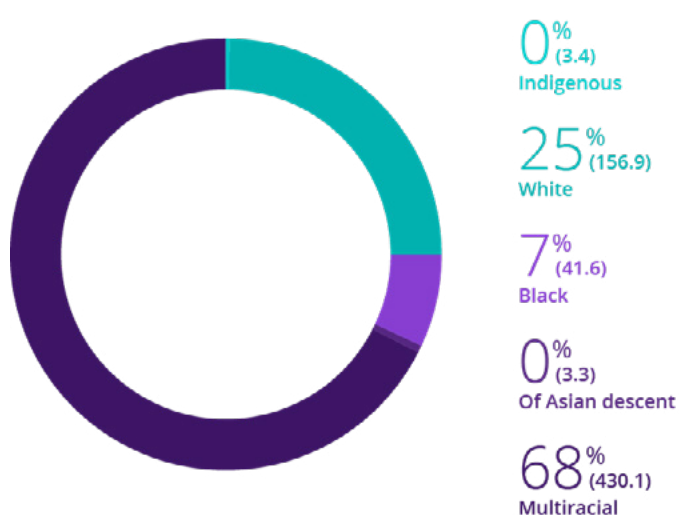
Given that the lack of sanitation was concentrated in the poorest groups of the Brazilian female population, the universalization of basic sanitation services and the increase in income associated with it would reduce the incidence of poverty. Considering the poverty line defined in Chapter 1 of this study, which was R\$ 350 per capita in 2016, it is estimated that the number of women living below the poverty line would decrease from 21,325 million to 20,690 million thanks to the universal access to sanitation. This indicates that 635,300 women would leave poverty condition because sanitation would bring productivity gains. It is important to note that estimates indicate that universalizing sanitation would have a greater impact on reducing poverty among women than among men. In the case of the male population, the universalization of sanitation would enable 601,200 men to leave the poverty condition.

Map 5.1 regionally distributes the potential number of women who would leave the poverty condition with universalization of sanitation. It is noted that almost half of the 635,300 women leaving poverty were living in the Brazilian Northeast. Maranhao, Bahia and Pernambuco would be the states of this region with the greatest poverty reductions among Brazilian women. The Brazilian North

has also a large number of women who would leave the poverty condition - about 20% of the total -, especially in the state of Para, where a reduction of 77,600 women in the poverty condition is projected.

Another important fact with regard to the effect of reduction in poverty is the concentration on self-declared black and multiracial woman. It is estimated that 3 out of 4 women leaving the poverty condition would be black, which highlights the inclusive nature of universal sanitation. The impacts are small in the self-declared female populations of Asian descent or indigenous, but are considerable in the self-declared white population, which would account for almost 25% of women to leave the poverty condition.

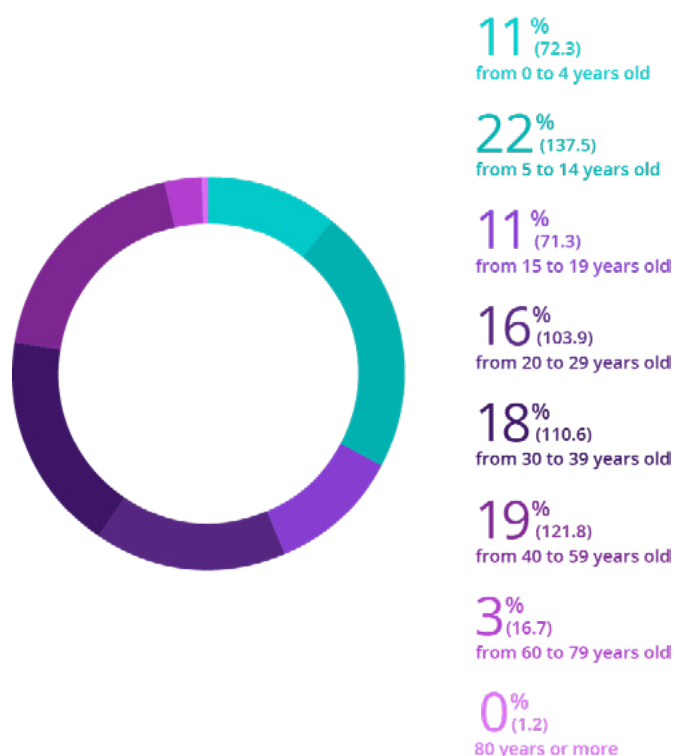
Graph 5.6
Self-reported race distribution of women who would leave poverty due to universalization of sanitation, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

It is worth noting that the effects on poverty would be concentrated in the young female population. Of the 635,300 women who would leave the condition of poverty, 281,100, or 44.3% of the total, would be up to 19 years old. Considering also the young women between the ages of 20 and 29 leaving the poverty conditions, estimated at 103,900 women, it is concluded that 6 out of 10 women to leave the poverty conditions belong to the future generations of the country. This fact qualifies as perennial the effects of the universalization of sanitation.

Graph 5.7
Distribution by age group of women who would leave poverty due to universalization of sanitation, 2016



Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica.

Finally, it should be noted that poverty reduction would not be the only effect for generations of Brazilian youth. Universalization would bring about a reduction of school delay and an improvement in the performance of women in the studies. These effects would also impact on the productivity of Brazilian girls, further increasing the income potential of Brazilian women in the future.



6. Main Conclusions

The present study analyzed, from several complementary points of view, the issue of women's lives and access to sanitation in Brazil. The study investigated how the lack of sanitation compromised the health of Brazilian women. The occurrence of these diseases not only affected the productivity of women in their economic activities but also caused a decrease in their potential for performance in studies. The study addressed how the lack of sanitation directly affected the lives of women with regard to how they organize their time between activities. Estimates have also been drawn that quantify the potential welfare gains that could be obtained with the advancement of sanitation, that is, indicating the increase in income and the greater

availability of hours of rest or leisure that the Brazilian women would have if access to sanitation was universal.

Following this executive summary, the main conclusions of the study are presented. In addition to the unprecedented approach of a joint discussion of gender and sanitation issues, there are some statistics that are new and that, for that reason, may be highlighted. These points are noted with (*). Regarding the analysis of women's access to basic sanitation and the incidence of infectious gastrointestinal diseases associated with lack of sanitation, it was concluded that:

1.

In 2016, according to PNADC data (IBGE, 2017), 90.8 million women reported living in households that received water through a general distribution network. In that year, there were still 15.2 million women who reported not receiving water in their homes, that is, 1 in 7 Brazilian women had no access to water.

2.

The lack of treated water was concentrated in the youngest women (between 0 and 14 years of age), in the self-declared multiracial and indigenous Brazilians, in the female population with the lowest levels of schooling and in the poorest income classes.

3.

In addition to the lack of access to the water distribution system, the lack of regular water supply also affects the quality of life of the population.

4.

Statistics showed that in 2016, 12 million women lived in houses connected to the general water distribution network, but water was not regularly delivered to their residences. This corresponded to 13.2% of the Brazilian female population. According to PNADC data, in 40% of these cases water was distributed between 4 and 6 days a week, in 45.7%, between 1 and 3 days a week and in 14.2% of the cases, the regularity was less than 1 day per week. *

5.

Women who did not receive regular water were concentrated in the age group of 20 to 59 years of age (56.6% of women with access to the general network). The incidence of irregular deliveries is higher among self-reported multiracial women (17.5% of the total) and black women (15.7%). It was also higher among women with lower levels of education and from lower income groups. *

6.

Consideration of irregular receipt of services as a deficit corrects estimates of the number of women with access to treated water services to more realistic levels. The number of women in the water deficit reached 27.2 million in 2016. This indicates that 1 in 4 women either had no access to treated water or did not receive regular water. *

7.

The lack of a bathroom at home is the most primary of the problems associated with sewage. This problem afflicted 1.585 million Brazilian women in 2016 (1.5% of all women). Women without a bathroom at home lived mostly in homes that belonged to the first quintile of the per capita household income distribution of 2016.

8.

In 2016, only 79.1 million women (or 74.6% of the 105.9 million Brazilian women) lived in housing where the sanitary disposal system was considered adequate. This indicates that 1 in 4 Brazilian women did not have an adequate system, a frequency similar to that of inadequate water (due to lack of access to the system or by interruption).

9.

The deficit of sanitary depletion has affected mostly women living in the urban areas of the country and in the North (67.3% of the population) and Northeast (39.0% of the population).

10.

Sanitary sewage deficits were higher among self-reported multiracial, indigenous, and black women: In these groups, the incidence rates of inadequate sanitary disposal were 24.3%, 33.0% and 40.9% of the respective female populations.

11.

As in the case of access to treated water, the lack of proper disposal conditions has further afflicted poorer women and women with low levels of education.

12.

Lack of sanitation has immediate implications on the health and quality of life of women living in environmentally degraded areas. The rate of incidence of absences from diarrhea or vomiting measures the ratio of the number of cases to

the total population, that is, it measures absences in relative terms. The incidence rate is expressed in cases per thousand inhabitants. In this indicator, there were 76.0 absences per thousand women in the country in 2013 according to data from the National Health Survey (IBGE, 2015).

13.

In the average of the capitals of the Federation units, the incidence rate was higher: 83.1 cases per thousand women. In regional terms, the highest incidence occurred in the Northeast of the country, with 88.7 cases per thousand women. The states with the highest incidences of absences due to diarrhea and vomiting were: Ceara, Rio Grande do Norte, Paraíba, Pernambuco and Alagoas, all with rates above 100 absences per thousand women.

14.

Absences from diarrhea or vomiting were concentrated in younger women. In the age group of up to 14 years of age, the incidence of withdrawals from routine activities reached 132.5 cases per thousand women. It is worth noting that for almost all age groups, the incidence of absences due to diarrhea or vomiting is greater in the female population than in the male population.

15.

The incidence of absences because of diarrhea or vomiting was extremely high in the female indigenous population (175.9 cases per thousand women in 2013).

16.

The incidence rate was also higher among uneducated women, a category that recorded 92.4 cases per 1,000 women.

17.

According to the National Health Survey (IBGE, 2015), absentee women were far from their activities for 3.48 days on average.

18.

According to information from the Unified Health System (SUS) database, there were 1.801 hospitalizations per thousand women in 2013. For all age groups, with the exception of the younger age group (up to 14 years of age), hospitalization rates were higher among women. The data also show that the women were, on average, 3 days hospitalized, indicating a total of 563.2 days of hospitalization in SUS network hospitals in 2013.

19.

Also, according to DATASUS statistics, 4,809 deaths by gastrointestinal infections were recorded nationwide in 2013. Of this total, 2,614 deaths were of women (54.4% of the total). In the majority, these deaths occurred in the older population, despite the fact that these diseases are more frequent in the young: 73.7% of deaths were in women over 60 years of age, while 15.2% of deaths were in girls up to 14 years of age.

With regard to the effect of sanitation on women's lives and the impacts of universal sanitation, it was concluded that:

20.

Young women receiving in their homes water distributed through the general network had lower averages of school delay. Those who lived in residences with sewage collection also had lower averages of school lagging. The biggest difference was seen in the case of the existence of bathroom for exclusive use in the household. On average, young women living in households with bathrooms had 1.2 years of school lagging less than those living in homes without a bathroom.

21.

Women, children or young women without access to basic sanitation will be less educated than others when entering the labor market. Since schooling positively affects workers' productivity and income, lower schooling will mean a loss of productivity and lesser pay.

23.

Of the total number of young people who completed the National High School Exam, 2.423 million were women (56.8% of the total) and 1.840 million were men (43.2%). The first fact that stands out is that women had lower scores on average than young men.

23.

Once again access to sanitation is a determinant variable. Considering only the female population, all averages of women residing in households without a private bathroom were below the averages of women living in households with bathrooms.*

24.

School performance is affected by sanitation conditions and interferes even more intensely with Brazilian girls and young women. As the national examination sources are used both for the selection of students in public higher education (SISU) and for the granting of scholarships in federal incentive programs, it can be concluded that lack of sanitation has a negative effect on the chances of women to progress to free public higher education. *

25.

On average in the country, women received a 22.9% lower remuneration than men in 2016. It is worth mentioning that the pay gap between men and women is high in all areas (urban or rural, in the capitals or in the interior) and in all Brazilian states.

26.

Considering only the female population, it was noted that there were strong differentials between the remuneration of women with and without children or stepchildren living in their homes.

27.

According to data from the PNADC of 2016, access to sanitation was once again an essential variable to understand such differences. Estimates of the statistical model reveal that, with the other factors constant, a woman living in a bathroom household without exclusive bathrooms is expected to have a 61.3% lower income than a woman living in house with a bathroom for exclusive use. In the case of a woman living in housing without sewage collection, the expected remuneration is 21.9% lower than that of women residing in housing with access to the general sewage collection network. If the woman does not have treated water in her house, it is expected a remuneration of 26.5% less than that of the female population residing in households with regular water supply through the general network.

28.

Lack of sanitation has directly affected women's lives, altering the way they have organized their time between activities and limiting their income potential in the economy. From the data of the PNADC of 2016 it was possible to analyze the allocation of hours of Brazilian women spend with different activities. For example, time spent with education decreases as age increases, and time spent with economic activity increases up to a certain age and then decreases. Girls spent most of their time between rest, leisure, and personal activities and studies. Women between the ages of 30 and 39 years were the most economically engaged and women between the ages of 40 and 59 were the most engaged in unpaid activities. *

29.

It is estimated that the majority of absences from diarrhea or vomiting occurred among young women, with 37.8% among girls aged up to 14 years old and 17.8% among girls aged 15-29 years old. Women in the age group between 30 and 59 years old accounted for 30.4% of absences and women over 60 years old, for 14.0% of the total.

30.

As a consequence of this distribution, it is inferred that absences due to diarrhea or vomiting have affected the hours of rest, leisure and development of women's personal activities more intensely. Of the total 862.7 million hours of leave, 70.4% concentrated on these activities, compromising the well-being of the female population. In addition, 83.358 million hours of study and 172.410 million hours of paid or unpaid work activities of the Brazilian female population were compromised due to diarrhea or vomiting. *

31.

If access to sanitation were universal, Brazilian women would no longer waste part of these hours away from their routine activities caused by diarrhea or vomiting. Based on the statistical models developed in this study, it is estimated that the total leave hours due to infectious gastrointestinal diseases associated with lack of sanitation would fall from 862.7 million per year to 790.5 million per year. This indicates a potential reduction of 72.2 million wasted hours with these health problems. The reduction of waste translates to welfare gains for Brazilian women, who would each gain 40 minutes of leisure, study or work over a year. *

32.

The waste incurred by women with lack of access to sanitation was not only time wasted. In 2016, women lost income in economic activities, and girls eventually accumulated more school delay than they would have if access to sanitation were universal.

33.

According to the statistical model of productivity determination, a woman living in a residence without regular access to treated water received an average of 3.6% less remuneration than a woman who had access to this service. The lack of sewage collection reduced the average wage of women by 6.1% and the lack of a bathroom decreased it by 23.0%. Women living in housing without regular access to water, without bathroom and without sewage collection had their income decreased by almost 1/3 in relation to women with full access to basic sanitation.

34.

Given that the lack of sanitation was concentrated in the poorest levels of the Brazilian female population, the universalization of basic sanitation services and the increase in income associated with it would reduce the incidence of poverty.

35.

Considering the poverty line defined in the study, which was R\$ 350 per capita in 2016, it is estimated that the number of

women living below the poverty line would decrease from 21.325 million to 20.690 million thanks to universal access to sanitation. This indicates that 635,300 women would leave the condition of poverty because of productivity gains brought by sanitation.

36.

It is estimated that 3 out of 4 women leaving the poverty condition would be black, which highlights the inclusive nature of universal sanitation.

37.

It is worth noting that the effects on poverty would be concentrated in the young female population. Of the 635,300 women who would leave the condition of poverty, 281,100, or 44.3% of the total, would be up to 19 years of age. Considering also the young women between the ages of 20 and 29 leaving the poverty conditions, estimated at 103,900 women, it is concluded that 6 out of 10 women leaving the poverty conditions belong to the future generations of the country.

38.

Finally, it should be noted that poverty reduction would not be the only effect for generations of Brazilian youth. Universalization would bring about a reduction of school delay and an improvement in the performance of women in the studies. These effects would also impact on the productivity of Brazilian girls, further increasing the income potential of Brazilian women in the future.

Methodological Annex

I. Sanitation and Morbidity of Infectious Gastrointestinal Diseases

The analysis of the effects of sanitation on the incidence of diarrhea was based on the cross-referencing of work-related absence due to diarrhea and vomiting, access to sewage, access to treated water and socioeconomic indicators. To calculate these effects, data from the National Health Survey of 2013 conducted by the IBGE were used. The socioeconomic indicators used in the econometric model are: information about individuals: (i) gender and (ii) age group; and information on the household: (iii) coverage material, (iv) garbage collection system; (v) availability of refrigerator; (vi) unit of the Federation in which the individual lives and (vii) area of the household (rural or urban).

A logistic regression model was used in which the probability of absence from activities due to diarrhea is a binary variable with values (1) for absence and (0) for non-absence. The logistic regression model is described by the following equation:

$$P(y = 1 | x_1, x_2, \dots, x_k) = G(\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k)$$

in which, y represents the dependent variable (probability of departure from diarrhea), x_j are the information provided by the set of explanatory variables, where $j = 1, 2, \dots, k$, β_j are the coefficients quantifying the relationships between these variables and the dependent variable. G is a function that assumes strictly positive values between zero and one: $0 < G(z) < 1$, for all real numbers z . This ensures that the estimated probabilities are strictly between zero and one.

The estimated model to analyze the effect of sanitation on the probability of absence from routine activities due to diarrhea or vomiting presented quite satisfactory results. The greater the share of the population with access to treated water and to the sewage collection network, the lower the probability of absence from routine activities due to diarrhea or vomiting, the coefficients of these two variables are presented in Table A.M.1. The other control variables had the expected signal and are statistically significant.

Table A.M.1
Regression of absences due to diarrhea, Brazil, 2013

	Coefficient	Standard error	p-value
Access to treated water	-0.2243	0.0082	0.0000
Access to sewage system	-0.1797	0.0055	0.0000

Source: Pesquisa Nacional de Saúde 2013 (IBGE, 2015). Observation: Likelihood Log: 3,300,153.094. Elaboration: Ex Ante Consultoria Economica.

2. Sanitation and Days of Leave due to Infectious Gastrointestinal Diseases

The analysis of the effects of sanitation on the number of days of leave due to diarrhea or vomiting identified the relationship between the number of days of withdrawal indicated in the SNP and the availability of sanitation (adequate access to water and sewage collection), controlling for a set of variables. The database used was the National Health Survey of 2013 conducted by IBGE and the control variables were: (i) gender, (ii) age group; (iii) material covering the domicile; (iv) waste collection system; (v) availability of refrigerator; (vi) unit of the Federation in which the individual lives; (vii) area of housing (rural or urban); and (viii) place of residence (capital, metropolitan regions or interior).

The econometric model used was Poisson type. This type of model is used when the dependent variable is a counting variable, in this case, number of days away (1, 2, 3, etc.). This technique consists of modeling the expected value as an exponential function according to the following equation:

$$E(y | x_1, x_2, \dots, x_k) = \exp(\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k)$$

Since $\exp(\cdot)$ is always positive, the equation guarantees that the predicted values of y will always be positive. On the inference processes using the Poisson model, see Wooldridge (2006).

The estimated model presented a very satisfactory result. The greater the share of the population with access to sewage, the smaller the number of days of leave due to diarrhea or vomiting. Access to treated water also had a positive effect, contributing to decrease the duration of the removal. The other control variables had the expected signal and are statistically significant.

Table A.M.2
Days of absence due to diarrhea or vomiting, Brazil, 2013

	Coefficient	Standard error	p-value
Acesss to treated water	-0.0594	0.0019	-
Access to sewage system	-0.1681	0.0020	-

Source: Pesquisa Nacional de Saúde 2013 (IBGE, 2015).

3.

Sanitation and School Lag

The analysis of the effects of sanitation on school performance was based on the dependent variable school delay built from the difference between the years of study of the person and the year that they should be attending. This analysis was applied only to school-age individuals. The database used was the Continuous National Survey by Domicile Sample of 2016 and the control variables were: (i) age; (ii) age squared; (iii) gender; (ivii) race; (v) schooling; (viii) housing wall material; (vii) housing roof material, (viii) garbage collection system; (ix) unit of the Federation in which the individual lives; (x) area of housing (rural or urban); and (xi) place of residence (capital, metropolitan regions or interior).

The econometric model used was a Poisson model. This type of model is used when the dependent variable is a counting variable. In this case, the variable is the number of years of school delay. This technique consists of modeling the expected value as an exponential function according to the following equation:

$$E(y | x_1, x_2, ..., x_k) = \exp(\beta_0 + \beta_1 x_1 + ... + \beta_k x_k)$$

Since $\exp(.)$ is always positive, the equation guarantees that the predicted values of y will always be positive. On the inference processes using the Poisson model, see Wooldridge (2006).

The estimated model presented a very satisfactory result. The greater the share of the population with access to sewage, the lower the school lag, that is, access to this service contributes positively to school performance. Access to treated water also had a positive effect, contributing to reduce the school delay. The other control variables had the expected signal and are statistically significant.

Table A.M.3
Regression of school delay, Brazil, 2016

	Coefficient	Standard error	p-value
Access to treated water	-0.0111	0.0002	0.0000
Access to sewage system	-0.0151	0.0002	0.0000
Bathroom availability	-0.0731	0.0004	0.0000

Source: PNADC 2016 (IBGE, 2017). Elaboration: Ex Ante Consultoria Economica.

4.

Sanitation and School Performance

The analysis of the effects of sanitation on school performance was based on the crossing of performance information in the ENEM 2016 tests with data on the availability of bathroom in the household and a broad set of socioeconomic indicators of control. The population analyzed was between 15 and 29 years of age. The database used in this evaluation was the micro data base of ENEM 2016 provided by INEP. The control variables were: (i) age; (ii) age squared; (iii) gender; (iv) race; (v) schooling; (vi) housing wall material; (vii) housing roof material, (viii) garbage collection system; (ix) unit of the Federation in which the individual lives; (x) area of housing (rural or urban); and (xi) place of residence (capital, metropolitan regions or interior).

The econometric models used were linear equations estimated by OLS, in which the dependent variables are the grades in the tests (D_i) of: natural sciences (CN), humanities (CH), languages and codes (LC), mathematics (MT), and writing (RE). It was also estimated a regression for the average of the grades of the five tests (average). The following equation describes the statistical model.

$$D_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + m, i = \text{CN, CH, LC, MT, RE, Média.}$$

The regression results are presented in Table A.M.4. The estimated models presented quite satisfactory results. As expected, the absence of a bathroom in the student's home reduces his grades in all ENEM tests. The table also shows the interaction between the coefficient associated with gender and the coefficients associated with the availability of bathroom in the candidate's household. With the exception of the math test, in which the interaction is positive, that is, in the group of women the unavailability of the bathroom has a smaller effect on the test score, in the other evaluations the bathroom unavailability has a negative effect on women's grades.

Table A.M.4
Regression of school performance, Brazil, 2016

		Coefficient	Standard error	p-value
Partial effect of the existence of bathroom in the house	Natural Sciences	-18.478	0.4883	0.0000
	Humanities	-58.168	0.5001	0.0000
	Languages and Codes	-44.733	0.4696	0.0000
Interaction of the partial effect with the female gender	Natural Sciences	-0.6865	0.6339	0.0000
	Humanities	-11.645	0.6493	0.0000
	Languages and Codes	-33.668	0.6096	0.0000
	Math	41.588	0.8942	0.0000
	Essay	-42.797	13.620	0.0000
	Average	-10.677	0.6180	0.0000

Source: ENEM 2016 (INEP, 2017). Elaboration: Ex Ante Consultoria Economica.

5.

Sanitation and Productivity

The analysis of the effects of sanitation on labor income was based on a cross-reference of hourly compensation information with data on access to sewage, access to treated water, availability of bathrooms in the household, and a broad set of socioeconomic indicators of control. The database used in this evaluation was the Continuous National Survey by Domicile Sample of 2016. The control variables were: (i) age; (ii) age squared; (iii) gender; (iv) race; (v) schooling; (vi) housing wall material; (vii) housing roof material, (viii) garbage collection system; (ix) unit of the Federation in which the individual lives; (x) area of housing (rural or urban); and (xi) place of residence (capital, metropolitan regions or interior).

The econometric model used was an estimated linear model OLS, in which the dependent variable, mean hourly compensation, was transformed into ln, for better statistical adequacy (lny). The following equation describes the statistical model.

$$\ln y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + m.$$

The regression results are presented in Table A.M.5. The estimated model presented quite satisfactory results. The larger the share of the population with access to sewage, the greater is their income from work. Access to treated water also positively affects the income of workers. The absence of a bathroom in the household reduces by 21.7% the average hourly remuneration expected.

Table A.M.5
Productivity regression, Brazil, 2016

	Coefficient	Standard error	p-value
Access to treated water	0.0314	0.0003	0.0000
Access to sewage system	0.0695	0.0003	0.0000
Bathroom availability	0.2150	0.0014	0.0000

Source: PNADC 2016 (IBGE, 2017). Elaboration: Ex Ante Consultoria Economica.

6.

Factors Determining Access to Sanitation

The analysis of determinants of access to sanitation was based on a cross-referencing of access to sewage, access to water treated with socioeconomic indicators. To calculate these effects, the data from the National Survey by Continuous Household Sample of Continuous of 2016 carried out by the IBGE were used. The control variables were: (i) agegender; (ii) age squared; (iii) gender; (iv) race; (iv) schooling; (vi) income; and domicile information: housing wall material; (vii) housing roof material, (viii) garbage collection system; (ix) (vi) unit of the Federation in which the individual lives; (viix)) area of housing (rural or urban); and (xiviii) place of residence (capital, metropolitan regions or interior).

A logistic regression model was used in which the probabilities of not having access to the treated water or to the sewage collection service are binary variables with values (1) for not having access and (0) for access. The logistic regression model is described by the following equation:

$$P(y = 1 | x_1, x_2, \dots, x_k) = G(\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k)$$

where y is the dependent variable (probability of departure from diarrhea), x_j is the information provided by the set of explanatory variables, where $j = 1, 2, \dots, k$, γ are the coefficients quantifying the relationships between these variables and the dependent variable. G is a function that assumes strictly positive values between zero and one: $0 < G(z) < 1$, for all real numbers z . This ensures that the estimated probabilities are strictly between zero and one.

The models estimated to analyze the probabilities for not having access to treated water or not having access to the sewage collection service presented satisfactory results. The coefficients of the main explanatory variables used to estimate the probabilities are shown in Table A.M.6.

Table A.M.6

Regressions of probabilities for not having access to treated water or of not having access to the sewage collection service, Brazil, 2016 (next page)

Source: PNADC 2016 (IBGE, 2017). Elaboration: Ex Ante Consultoria Economica.

		Inadequate water access			Inadequate access to sewage collection		
		Coefficient	Standard error	p-value	Coefficient	Standard error	p-value
Area	Urban	-24.714	0.0006	0.0000	20.001	0.0007	0.0000
	Capital	-0.8233	0.0006	0.0000	-12.156	0.0006	0.0000
	Other municipalities in the metropolitan region	0.6203	0.0006	0.0000	-0.1795	0.0006	0.0000
	Municipalities in Integrated Development Regions	-0.0530	0.0024	0.0000	0.4554	0.0020	0.0000
Gender	Male	0.0334	0.0004	0.0000	0.0436	0.0004	0.0000
Age group	up to 4 years old	0.0271	0.0015	0.0000	0.1311	0.0015	0.0000
	from 5 to 14 years of age	0.1431	0.0016	0.0000	0.3243	0.0017	0.0000
	from 15 to 19 years of age	0.2071	0.0016	0.0000	0.4278	0.0016	0.0000
	from 20 to 29 years of age	0.1663	0.0016	0.0000	0.3656	0.0016	0.0000
	from 30 to 39 years of age	0.1768	0.0015	0.0000	0.2756	0.0015	0.0000
	from 40 to 59 years of age	0.1492	0.0015	0.0000	0.1417	0.0016	0.0000
Race	White	0.0193	0.0276	0.4851	-0.9181	0.0235	0.0000
	Black	0.0191	0.0276	0.4885	-0.7722	0.0235	0.0000
	Of Asian descent	-0.0853	0.0278	0.0022	-12.276	0.0238	0.0000
	Multiracial	0.0485	0.0276	0.0790	-0.7325	0.0235	0.0000
	Indigenous	-0.1318	0.0279	0.0000	-0.7300	0.0238	0.0000
Degree of education	Uneducated	0.3542	0.0011	0.0000	0.6503	0.0011	0.0000
	Incomplete elementary school	0.3271	0.0010	0.0000	0.5553	0.0009	0.0000
	Complete elementary school	0.2184	0.0011	0.0000	0.3121	0.0011	0.0000
	Incomplete high school	0.1644	0.0012	0.0000	0.3415	0.0012	0.0000
	Complete high school	0.1187	0.0009	0.0000	0.1671	0.0009	0.0000
	Incomplete higher education	0.0784	0.0014	0.0000	-0.0130	0.0013	0.0000
Income class	1st decile	0.6257	0.0012	0.0000	0.9935	0.0012	0.0000
	2nd decile	0.5923	0.0012	0.0000	0.7186	0.0011	0.0000
	3rd decile	0.5922	0.0012	0.0000	0.6161	0.0011	0.0000
	4th decile	0.4565	0.0012	0.0000	0.5151	0.0011	0.0000
	5th decile	0.4880	0.0011	0.0000	0.5083	0.0011	0.0000
	6th decile	0.4345	0.0011	0.0000	0.4539	0.0011	0.0000
	7th decile	0.3450	0.0011	0.0000	0.3291	0.0011	0.0000
	8th decile	0.2750	0.0011	0.0000	0.2548	0.0011	0.0000
	9th decile	0.3324	0.0011	0.0000	0.1856	0.0011	0.0000

STATISTICAL APPENDIX

Table A.1 Female population with access to the general distribution network, in people and (%) of the population, 2016

	Region total		Urban areas		Rural areas		Metropolitan regions		Capital	
	People	(%)	People	(%)	People	(%)	People	(%)	People	(%)
North	5,288,713	60.7%	4,843,808	71.2%	444,905	23.3%	314,391	50.3%	2,174,918	76.2%
Rorônia	390,801	44.1%	213,514	56.6%	10,590	4.9%	-	0.0%	95,260	36.3%
Acre	217,538	53.6%	1,362,572	68.6%	51,867	4.3%	-	0.0%	116,525	59.8%
Amazonas	1,414,438	74.6%	190,924	84.1%	10,835	18.7%	106,943	63.0%	911,394	85.1%
Roraima	201,759	88.5%	1,827,353	98.4%	336,065	31.9%	-	0.0%	162,230	98.1%
Pará	2,163,419	52.4%	232,317	60.9%	1,777	29.6%	174,923	44.0%	608,187	78.6%
Amapá	234,095	58.6%	636,917	64.1%	29,747	4.7%	32,525	57.0%	137,968	57.4%
Tocantins	666,664	87.1%	20,666,131	98.5%	2,859,110	25.2%	-	0.0%	143,354	97.4%
Northeast	23,525,241	87.1%	1,919,854	92.3%	464,195	40.8%	2,970,737	86.5%	6,313,112	94.6%
Maranhão	2,384,049	80.0%	1,104,617	80.7%	249,612	40.9%	116,439	65.5%	451,934	78.3%
Piauí	1,354,229	67.9%	3,315,308	97.0%	369,704	49.1%	-	0.0%	427,867	96.4%
Ceará	3,685,012	82.2%	1,357,555	92.4%	189,661	36.4%	467,982	74.5%	1,359,242	97.2%
Rio Grande do Norte	1,547,216	80.1%	1,539,310	94.1%	95,127	50.9%	313,507	95.0%	474,215	100.0%
Paraíba	1,634,437	85.3%	3,643,259	92.6%	198,985	21.7%	212,745	81.2%	430,794	98.3%
Pernambuco	3,842,245	77.8%	1,135,255	90.6%	175,188	23.0%	1,081,825	89.4%	814,916	92.5%
Alagoas	1,310,443	78.6%	855,745	86.6%	154,835	39.7%	100,295	76.5%	447,071	81.2%
Sergipe	1,010,580	74.8%	5,795,227	96.6%	961,803	53.4%	152,085	99.2%	340,744	100.0%
Bahia	6,757,030	86.0%	40,634,322	97.2%	822,917	49.5%	525,860	97.4%	1,566,328	99.9%
Southeast	41,457,239	85.5%	9,309,291	96.8%	307,264	29.5%	9,103,224	91.5%	11,181,204	99.1%
Minas Gerais	9,616,555	92.6%	1,740,560	98.0%	36,941	23.3%	1,381,711	97.1%	1,336,675	100.0%
Espírito Santo	1,777,501	88.9%	7,525,992	98.0%	81,026	13.4%	798,939	97.5%	198,510	100.0%
Rio de Janeiro	7,607,017	87.0%	22,058,479	89.5%	397,686	30.5%	2,305,074	77.1%	3,440,550	99.8%
São Paulo	22,456,165	87.7%	12,777,640	99.0%	686,727	42.7%	4,617,500	97.9%	6,205,469	98.5%
South	13,464,368	96.7%	5,300,940	89.1%	228,715	35.1%	2,307,121	92.5%	2,027,394	99.5%
Paraná	5,200,940	89.1%	5,072,225	97.2%	228,715	34.6%	773,223	95.6%	999,183	99.8%
Santa Catarina	2,989,395	91.5%	2,837,603	98.9%	151,792	29.4%	257,803	98.8%	244,775	96.8%
Rio Grande do Sul	5,174,033	85.6%	4,867,812	95.4%	306,221	29.4%	1,276,095	89.6%	783,437	99.8%
Midwest	7,033,972	88.8%	6,877,198	96.5%	156,773	39.4%	530,316	77.5%	2,985,868	96.8%
Mato Grosso do Sul	1,192,902	88.4%	1,166,613	94.5%	26,289	23.1%	-	0.0%	447,228	98.5%
Mato Grosso do	1,340,534	89.2%	1,308,546	95.7%	31,988	22.2%	-	0.0%	302,476	97.2%
South Mato Grosso	2,998,310	82.2%	2,950,650	92.0%	47,659	15.3%	125,720	79.3%	733,939	96.1%
Goiás	1,502,226	87.4%	1,451,388	93.1%	50,837	18.2%	404,596	76.9%	1,502,226	96.7%
Distrito Federal	1,502,226	87.4%	1,451,388	93.1%	50,837	18.2%	404,596	76.9%	1,502,226	96.7%
Brazil	90,769,532	96.7%	85,799,099	93.7%	4,970,433	57.8%	15,225,789	88.6%	24,682,497	95.2%

Source: IBGE, 2017. Elaboration: Ex Ante Consultoria

Table A.2 Female population with regular water service in people and (%) of the population, 2016

	Region total		Urban areas		Rural areas		Metropolitan regions	
	People	(%)	People	(%)	People	(%)	People	(%)
North	4,633,458	53.2%	4,218,244	62.0%	415,214	21.7%	283,942	45.5%
Roraima	350,635	39.5%	340,044	62.0%	10,590	21.7%	283,942	45.5%
Acre	89,419	22.0%	88,592	50.6%	827	4.9%	-	0.0%
Amazonas	1,269,472	66.9%	1,221,634	28.5%	47,837	0.9%	-	0.0%
Roraima	195,094	85.6%	184,999	75.4%	10,095	17.3%	99,550	58.7%
Pará	1,846,022	44.7%	1,531,255	95.4%	314,767	29.8%	-	0.0%
Amapá	225,885	56.5%	224,108	51.1%	1,777	27.8%	155,756	39.2%
Tocantins	656,931	85.9%	627,611	61.9%	29,320	4.7%	28,636	50.2%
Northeast	15,650,562	53.2%	13,878,448	62.0%	1,772,114	24.8%	-	0.0%
Maranhão	1,691,290	48.2%	1,333,908	56.1%	357,382	31.5%	1,873,772	54.6%
Piauí	1,273,934	77.3%	1,038,305	91.1%	235,629	46.4%	74,610	42.0%
Ceará	2,860,634	62.2%	2,626,275	73.2%	234,359	23.1%	-	0.0%
Rio Grande do Norte	925,378	51.0%	831,319	57.6%	94,059	25.2%	364,878	82.9%
Norte Paraíba	838,418	39.9%	800,062	48.1%	38,356	8.8%	273,549	66.5%
Pernambuco	1,751,570	35.8%	1,661,793	41.3%	89,777	10.4%	174,136	39.4%
Alagoas	1,030,047	58.8%	915,900	69.9%	114,148	25.9%	476,977	69.6%
Sergipe	820,927	69.8%	715,789	80.8%	105,138	36.3%	91,247	94.4%
Bahia	4,458,365	56.4%	3,955,098	66.3%	503,267	25.9%	144,796	50.7%
Southeast	38,654,693	86.4%	37,910,303	90.3%	744,390	26.7%	273,578	72.6%
Minas Gerais	9,257,710	85.6%	8,994,145	94.7%	263,564	20.0%	7,221,900	94.7%
Espírito Santo	1,715,858	83.9%	1,679,581	94.9%	36,276	13.2%	1,348,576	93.8%
Rio de Janeiro	6,529,222	75.2%	6,459,840	76.8%	69,382	26.1%	768,306	47.2%
São Paulo	21,151,903	91.1%	20,776,736	93.2%	375,167	40.3%	1,409,707	78.3%
South	13,191,685	87.3%	12,512,990	95.1%	678,695	34.7%	3,695,311	91.6%
Paraná	5,193,353	89.7%	4,966,990	96.8%	226,363	34.2%	2,284,665	95.0%
Santa Catarina	2,873,531	82.3%	2,724,141	91.6%	149,390	29.0%	768,191	95.8%
Rio Grande do Sul	5,124,801	88.0%	4,821,859	95.6%	302,942	38.9%	249,994	88.9%
Midwest	6,637,438	83.4%	6,496,047	89.3%	141,392	20.9%	1,266,480	57.9%
Mato Grosso do Sul	1,172,589	87.7%	1,148,996	94.3%	23,593	19.9%	396,047	0.0%
Mato Grosso	1,057,883	64.8%	1,029,918	72.4%	27,966	13.4%	-	9.2%
South Mato Grosso	2,907,725	84.7%	2,867,871	90.5%	39,854	15.2%	14,598	72.5%
Goiás	1,499,241	96.5%	1,449,262	98.8%	49,979	56.9%	381,448	0.0%
Distrito Federal	78,767,836	74.4%	75,016,032	81.9%	3,751,804	26.2%	-	70.2%

Source: IBGE, 2017. Elaboration: Ex Ante Consultoria

Table A.3 Female population with bathroom or toilet in household, in people and (%) of the population, 2016

	Region total		Urban areas		Rural areas		Metropolitan regions	
	People	(%)	People	(%)	People	(%)	People	(%)
North	883,052	96.6%	669,911	98.5%	1,713,966	89.7%	603,594	96.6%
Rorondônia	365,564	99.6%	297,390	99.8%	213,141	99.0%	-	0.0%
Acre	1,796,066	90.1%	1,586,510	95.5%	68,173	72.3%	-	0.0%
Amazonas	226,506	94.7%	193,643	97.9%	209,556	75.6%	154,732	91.2%
Roraima	4,011,578	99.4%	2,952,694	99.8%	32,863	96.9%	-	0.0%
Pará	392,355	97.1%	358,406	98.5%	1,058,883	93.4%	392,905	98.8%
Amapá	740,456	98.1%	643,057	98.9%	33,950	90.4%	55,957	98.1%
Tocantins	28,259,071	96.8%	22,152,598	99.4%	97,399	82.4%	-	0.0%
Northeast	3,177,869	96.1%	2,298,533	98.9%	6,106,473	87.1%	3,406,345	99.2%
Maranhão	1,463,763	90.5%	1,117,338	96.6%	879,336	77.6%	168,536	94.8%
Piauí	4,432,992	88.8%	3,512,173	98.1%	346,426	68.2%	-	0.0%
Ceará	1,807,891	96.3%	1,442,147	97.9%	920,819	90.6%	619,334	98.6%
Rio Grande do	2,067,329	99.6%	1,657,361	100.0%	365,744	98.2%	328,938	99.6%
Norte Paraíba	4,779,395	98.4%	4,008,473	99.7%	409,968	93.6%	261,580	99.9%
Pernambuco	1,706,718	97.8%	1,303,215	99.7%	770,922	88.9%	1,208,234	99.9%
Alagoas	1,166,070	97.4%	883,623	99.4%	403,504	91.4%	130,777	99.8%
Sergipe	7,657,044	99.2%	5,929,736	99.8%	282,447	97.4%	153,036	99.8%
Bahia	44,661,197	96.9%	41,920,534	99.5%	1,727,308	89.0%	535,911	99.2%
Southeast	10,753,786	99.8%	9,482,765	99.9%	2,740,663	98.2%	9,942,709	99.9%
Minas Gerais	2,037,423	99.5%	1,763,459	99.9%	1,271,022	96.5%	1,423,462	100.0%
Espírito Santo	8,667,963	99.7%	8,401,880	99.7%	273,964	99.7%	815,200	99.5%
Rio de Janeiro	23,202,025	99.9%	22,272,431	99.9%	266,083	100.0%	2,986,442	99.9%
São Paulo	15,067,954	99.9%	13,130,414	99.9%	929,594	99.7%	4,717,606	100.0%
South	5,778,386	99.7%	5,124,155	99.8%	1,937,540	99.1%	2,489,713	99.8%
Paraná	3,484,613	99.8%	2,971,342	99.9%	654,232	98.8%	808,430	100.0%
Santa Catarina	5,804,954	99.8%	5,034,917	99.9%	513,271	99.5%	260,689	99.9%
Rio Grande do	7,940,475	99.7%	7,271,366	99.8%	770,037	99.0%	1,420,594	99.8%
Sul	1,336,586	99.8%	1,218,157	99.9%	669,109	98.7%	684,430	100.0%
Midwest	1,627,396	99.9%	1,420,433	99.9%	118,429	100.0%	-	0.0%
Mato Grosso do	3,423,383	99.7%	3,167,327	99.9%	206,963	98.9%	158,498	100.0%
South Mato Grosso	1,553,110	99.7%	1,465,449	99.9%	256,056	97.7%	525,932	100.0%
Goiás	104,344,275	99.9%	91,176,524	99.9%	87,661	99.7%	-	0.0%
Distrito Federal		98.5%		99.6%	13,167,751	91.8%	17,126,791	99.7%

Source: IBGE, 2017. Elaboration: Ex Ante Consultoria

Table A.4 Female population with access to sanitary sewage system in people and (%) of the population, 2016

	Region total		Urban areas		Rural areas		Metropolitan regions	
	People	(%)	People	(%)	People	(%)	People	(%)
North	2,826,651	32.4%	1,571,185	23.1%	1,255,465	65.7%	118,148	18.9%
Rorônia	309,202	34.9%	99,551	14.8%	209,650	97.4%	-	0.0%
Acre	175,176	43.2%	128,620	41.3%	46,556	49.4%	-	0.0%
Amazonas	675,761	35.6%	581,618	35.9%	94,143	34.0%	52,732	31.1%
Roraima	89,972	39.5%	61,252	31.6%	28,721	84.7%	-	0.0%
Pará	1,185,227	28.7%	426,447	14.2%	758,781	66.9%	60,154	15.1%
Anapá	57,983	14.5%	33,594	9.3%	24,389	65.0%	5,262	9.2%
Tocantins	333,329	43.6%	240,103	37.1%	93,226	78.9%	-	0.0%
Northeast	17,944,125	61.0%	12,461,604	55.7%	5,482,520	78.2%	1,928,915	56.2%
Maranhão	1,238,489	35.3%	571,227	24.0%	667,262	58.9%	109,258	61.4%
Piauí	459,623	27.9%	128,410	11.3%	331,213	65.2%	-	0.0%
Ceará	2,912,090	63.3%	2,043,294	57.0%	868,795	85.5%	248,360	39.5%
Rio Grande do	761,154	41.9%	406,464	28.2%	354,690	95.2%	108,373	32.8%
Norte Paraíba	1,440,580	68.6%	1,091,154	65.6%	349,426	79.8%	80,967	30.9%
Pernambuco	3,409,343	69.7%	2,742,776	68.2%	666,567	76.9%	752,673	62.2%
Alagoas	904,973	51.7%	526,587	40.2%	378,386	85.7%	61,174	46.7%
Sergipe	879,762	74.8%	604,601	68.3%	275,162	94.9%	126,578	82.6%
Bahia	5,938,110	75.1%	4,347,092	72.9%	1,591,018	82.0%	441,533	81.8%
Southeast	41,793,634	93.4%	39,433,221	94.0%	2,360,414	84.6%	9,042,368	90.9%
Minas Gerais	9,669,782	89.4%	8,676,011	91.4%	993,771	75.4%	1,230,581	86.4%
Espírito Santo	1,830,493	89.6%	1,603,559	90.6%	226,934	82.6%	721,862	88.1%
Rio de Janeiro	7,799,833	89.9%	7,553,931	89.8%	245,901	92.4%	2,599,679	87.0%
São Paulo	22,493,526	96.9%	21,599,719	96.9%	893,807	95.9%	4,490,246	95.2%
South	11,475,338	76.0%	9,607,236	73.1%	1,868,102	95.5%	2,203,845	88.4%
Paraná	4,590,757	79.3%	3,952,255	77.0%	638,502	96.5%	751,681	92.9%
Santa Catarina	2,308,381	66.1%	1,810,895	60.9%	497,485	96.5%	164,860	63.2%
Rio Grande do	4,576,200	78.6%	3,844,085	76.2%	732,115	94.1%	1,287,304	90.4%
Sul	5,012,254	63.0%	4,354,912	59.8%	657,343	97.0%	285,876	41.8%
Midwest	667,571	49.9%	553,047	45.4%	114,524	96.7%	-	0.0%
Mato Grosso do	826,924	50.7%	623,646	43.8%	203,278	97.1%	87,665	55.3%
South Mato Grosso	2,105,043	61.3%	1,851,104	58.4%	253,939	96.9%	198,211	37.7%
Goiás	1,412,717	90.9%	1,327,114	90.5%	85,602	97.4%	-	0.0%
Distrito Federal	79,052,001	74.6%	67,428,158	73.6%	11,623,844	81.0%	13,579,152	79.0%

Source: IBGE, 2017. Elaboration: Ex Ante Consultoria

Table A.5. Absences from routine activities due to diarrhea or vomiting, female population, in cases per thousand inhabitants, 2013

	Region total		Urban areas		Rural areas		Metropolitan regions		Capital	
	People	(%)	People	Incidence (%)	People	Incidence (%)	People	Incidence (%)	People	Incidence (%)
North	15,793	75.6	525,908	79.5	111,173	61.2	58,198	22.0	255,499	92.3
Rorônia	32,772	18.3	3,910	5.9	11,883	57.9	-	-	3,910	15.8
Acre	129,628	84.5	27,594	90.0	5,177	63.6	-	-	10,844	57.2
Amazonas	13,227	68.9	102,229	63.1	27,399	105.0	9,454	27.6	24,118	23.0
Roraima	312,674	60.3	11,375	57.3	1,853	88.9	-	-	9,139	58.0
Pará	45,977	79.1	255,797	90.2	56,877	50.9	44,814	181.0	161,787	212.6
Anapá	87,011	122.6	44,277	128.1	1,700	57.9	3,930	97.7	23,928	104.3
Tocantins	2,549,482	116.5	80,726	125.0	6,285	62.3	-	-	21,773	164.0
Northeast	366,080	88.7	2,078,013	95.2	471,469	68.1	200,705	21.2	562,524	86.2
Maranhão	124,588	107.0	269,052	120.0	97,029	82.2	22,636	155.7	92,549	164.4
Piauí	457,071	76.8	107,010	97.3	17,578	33.7	-	-	23,438	51.2
Ceará	238,807	101.2	400,336	112.8	56,736	58.7	27,131	65.2	102,449	76.3
Rio Grande do Norte	263,333	133.8	174,997	121.1	63,809	187.7	-	-	86,661	192.1
Paraíba	550,563	129.2	263,333	164.8	-	-	-	-	45,144	109.5
Pernambuco	202,955	115.2	503,823	128.3	46,740	54.8	145,362	90.6	41,275	47.8
Alagoas	34,960	118.1	183,631	140.7	19,324	46.6	-	-	119,267	220.8
Sergipe	311,125	31.0	16,262	18.7	18,698	71.6	-	-	16,262	48.5
Bahia	3,043,580	40.2	159,570	27.5	151,555	78.0	5,576	19.8	35,480	22.7
Southeast	789,247	68.7	2,658,492	64.2	385,087	133.0	221,099	10.4	934,862	82.1
Minas Gerais	183,511	73.9	690,812	74.5	98,435	69.4	129,954	97.6	139,794	104.8
Espírito Santo	399,991	92.3	160,316	95.4	23,195	75.4	91,145	107.0	13,819	73.9
Rio de Janeiro	1,670,831	45.5	399,991	47.1	-	-	-	-	240,308	67.7
São Paulo	1,095,704	73.2	1,407,374	64.1	263,457	300.3	-	-	540,941	85.6
South	284,614	73.7	960,571	74.9	135,133	66.1	120,951	27.0	213,712	105.6
Paraná	379,322	50.2	278,155	56.6	6,459	8.6	64,137	89.6	90,595	95.2
Santa Catarina	431,768	112.6	297,744	103.0	81,579	170.0	11,916	113.5	45,051	184.8
Rio Grande do Sul	580,138	74.0	384,672	76.6	47,096	58.0	44,898	54.5	78,066	94.3
Midwest	149,837	75.8	580,138	82.5	-	-	166,861	100.2	165,984	56.0
Mato Grosso do	52,471	115.7	149,837	124.1	-	-	-	-	37,616	87.6
South Mato Grosso	282,535	33.6	52,471	39.9	-	-	21,576	48.3	-	-
Goiás	95,294	85.6	282,535	92.6	-	-	145,285	146.3	33,073	44.9
Distrito Federal	7,905,985	63.7	95,294	65.5	-	-	-	-	95,294	63.7
Brazil		76.0	6,803,123	75.8	1,102,862	77.1	767,815	73.5	2,132,581	83.1

Source: IBGE, 2015. Elaboration: Ex Ante Consultoria

Table A.6. People bedridden due to diarrhea or vomiting, in cases per thousand inhabitants, 2013

	Region total		Urban areas		Rural areas		Metropolitan regions		Capital	
	People Incidence (‰)		People Incidence (‰)		People Incidence (‰)		People Incidence (‰)		People Incidence (‰)	
North	337,054	40.0	238,988	36.1	98,066	54.0	43,692	68.0	135,802	49.1
Rorondônia	15,793	18.3	3,910	5.9	11,883	57.9	-	-	3,910	15.8
Acre	9,925	25.6	7,845	25.6	2,081	25.5	-	-	2,729	14.4
Amazonas	42,121	22.4	21,180	13.1	20,941	80.3	6,553	14.3	10,830	10.3
Roraima	5,330	24.3	5,330	26.8	-	-	-	-	3,094	19.6
Pará	169,986	43.0	113,110	39.9	56,877	50.9	34,756	103.4	83,251	109.4
Amapá	34,410	91.8	34,410	99.6	-	-	2,384	76.6	19,454	84.8
Tocantins	59,489	79.7	53,204	82.4	6,285	62.3	-	-	12,533	94.4
Northeast	1,374,635	47.8	1,148,109	52.6	226,526	32.7	94,892	43.8	319,115	48.9
Maranhão	145,332	42.5	53,992	24.1	91,341	77.4	22,636	113.8	61,536	109.3
Piauí	38,010	23.4	25,100	22.8	12,911	24.7	-	-	-	-
Ceará	355,941	78.8	340,029	95.8	15,912	16.5	13,750	34.9	55,524	41.3
Rio Grande do Norte	158,717	88.9	121,893	84.4	36,824	108.3	-	-	52,805	117.0
Paraíba	230,567	113.1	230,567	144.3	-	-	-	-	12,378	30.0
Pernambuco	268,049	56.1	247,860	63.1	20,188	23.7	58,506	48.4	41,275	47.8
Alagoas	61,596	35.8	61,596	47.2	-	-	-	-	61,596	114.0
Sergipe	34,960	31.0	16,262	18.7	18,698	71.6	-	-	16,262	48.5
Bahia	81,462	10.5	50,811	8.8	30,652	15.8	-	8.5	17,740	11.4
Southeast	1,026,724	23.2	792,592	19.1	234,132	80.9	28,051	12.1	228,158	20.0
Minas Gerais	134,592	12.6	101,781	11.0	32,812	23.1	28,051	15.9	15,949	12.0
Espírito Santo	51,718	26.0	28,523	17.0	23,195	75.4	-	-	-	-
Rio de Janeiro	169,397	19.3	169,397	19.9	-	-	-	-	109,924	31.0
São Paulo	671,017	29.4	492,892	22.4	178,125	203.0	-	-	102,285	16.2
South	572,638	38.5	491,285	38.3	81,353	39.8	59,705	36.1	102,198	50.5
Paraná	81,534	14.4	81,534	16.6	-	-	48,014	47.2	33,520	35.2
Santa Catarina	262,281	77.8	192,619	66.7	69,662	145.2	-	51.1	25,667	105.3
Rio Grande do Sul	228,822	39.2	217,131	43.3	11,691	14.4	11,691	24.3	43,011	51.9
Midwest	296,702	38.8	296,702	42.2	-	-	87,340	98.1	75,985	25.7
Mato Grosso do	94,058	72.6	94,058	77.9	-	-	-	-	16,094	37.5
South Mato Grosso	30,895	19.8	30,895	23.5	-	-	-	-	-	-
Goiás	111,857	33.9	111,857	36.7	-	-	87,340	71.6	-	-
Distrito Federal	59,891	40.0	59,891	41.2	-	-	-	-	59,891	40.0
Brazil	3,607,753	34.7	2,967,676	33.1	640,077	44.8	313,680	29.8	861,258	33.5

Source: IBGE, 2015. Elaboration: Ex Ante Consultoria

Table A.7. Hospitalizations in the SUS network due to diarrhea or vomiting *, female population, in cases per thousand inhabitants,

	Region total		Metropolitan regions		Capitals		Demais cidades	
	Hospitalizations	Incidence (%)	Hospitalizations	Incidence (%)	Hospitalizations	Incidence (%)	People	Incidence (%)
North	31,430	3.730	7,114	2.112	3,146	1.137	24,316	4.807
Rorônia	2,211	2.559	-	-	110	0.444	2,101	3.408
Acre	1,500	3.867	-	-	61	0.322	1,439	7.255
Amazonas	2,470	1.313	1,119	0.921	757	1.224	1,351	2.028
Roraima	313	1.427	246	1.560	193	2.221	67	1.087
Pará	22,781	5.763	4,841	4.242	1,690	2.221	17,940	6.381
Amapá	452	1.206	270	0.947	184	0.802	182	2.027
Tocantins	1,703	2.280	638	4.806	151	1.138	1,065	1.734
Northeast	102,072	3.550	17,757	1.791	6,416	0.983	84,315	4.476
Maranhão	26,939	7.874	1,906	2.576	368	0.654	25,033	9.335
Piauí	10,874	6.706	1,412	3.083	642	1.402	9,462	8.132
Ceará	11,415	2.528	2,889	1.455	2,007	1.495	8,526	3.371
Rio Grande do Norte	5,967	3.344	397	0.517	187	0.414	5,570	5.476
Paraíba	7,130	3.499	4,245	6.288	607	1.472	2,885	2.117
Pernambuco	8,233	1.723	1,857	0.902	1,081	1.252	6,376	2.345
Alagoas	4,368	2.541	3,996	5.989	989	1.831	372	0.354
Sergipe	809	0.716	168	0.345	155	0.463	641	0.998
Bahia	26,337	3.400	887	0.427	380	0.243	25,450	4.489
Southeast	23,948	0.541	6,619	0.312	2,584	0.227	17,329	0.751
Minas Gerais	9,138	0.855	864	0.312	494	0.370	8,274	1.044
Espírito Santo	2,592	1.303	318	0.324	128	0.684	2,274	2.256
Rio de Janeiro	2,651	0.302	1,457	0.225	272	0.077	1,194	0.516
São Paulo	9,567	0.419	3,980	0.362	1,690	0.267	5,587	0.472
South	17,636	1.186	5,926	1.322	1,233	0.609	11,710	1.127
Paraná	8,403	1.482	3,881	2.246	539	0.566	4,522	1.147
Santa Catarina	3,382	1.004	456	0.908	45	0.185	2,926	1.020
Rio Grande do Sul	5,851	1.003	1,589	0.705	649	0.784	4,262	1.191
Midwest	12,222	1.597	3,419	0.952	2,053	0.693	8,803	2.167
Mato Grosso do	1,810	1.398	597	1.391	102	0.238	1,213	1.401
South Mato Grosso	2,865	1.835	-	-	157	0.524	2,708	2.429
Goiás	6,700	2.030	1,975	1.620	947	1.285	4,725	2.270
Distrito Federal	847	0.566	847	0.566	847	0.566	-	-
Brazil	847	1.801	847	0.959	847	0.601	146,473	2.384

Source: Datasus, 2017. Elaboration: Ex Ante Consultoria Econômica. (*) ICD 10: Cholera, shigellosis, amebiasis, diarrhea and presumed infectious gastroenteritis, other intestinal infectious diseases

Table A.8. Hospitalizations in the SUS network due to diarrhea or vomiting *, female population, in cases per thousand inhabitants, 2016

	Region total		Metropolitan regions		Capitals		Demais cidades	
	Hospitaliza- ções	Incidence (%)	Hospitaliza- ções	Incidence (%)	Hospitaliza- ções	Incidence (%)	People	Incidence (%)
North								
Roraima	25,706	2.950	5,630	1.618	3,739	1.310	20,076	3.835
Acre	1,815	2.047	-	-	144	0.548	1,671	2.678
Amazonas	773	1.906	-	-	48	0.246	725	3.440
Roraima	2,319	1.222	1,239	0.999	999	0.933	1,080	1.644
Pará	379	1.663	348	2.105	286	1.730	31	0.496
Amapá	19,101	4.623	3,566	3.044	2,076	2.683	15,535	5.247
Tocantins	222	0.555	100	0.336	65	0.270	122	1.193
North-east								
Maranhão	1,097	1.434	377	2.562	121	0.822	720	1.165
Piauí	70,833	2.410	13,793	1.365	6,069	0.910	57,040	2.957
Ceará	26,078	7.425	1,813	2.400	242	0.419	24,265	8.802
Rio Grande do	8,340	5.062	1,178	2.655	561	1.264	7,162	5.949
Norte Paraíba	8,301	1.804	3,011	1.486	2,167	1.550	5,290	2.053
Pernambuco	2,697	1.486	288	0.358	123	0.259	2,409	2.385
Alagoas	4,418	2.135	3,058	4.368	674	1.538	1,427	1.019
Sergipe	4,485	0.904	1,593	0.762	1,209	1.373	2,825	1.010
Bahia	2,278	1.300	2,087	3.062	607	1.102	191	0.178
Southeast								
Minas Gerais	586	0.499	178	0.360	161	0.472	408	0.599
Espírito Santo	13,650	1.727	587	0.278	325	0.207	13,063	2.255
Rio de Janeiro	21,866	0.811	6,132	0.289	2,672	0.237	15,734	0.669
São Paulo	8,772	0.811	875	0.317	485	0.363	7,897	0.981
South								
Paraná	2,340	0.227	278	0.273	141	0.710	2,062	2.009
Santa Catarina	1,970	0.378	903	0.140	202	0.059	1,067	0.477
Rio Grande do	8,784	1.093	4,076	0.370	1,844	0.293	4,708	0.386
Sul	16,513	1.222	4,937	1.089	1,114	0.547	11,576	1.095
Midwest								
Mato Grosso do	7,076	1.239	3,113	1.720	388	0.388	3,963	0.995
South Mato Grosso	4,326	0.878	491	0.956	58	0.229	3,835	1.288
Goiás	5,111	0.878	1,333	0.604	668	0.851	3,778	1.045
Total	9,382	1.179	2,101	0.558	1,663	0.539	7,281	1.739
	1,729	1.293	287	0.632	55	0.121	1,442	1.632
	2,302	1.411	-	-	113	0.363	2,189	1.884
	4,349	1.267	812	0.630	493	0.645	3,537	1.651
	1,002	0.645	1,002	0.645	1,002	0.645	-	-
Distrito Federal								
		1.362		0.756		0.588	111,707	1.778

Source: Datasus, 2017. Elaboration: Ex Ante Consultoria Econômica. (*) ICD 10: Cholera, shigellosis, amebiasis, diarrhea and presumed infectious gastroenteritis, other intestinal infectious diseases

Table A.9. Deaths due to diarrhea or vomiting *, female population, in cases per thousand inhabitants, 2013

	Region total		Metropolitan regions		Capitals		Demais cidades	
	Deaths	Incidence*	Deaths	Incidence*	Deaths	Incidence*	Deaths	Incidence*
North	Deaths	Incidence*	Deaths	Incidence*	Deaths	Incidence*	Deaths	Incidence*
Rondônia	234	2.777	86	2.553	64	2.313	64	2.313
Acre	17	1.967	-	-	6	2.424	148	1.784
Amazonas	11	2.836	-	-	3	1.583	11	4.033
Roraima	92	4.890	31	2.551	26	2.478	8	9.158
Pará	12	5.471	10	6.341	1	0.634	61	3.246
Amapá	12	2.176	35	3.067	23	3.023	2	1.814
Amapá	86	1.067	4	1.403	4	1.744	51	-
Tocantins	4	1.607	6	4.520	1	0.753	-	0.977
Northeast	Deaths	Incidence*	Deaths	Incidence*	Deaths	Incidence*	Deaths	Incidence*
Maranhão	12	3.905	452	4.558	196	3.002	6	3.562
Piauí	1,123	2.747	28	3.785	17	3.020	671	2.461
Ceará	94	4.132	17	3.711	12	2.620	66	4.297
Rio Grande do Norte	67	3.610	55	2.769	31	2.308	50	4.270
Paraíba	163	3.642	24	3.128	16	3.546	108	4.031
Pernambuco	65	3.140	51	7.555	6	1.455	41	0.954
Alagoas	64	5.546	109	5.292	50	5.792	13	5.737
Sergipe	265	6.980	108	16.186	23	4.258	156	1.141
Bahia	120	3.187	10	2.053	8	2.388	12	4.048
Southeast	Deaths	Incidence*	Deaths	Incidence*	Deaths	Incidence*	Deaths	Incidence*
Minas Gerais	36	3.214	50	2.408	33	2.111	26	3.510
Espírito Santo	249	1.819	404	1.904	186	1.633	199	1.741
Rio de Janeiro	806	2.162	37	1.338	13	0.974	402	2.449
São Paulo	231	1.810	10	1.020	4	2.138	194	2.579
South	Deaths	Incidence*	Deaths	Incidence*	Deaths	Incidence*	Deaths	Incidence*
Paraná	128	1.457	80	1.236	44	1.239	26	2.075
Santa Catarina	411	1.800	277	2.519	125	1.978	48	1.131
Rio Grande do Sul	309	2.078	214	4.772	61	3.014	134	0.915
Midwest	Deaths	Incidence*	Deaths	Incidence*	Deaths	Incidence*	Deaths	Incidence*
Mato Grosso do	123	2.169	91	5.267	38	3.993	95	0.812
South Mato Grosso	127	1.751	59	11.751	5	2.051	32	-
Goias	59	2.178	64	2.839	18	2.173	-	1.761
Distrito Federal	142	1.855	50	1.392	48	1.620	63	2.265
Brazil	Deaths	Incidence*	Deaths	Incidence*	Deaths	Incidence*	Deaths	Incidence*
	48	3.707	14	3.262	8	1.864	92	3.927
	30	1.921	-	-	9	3.007	34	1.883
	42	1.273	14	1.148	9	1.221	21	1.345
	22	1.470	22	1.470	22	1.470	28	-
	22	2.513	1,206	2.833	555	2.162	-	2.292

Source: Datasus, 2017. Elaboration: Ex Ante Consultoria Econômica. (*) ICD 10: Cholera, shigellosis, amebiasis, diarrhea and presumed infectious gastroenteritis, other intestinal infectious diseases

Tabela A,10, Deaths em razão de diarreia ou vômito*, população feminina, em casos e por mil habitantes, 2016

	Region total		Metropolitan regions		Capitais		Demais cidades	
	Deaths	Incidence*	Deaths	Incidence*	Deaths	Incidence*	Deaths	Incidence*
North	64	0.734	32	0.920	24	0.841	32	0.611
Rondônia	3	0.338	-	-	-	-	3	0.481
Acre	6	1.479	-	-	3	1.540	3	1.424
Amazonas	10	0.527	6	0.484	6	0.560	4	0.609
Roraima	6	2.633	6	3.629	6	3.629	-	-
Pará	34	0.823	16	1.366	5	0.646	18	0.608
Amapá	4	1.001	3	1.009	3	1.248	1	0.978
Tocantins	1	0.131	1	0.679	1	0.679	-	-
Northeast	412	1.402	147	1.455	69	1.034	265	1.374
Maranhão	41	1.167	9	1.191	7	1.212	32	1.161
Piauí	18	1.093	6	1.352	5	1.127	12	0.997
Ceará	74	1.608	18	0.888	8	0.572	56	2.174
Rio Grande do	19	1.047	2	0.249	1	0.211	17	1.683
Norte Paraíba	41	1.952	30	4.286	6	1.369	11	0.785
Pernambuco	60	1.227	36	1.722	23	2.612	24	0.858
Alagoas	29	1.655	29	4.254	9	1.635	-	-
Sergipe	14	1.191	6	1.214	5	1.467	8	1.174
Bahia	116	1.468	11	0.522	5	0.319	105	1.812
Southeast	283	0.632	99	0.466	33	0.293	184	0.782
Minas Gerais	96	0.888	10	0.362	4	0.299	86	1.068
Espírito Santo	17	0.832	6	0.590	1	0.504	11	1.072
Rio de Janeiro	17	0.196	7	0.109	2	0.058	10	0.447
São Paulo	153	0.659	76	0.690	26	0.413	77	0.631
South	186	1.231	98	2.162	38	1.864	88	0.832
Paraná	42	0.725	24	1.326	5	0.500	18	0.452
Santa Catarina	34	0.974	8	1.557	3	1.187	26	0.873
Rio Grande do	110	1.889	66	2.988	30	3.823	44	1.217
Sul	61	0.767	17	0.451	20	0.649	44	1.051
Midwest	18	1.346	4	0.881	3	0.661	14	1.585
Mato Grosso do	16	0.981	-	-	4	1.285	12	1.033
South Mato Grosso	17	0.495	3	0.233	3	0.393	14	0.653
Goiás	10	0.643	10	0.643	10	0.643	-	-
Distrito Federal	1,006	0.950	393	0.912	454	0.710	613	0.976

Source: Datasus, 2017. Elaboration: Ex Ante Consultoria Econômica. (*) ICD 10: Cholera, shigellosis, amebiasis, diarrhea and presumed infectious gastroenteritis, other intestinal infectious diseases

Table A.11. Distribution of Brazilian students between regions, 2016

	Region total			Urban areas			Rural areas			Metropolitan regions**			Capital	
	Students	(%) das mulheres*		Students	(%) das mulheres*		Students	(%) das mulheres*		Students	(%) das mulheres*		Students	(%) das mulheres*
North	2,684,749	33.5%		2,078,521	32.9%		606,227	35.4%		183,265	32.1%		861,949	32.5%
Rorônia	237,541	28.9%		182,109	29.3%		55,433	27.9%		-	-		73,633	30.3%
Acre	139,504	37.6%		105,512	36.7%		33,993	40.7%		-	-		62,656	34.6%
Amazonas	601,921	35.0%		506,082	34.3%		95,839	39.5%		50,867	33.8%		329,081	33.5%
Roraima	75,710	36.4%		63,431	35.8%		12,279	40.1%		-	-		54,688	36.1%
Pará	1,253,277	32.8%		891,579	31.7%		361,698	35.7%		114,259	31.1%		197,956	27.0%
Amapá	144,377	39.5%		130,294	39.3%		14,083	41.2%		18,138	34.8%		89,697	40.3%
Tocantins	232,418	32.5%		199,514	33.0%		32,904	29.9%		-	-		54,239	39.1%
Northeast	7,616,739	27.6%		5,756,119	27.3%		1,860,620	28.6%		829,086	25.7%		1,632,093	25.8%
Maranhão	1,029,932	31.6%		686,578	31.0%		343,354	33.1%		48,173	29.1%		157,176	28.9%
Piauí	425,680	27.6%		305,283	28.5%		120,397	25.6%		-	-		113,028	27.3%
Ceará	1,151,827	26.6%		890,973	26.4%		260,854	27.5%		150,205	25.4%		339,499	25.7%
Rio Grande do	458,786	26.9%		360,438	26.5%		98,348	28.2%		90,699	29.0%		109,624	24.1%
Norte Paraíba	560,227	28.5%		448,567	28.8%		111,660	27.3%		68,975	28.6%		113,818	27.6%
Pernambuco	1,140,956	24.8%		923,228	24.4%		217,728	27.0%		259,530	22.6%		202,510	24.1%
Alagoas	455,966	27.8%		336,334	27.1%		119,632	29.7%		32,777	26.4%		130,771	24.9%
Sergipe	278,096	25.4%		207,270	25.0%		70,825	26.5%		35,392	24.7%		74,583	23.3%
Bahia	2,115,270	28.4%		1,597,448	28.4%		517,822	28.4%		143,335	28.4%		391,083	26.1%
Southeast	9,587,900	22.7%		8,977,227	22.6%		610,673	23.3%		2,254,614	23.8%		2,285,332	21.3%
Minas Gerais	2,458,671	24.2%		2,158,988	24.2%		299,683	24.2%		351,231	26.3%		288,540	22.7%
Espírito Santo	468,640	24.3%		414,475	24.9%		54,165	20.9%		192,185	24.9%		44,823	23.9%
Rio de Janeiro	1,671,361	20.2%		1,621,009	20.2%		50,352	20.3%		578,156	20.2%		623,999	19.0%
São Paulo	4,989,228	22.7%		4,782,755	22.7%		206,473	23.5%		1,133,042	25.2%		1,327,970	22.2%
South	3,458,049	24.3%		3,044,000	24.6%		414,049	22.4%		570,001	24.2%		459,511	23.6%
Paraná	1,362,776	24.9%		1,217,192	25.2%		145,583	23.2%		178,967	23.6%		229,727	23.8%
Santa Catarina	793,721	24.1%		679,642	24.2%		114,079	23.5%		56,960	23.1%		58,473	24.3%
Rio Grande do	1,301,552	23.7%		1,147,166	24.1%		154,387	20.9%		334,074	24.8%		171,311	23.0%
Sul	2,025,470	27.3%		1,867,745	27.5%		157,724	25.0%		192,808	30.6%		782,999	27.0%
Midwest	346,469	27.5%		318,429	27.7%		28,041	25.6%		-	-		122,973	28.6%
Mato Grosso do	452,096	29.8%		399,465	30.3%		52,630	26.9%		44,770	30.9%		88,347	30.2%
South Mato Grosso	829,093	25.9%		773,752	26.2%		55,341	22.4%		148,038	30.5%		173,868	24.2%
Goias	397,812	27.3%		376,099	27.3%		21,713	27.4%		-	-		397,812	27.3%

Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica. (*) More than 5 years old. (**) Excluding capitals

Table A.12. Average school delay of the female population between the ages of 5 and 19, 2016

	Region total			Urban areas			Rural areas			Metropolitan regions*			Capital		
	Anos de atraso escolar	Em relação à média		Anos de atraso escolar	Em relação à média		Anos de atraso escolar	Em relação à média		Anos de atraso escolar	Em relação à média		Anos de atraso escolar	Em relação à média	
North	3.97	3.8%		3.93	3.9%		4.12	0.5%		3.94	5.0%		4.03	2.9%	
Roraima	4.30	12.4%		4.35	15.2%		4.13	0.8%		-	-		4.32	10.3%	
Acre	3.60	-6.0%		3.49	-7.7%		3.91	-4.7%		-	-		3.59	-8.2%	
Amazonas	3.92	2.4%		3.90	3.2%		4.02	-1.9%		4.13	10.1%		4.16	6.3%	
Roraima	3.51	-8.4%		3.54	-6.4%		3.33	-18.7%		-	-		3.45	-11.9%	
Pará	4.04	5.6%		3.95	4.7%		4.25	3.6%		3.89	3.7%		4.14	5.8%	
Amapá	3.78	-1.1%		3.81	0.7%		3.60	-12.2%		3.71	-1.3%		3.74	-4.4%	
Tocantins	3.79	-1.0%		3.81	0.8%		3.66	-10.7%		-	-		3.64	-6.8%	
Northeast	3.95	3.3%		3.89	3.0%		4.13	0.8%		3.95	5.2%		4.04	3.3%	
Maranhão	3.74	-2.3%		3.67	-2.8%		3.87	-5.7%		3.78	0.7%		3.57	-8.7%	
Piauí	3.97	3.7%		3.76	-0.6%		4.42	7.9%		-	-		3.98	1.9%	
Ceará	4.08	6.7%		4.09	8.3%		4.06	-1.0%		4.05	7.8%		4.22	7.8%	
Rio Grande do Norte	3.99	4.3%		4.05	7.1%		3.80	-7.2%		3.91	4.1%		4.07	4.1%	
Paraíba	3.85	0.6%		3.82	1.1%		3.97	-3.1%		4.10	9.2%		3.72	-4.8%	
Pernambuco	3.98	4.0%		3.95	4.6%		4.09	-0.3%		3.78	0.7%		4.32	10.4%	
Alagoas	4.03	5.4%		3.92	3.7%		4.34	5.9%		4.53	20.6%		3.89	-0.7%	
Sergipe	4.22	10.4%		4.13	9.4%		4.46	8.8%		4.07	8.3%		4.33	10.6%	
Bahia	3.91	2.2%		3.78	0.0%		4.27	4.1%		4.04	7.7%		3.99	1.9%	
Southeast	3.70	-3.4%		3.67	-2.8%		4.03	-1.7%		3.64	-3.2%		3.79	-3.0%	
Minas Gerais	3.85	0.6%		3.85	1.9%		3.87	-5.7%		3.96	5.5%		3.71	-5.3%	
Espírito Santo	3.96	3.4%		3.91	3.4%		4.28	4.4%		4.04	7.7%		3.95	1.0%	
Rio de Janeiro	3.95	3.2%		3.91	3.5%		5.11	24.6%		3.96	5.3%		3.97	1.5%	
São Paulo	3.51	-8.3%		3.49	-7.5%		3.88	-5.3%		3.26	-13.1%		3.71	-5.1%	
South	3.88	1.2%		3.86	2.2%		3.96	-3.4%		3.84	2.4%		4.14	5.7%	
Paraná	3.74	-2.2%		3.71	-1.7%		3.99	-2.6%		3.81	1.4%		3.84	-1.9%	
Santa Catarina	3.90	1.9%		3.92	3.8%		3.75	-8.5%		3.99	6.3%		4.25	8.7%	
Rio Grande do Sul	3.99	4.3%		3.98	5.3%		4.07	-0.8%		3.84	2.2%		4.48	14.5%	
Midwest	3.76	-1.8%		3.70	-2.2%		4.35	6.0%		3.93	4.6%		3.80	-2.8%	
Mato Grosso do Sul	3.76	-1.9%		3.68	-2.5%		4.42	7.7%		-	-		3.70	-5.3%	
Mato Grosso	3.84	0.2%		3.78	0.1%		4.22	2.9%		4.47	18.9%		3.43	-12.4%	
South Mato Grosso	3.63	-5.1%		3.59	-4.9%		4.09	-0.3%		3.76	0.3%		3.71	-5.3%	
Goiás	3.95	3.3%		3.85	1.9%		5.34	30.2%		-	-		3.95	1.1%	
Total	3.83	3.3%		3.78	1.9%		4.10	30.2%		3.75	5.0%		3.95	1.1%	

Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Economica. (*) Excluding capitals

Table A.13. Female population engaged in economic activity and unemployment rate by region, 2016

	Region total			Urban areas			Rural areas			Metropolitan regions**			Capital		
	Mulheres Ocupadas	Taxa de desemprego*	Taxa de desemprego*	Mulheres Ocupadas	Taxa de desemprego*	Taxa de desemprego*	Mulheres Ocupadas	Taxa de desemprego*	Taxa de desemprego*	Mulheres Ocupadas	Taxa de desemprego*	Taxa de desemprego*	Mulheres Ocupadas	Taxa de desemprego*	Taxa de desemprego*
North	2,800,238	14.6%	14.6%	2,343,895	15.9%	7.3%	456,343	7.3%	7.3%	216,113	17.3%	17.3%	1,070,621	17.8%	17.8%
Rondônia	307,455	8.3%	9.0%	252,532	9.0%	4.6%	54,923	4.6%	-	-	-	-	97,519	12.4%	12.4%
Acre	117,061	13.0%	13.5%	100,778	13.5%	9.7%	16,283	9.7%	-	-	-	-	69,907	12.8%	12.8%
Amazonas	602,350	18.9%	21.0%	520,225	21.0%	2.0%	82,125	2.0%	14.7%	50,360	14.7%	14.7%	377,188	22.9%	22.9%
Roraima	81,124	11.7%	12.0%	72,026	12.0%	8.7%	9,098	8.7%	-	-	-	-	63,429	11.3%	11.3%
Pará	1,320,254	13.6%	14.8%	1,058,428	14.8%	8.4%	261,827	8.4%	17.7%	149,042	17.7%	17.7%	314,514	15.0%	15.0%
Amapá	125,481	19.4%	20.1%	116,645	20.1%	8.9%	8,836	8.9%	21.6%	16,711	21.6%	21.6%	87,703	19.4%	19.4%
Tocantins	246,513	14.9%	15.0%	223,261	15.0%	14.5%	23,252	14.5%	-	-	-	-	60,361	15.1%	15.1%
Northeast	8,974,300	15.3%	15.6%	7,519,032	15.6%	14.1%	1,455,268	14.1%	20.4%	1,090,123	20.4%	20.4%	2,653,567	15.5%	15.5%
Maranhão	982,427	13.0%	13.8%	729,497	13.8%	10.4%	252,930	10.4%	21.4%	52,247	21.4%	21.4%	207,013	18.1%	18.1%
Piauí	538,469	9.3%	9.4%	415,536	9.4%	8.7%	122,933	8.7%	-	-	-	-	195,609	8.6%	8.6%
Ceará	1,400,404	13.3%	13.3%	1,208,469	13.3%	13.6%	191,934	13.6%	17.4%	190,272	17.4%	17.4%	539,134	13.5%	13.5%
Rio Grande do	575,042	14.9%	14.7%	493,044	14.7%	15.8%	81,999	15.8%	18.0%	124,479	18.0%	18.0%	182,880	15.9%	15.9%
Norte Paraíba	616,028	12.1%	12.3%	527,332	12.3%	10.3%	88,697	10.3%	13.4%	76,554	13.4%	13.4%	165,323	12.5%	12.5%
Pernambuco	1,408,182	16.5%	16.5%	1,257,510	16.5%	17.1%	150,672	17.1%	18.9%	375,566	18.9%	18.9%	328,222	14.9%	14.9%
Alagoas	473,344	15.5%	15.6%	402,847	15.6%	14.7%	70,496	14.7%	18.6%	36,658	18.6%	18.6%	207,877	15.8%	15.8%
Sergipe	385,004	13.8%	14.6%	313,632	14.6%	10.3%	71,372	10.3%	18.5%	43,656	18.5%	18.5%	137,156	15.4%	15.4%
Bahia	2,595,400	18.7%	18.9%	2,171,165	18.9%	17.5%	424,235	17.5%	29.6%	190,691	29.6%	29.6%	690,353	18.6%	18.6%
Southeast	17,905,997	13.5%	13.4%	17,106,218	13.4%	14.0%	799,779	14.0%	17.2%	3,932,054	17.2%	17.2%	4,855,567	12.2%	12.2%
Minas Gerais	4,229,015	12.5%	12.6%	3,906,039	12.6%	12.0%	322,976	12.0%	18.2%	619,478	18.2%	18.2%	622,992	12.6%	12.6%
Espírito Santo	758,415	14.4%	15.3%	676,247	15.3%	6.4%	82,168	6.4%	17.3%	328,893	17.3%	17.3%	75,935	13.7%	13.7%
Rio de Janeiro	3,163,313	13.9%	13.9%	3,077,750	13.9%	13.6%	85,563	13.6%	18.2%	1,031,679	18.2%	18.2%	1,344,914	10.1%	10.1%
São Paulo	9,755,254	13.6%	13.5%	9,446,182	13.5%	17.8%	309,072	17.8%	16.4%	1,952,004	16.4%	16.4%	2,811,725	13.0%	13.0%
South	6,434,066	8.9%	9.5%	5,676,962	9.5%	4.5%	757,103	4.5%	9.4%	1,042,173	9.4%	9.4%	925,739	9.1%	9.1%
Paraná	2,389,895	9.5%	9.9%	2,163,237	9.9%	5.3%	226,658	5.3%	8.6%	325,496	8.6%	8.6%	445,561	9.9%	9.9%
Santa Catarina	1,520,917	7.6%	8.1%	1,316,924	8.1%	4.4%	203,993	4.4%	8.8%	121,879	8.8%	8.8%	120,741	5.7%	5.7%
Rio Grande do	2,523,254	9.1%	9.8%	2,196,802	9.8%	4.0%	326,452	4.0%	9.9%	594,798	9.9%	9.9%	359,437	9.2%	9.2%
Sul	3,139,413	11.6%	11.8%	2,941,024	11.8%	9.3%	198,389	9.3%	14.9%	260,558	14.9%	14.9%	1,319,762	12.0%	12.0%
Midwest	557,998	7.3%	7.4%	520,084	7.4%	6.2%	37,914	6.2%	-	-	-	-	200,938	7.0%	7.0%
Mato Grosso do	605,546	11.6%	12.4%	544,111	12.4%	4.2%	61,435	4.2%	11.6%	56,210	11.6%	11.6%	130,346	13.1%	13.1%
South Mato Grosso	1,314,198	12.2%	12.2%	1,249,106	12.2%	12.6%	65,093	12.6%	15.8%	204,348	15.8%	15.8%	326,808	11.1%	11.1%
Goias	661,670	13.7%	13.7%	627,723	13.7%	14.3%	33,947	14.3%	-	6,544,438	-	-	661,670	13.7%	13.7%

Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica. (*) More than 5 years old. (**) Excluding capitals

Table A.14. Average monthly salary of women, by region, 2016

	Region total			Urban areas			Rural areas			Metropolitan regions*			Capital	
	R\$ por mês	Em relação ao rendimento % of men		R\$ por mês	Em relação ao rendimento % of men		R\$ por mês	Em relação ao rendimento % of men		R\$ por mês	Em relação ao rendimento % of men		R\$ por mês	Em relação ao rendimento % of men
North	1,446.14	-11.0%		1,514.37	-17.9%		907.21	-4.4%		1,279.36	-25.5%		1,809.15	-17.9%
Rorônia	1,503.86	-14.6%		1,575.94	-19.2%		1,028.33	-20.6%		-	-		1,751.04	-20.1%
Acre	1,579.84	-9.0%		1,643.43	-18.4%		927.70	6.6%		-	-		1,857.03	-10.2%
Amazonas	1,514.82	-9.8%		1,568.12	-16.9%		706.16	16.1%		1,181.21	4.9%		1,717.68	-23.6%
Roraima	2,042.67	-5.8%		2,037.25	-12.3%		2,086.87	55.9%		-	-		2,103.99	-15.3%
Pará	1,280.35	-13.3%		1,345.43	-21.8%		901.05	-2.0%		1,269.33	-35.1%		1,706.83	-17.1%
Amapá	2,034.18	0.9%		2,066.50	-3.0%		1,226.45	22.0%		1,664.65	-14.5%		2,217.56	-0.7%
Tocantins	1,535.17	-10.7%		1,604.96	-12.1%		803.24	-37.0%		-	-		2,049.02	-14.5%
Northeast	1,315.11	-11.6%		1,432.88	-18.3%		617.18	-6.4%		1,140.35	-19.6%		2,012.28	-23.7%
Maranhão	1,092.07	-8.2%		1,239.94	-13.7%		620.82	-5.3%		982.67	-25.3%		1,758.77	-16.0%
Piauí	1,269.01	-4.8%		1,419.42	-18.6%		594.23	12.1%		-	-		1,556.38	-23.5%
Ceará	1,251.75	-12.7%		1,352.79	-19.1%		565.66	0.6%		986.06	-17.9%		1,750.13	-24.5%
Rio Grande do	1,505.91	-14.5%		1,615.50	-19.2%		813.07	-0.8%		1,428.36	-13.2%		2,139.49	-28.4%
Norte Paraíba	1,322.77	-10.6%		1,420.79	-16.2%		633.99	-6.0%		940.13	-18.9%		2,190.21	-21.1%
Pernambuco	1,618.30	-9.1%		1,715.71	-14.7%		658.78	-1.2%		1,185.51	-16.1%		3,182.62	-19.7%
Alagoas	1,276.16	-6.0%		1,356.78	-12.2%		732.27	-3.8%		957.87	-16.8%		1,618.75	-19.0%
Sergipe	1,478.07	-16.3%		1,641.71	-23.2%		614.23	-10.2%		963.93	-35.1%		2,398.90	-27.2%
Bahia	1,217.62	-15.1%		1,326.46	-21.8%		570.19	-17.4%		1,216.41	-32.5%		1,831.14	-26.9%
Southeast	1,805.91	-22.7%		1,834.47	-24.4%		1,066.14	-14.3%		1,438.97	-31.7%		3,004.61	-22.3%
Minas Gerais	1,557.79	-24.4%		1,599.36	-27.5%		885.92	-23.8%		1,461.26	-27.3%		2,413.13	-25.3%
Espírito Santo	1,680.58	-21.7%		1,731.30	-25.7%		1,071.23	-13.7%		1,463.55	-25.8%		3,771.86	-23.0%
Rio de Janeiro	2,084.31	-20.4%		2,109.82	-20.8%		1,150.66	-28.7%		1,474.45	-26.6%		2,842.33	-18.9%
São Paulo	2,303.88	-32.5%		2,330.31	-33.1%		1,467.37	-22.4%		2,425.50	-48.6%		3,010.01	-25.3%
South	1,916.83	-25.6%		1,966.27	-27.1%		1,384.17	-26.0%		1,760.82	-21.1%		2,784.83	-30.2%
Paraná	1,903.29	-25.0%		1,939.86	-27.3%		1,448.19	-13.1%		1,792.97	-17.0%		2,624.20	-29.0%
Santa Catarina	1,861.63	-26.9%		1,907.01	-28.5%		1,500.41	-21.5%		2,042.64	-26.4%		2,640.40	-30.0%
Rio Grande do	1,962.93	-25.3%		2,027.81	-26.0%		1,267.08	-37.0%		1,685.47	-21.9%		3,032.48	-31.8%
Sul	1,995.16	-22.5%		2,047.91	-23.8%		1,145.11	-30.9%		1,367.26	-24.7%		2,704.70	-22.9%
Midwest	1,726.93	-27.5%		1,766.62	-28.1%		1,137.97	-38.0%		-	-		2,258.17	-21.2%
Mato Grosso do	1,638.99	-28.4%		1,681.25	-29.9%		1,203.80	-31.8%		1,571.61	-22.8%		2,035.49	-30.0%
South Mato Grosso	1,639.50	-23.4%		1,668.51	-24.3%		1,008.20	-33.4%		1,311.05	-25.1%		2,134.55	-26.6%
Goiás	3,253.75	-21.2%		3,353.77	-22.3%		1,309.36	-13.7%		-	-		3,253.75	-21.2%
	1,000.00			1,000.00			1,000.00			1,000.00			1,000.00	

Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica. (*) Excluding capitals

Table A.15 Male population with access to the general distribution network, in persons and (%) of the population, 2016

	Region total		Urban areas		Rural areas		Metropolitan regions		Capital	
	People	(%)	People	(%)	People	(%)	People	(%)	People	(%)
North	367,388	58.8%	358,754	71.0%	8,634	22.4%	305,820	49.1%	2,027,629	76.7%
Rondônia	200,919	41.2%	196,741	55.9%	4,178	3.5%	-	0.0%	86,046	34.7%
Acre	1,427,112	50.5%	1,362,007	67.6%	65,105	3.9%	-	0.0%	105,578	58.0%
Amazonas	196,307	72.8%	185,579	84.5%	10,728	18.7%	108,426	60.1%	874,262	85.4%
Roraima	2,071,298	85.1%	1,703,290	97.9%	368,008	26.1%	-	0.0%	154,358	97.2%
Pará	230,154	50.5%	229,494	59.9%	660	29.3%	160,953	41.8%	538,728	80.2%
Amapá	626,663	61.1%	594,059	68.7%	32,604	1.6%	36,441	64.1%	140,481	62.3%
Tocantins	21,330,585	82.9%	18,381,198	97.3%	2,949,386	22.5%	-	0.0%	128,176	96.6%
Northeast	2,236,326	77.9%	1,776,170	91.9%	460,155	39.9%	2,780,902	86.1%	5,456,046	94.5%
Maranhão	1,246,499	65.7%	972,742	80.6%	273,757	38.3%	102,906	60.6%	387,608	76.8%
Piauí	3,395,624	79.6%	3,019,689	97.1%	375,935	48.6%	-	0.0%	392,110	97.0%
Ceará	1,391,564	77.8%	1,197,489	92.0%	194,075	34.8%	478,413	74.1%	1,181,604	97.4%
Rio Grande do Norte	1,402,031	83.8%	1,312,504	94.3%	89,526	49.6%	289,901	95.4%	403,060	99.9%
Paraíba	3,426,611	74.7%	3,229,236	91.3%	197,376	20.4%	190,409	78.7%	355,115	97.9%
Pernambuco	1,171,442	76.8%	997,322	90.2%	174,120	22.3%	999,709	90.5%	687,715	92.3%
Alagoas	920,552	73.2%	753,670	86.6%	166,882	38.8%	86,081	75.6%	379,749	80.6%
Sergipe	6,139,934	84.4%	5,122,376	95.8%	1,017,558	54.9%	142,039	98.8%	300,922	100.0%
Bahia	38,148,997	83.5%	37,271,103	97.0%	877,894	49.0%	491,443	97.1%	1,368,163	99.9%
Southeast	8,892,705	91.7%	8,572,826	96.7%	319,880	28.6%	8,497,113	91.3%	10,040,545	99.0%
Minas Gerais	1,627,202	87.4%	1,585,516	98.3%	41,686	22.0%	1,290,456	96.2%	1,176,793	100.0%
Espírito Santo	6,917,488	84.5%	6,822,460	97.9%	95,029	13.6%	728,407	97.5%	169,995	100.0%
Rio de Janeiro	20,711,601	86.9%	20,290,301	89.1%	421,300	30.8%	2,105,117	77.1%	3,038,278	99.6%
São Paulo	12,505,738	96.2%	11,807,844	98.8%	697,893	41.9%	4,373,134	97.4%	5,655,480	98.4%
South	4,876,191	87.5%	4,640,597	97.0%	235,595	32.7%	2,159,396	91.7%	1,804,518	99.4%
Paraná	2,859,902	89.6%	2,707,091	98.8%	152,811	31.6%	742,363	94.9%	892,440	99.8%
Santa Catarina	4,769,644	84.0%	4,460,157	95.2%	309,487	27.2%	254,295	98.7%	216,490	96.3%
Rio Grande do Sul	6,550,360	87.5%	6,388,019	96.4%	162,341	37.5%	1,162,739	88.4%	695,588	99.8%
Midwest	1,124,240	86.3%	1,096,905	94.0%	27,335	20.5%	473,417	75.5%	2,674,857	96.0%
Mato Grosso do	1,277,373	87.8%	1,245,839	95.8%	31,535	20.1%	-	0.0%	401,314	97.9%
South Mato Grosso	2,790,386	78.6%	2,735,821	91.0%	54,565	12.3%	108,171	75.3%	262,717	96.1%
Goiás	1,358,361	85.5%	1,309,453	92.5%	48,908	17.8%	365,246	75.6%	652,466	95.3%
Distrito Federal	83,655,521	95.7%	78,478,089	98.7%	5,177,432	52.6%	-	0.0%	1,358,361	95.7%
Brazil		84.0%		93.4%		33.3%	14,216,648	88.1%	22,003,596	95.0%

Source: IBGE, 2017. Elaboration: Ex Ante Consultoria

Table A.16 Male population with regular water supply in people and (%) of the population, 2016

	Region total		Urban areas		Rural areas		Metropolitan regions		Capital	
	People	(%)	People	(%)	People	(%)	People	(%)	People	(%)
North	331,097	51.7%	322,463	62.1%	8,634	20.9%	279,951	44.9%	1,771,423	67.0%
Rondônia	80,952	37.1%	80,078	50.2%	875	3.5%	-	0.0%	64,179	25.9%
Acre	1,272,987	20.3%	1,213,052	27.5%	59,935	0.8%	-	0.0%	39,303	21.6%
Amazonas	188,687	65.0%	178,645	75.2%	10,041	17.2%	101,486	56.2%	781,640	76.4%
Roraima	1,793,385	81.8%	1,448,371	94.3%	345,014	24.4%	-	0.0%	151,939	95.7%
Pará	221,240	43.7%	220,580	50.9%	660	27.5%	147,659	38.3%	467,749	69.6%
Amapá	618,965	58.7%	586,844	66.0%	32,121	1.6%	30,806	54.2%	138,535	61.5%
Tocantins	14,108,294	81.9%	12,280,846	96.1%	1,827,448	22.2%	-	0.0%	128,078	96.5%
Northeast	1,598,913	51.5%	1,242,990	61.4%	355,923	24.7%	1,710,048	52.9%	4,718,262	81.7%
Maranhão	1,173,000	47.0%	915,974	56.4%	257,025	29.7%	63,705	37.5%	198,826	39.4%
Piauí	2,618,959	74.9%	2,377,348	91.4%	241,611	45.6%	-	0.0%	384,686	95.1%
Ceará	846,353	60.0%	747,172	72.4%	99,181	22.4%	372,654	57.7%	1,132,923	93.4%
Rio Grande do Norte	713,585	51.0%	676,161	58.8%	37,424	25.4%	250,229	82.3%	351,563	87.2%
Paraíba	1,503,396	38.0%	1,416,497	47.0%	86,900	8.5%	161,552	66.8%	325,251	89.6%
Pernambuco	917,553	33.7%	804,488	39.6%	113,065	9.8%	406,540	36.8%	519,680	69.8%
Alagoas	741,606	57.3%	629,748	69.9%	111,858	25.2%	78,716	69.1%	360,823	76.6%
Sergipe	3,994,929	68.0%	3,470,467	80.1%	524,462	36.8%	137,627	95.7%	282,394	93.8%
Bahia	35,354,515	54.3%	34,562,307	65.7%	792,208	25.3%	239,025	47.2%	1,162,117	84.9%
Southeast	8,522,053	85.0%	8,246,387	89.7%	275,666	25.8%	6,588,372	70.8%	9,752,658	96.2%
Minas Gerais	1,568,007	83.8%	1,527,318	94.5%	40,689	19.0%	1,255,121	93.6%	1,175,199	99.9%
Espírito Santo	5,898,196	81.4%	5,818,454	94.3%	79,742	13.3%	697,275	93.4%	169,995	100.0%
Rio de Janeiro	19,366,259	74.1%	18,970,148	76.0%	396,111	25.8%	1,260,718	46.2%	2,972,880	97.4%
São Paulo	12,252,036	89.9%	11,562,060	92.4%	689,976	39.4%	3,375,259	75.2%	5,434,584	94.6%
South	4,772,608	85.7%	4,540,518	95.0%	232,090	32.4%	2,141,042	90.9%	1,742,487	96.0%
Paraná	2,751,279	87.7%	2,600,595	96.6%	150,684	31.2%	737,665	94.3%	846,515	94.7%
Santa Catarina	4,728,149	80.8%	4,420,947	91.4%	307,202	26.8%	247,332	96.0%	213,883	95.1%
Rio Grande do Sul	6,197,591	86.7%	6,052,414	95.5%	145,177	37.3%	1,156,046	87.9%	682,089	97.9%
Midwest	1,104,964	81.7%	1,080,300	89.0%	24,664	18.3%	356,335	56.8%	2,558,503	91.8%
Mato Grosso do	1,031,919	86.3%	1,005,919	94.4%	26,000	18.1%	-	0.0%	399,444	97.4%
South Mato Grosso	2,706,934	63.5%	2,659,613	73.5%	47,321	10.1%	12,380	8.6%	161,519	59.1%
Goiás	1,353,774	83.0%	1,306,583	89.9%	47,191	15.5%	343,955	71.2%	643,767	94.0%
Distrito Federal	72,419,749	95.4%	68,507,661	98.5%	3,912,087	50.8%	-	0.0%	1,353,774	95.4%
Brazil		72.7%		81.5%		25.1%	11,075,749	68.6%	20,543,333	88.7%

Source: IBGE, 2017. Elaboration: Ex Ante Consultoria

Table A.17 Male population with bathroom or toilet in the house, in people and (%) of the population, 2016

	Region total		Urban areas		Rural areas		Metropolitan regions		Capital	
	People	(%)	People	(%)	People	(%)	People	(%)	People	(%)
North	884,859	96.1%	640,511	98.4%	244,349	89.3%	597,065	95.8%	2,602,420	98.5%
Rorônia	356,313	99.3%	278,430	99.7%	77,882	98.1%	-	0.0%	248,202	100.0%
Acre	1,836,675	89.5%	1,574,552	95.7%	262,123	72.8%	-	0.0%	175,583	96.4%
Amazonas	228,717	93.7%	188,925	97.7%	39,792	75.4%	160,116	88.7%	1,002,346	98.0%
Roraima	3,972,762	99.2%	2,797,926	99.7%	1,174,836	96.7%	-	0.0%	158,233	99.7%
Pará	368,138	96.9%	330,632	98.4%	37,507	93.5%	381,067	98.8%	663,195	98.7%
Amapá	723,762	97.7%	605,825	98.9%	117,937	88.4%	55,882	98.3%	222,158	98.6%
Tocantins	26,069,902	95.8%	19,746,347	99.2%	6,323,555	81.4%	-	0.0%	132,704	100.0%
Northeast	3,053,543	95.2%	2,128,814	98.8%	924,729	85.6%	3,193,886	98.9%	5,701,795	98.7%
Maranhão	1,352,839	89.7%	983,516	96.6%	369,323	77.1%	159,523	93.9%	497,447	98.6%
Piauí	4,177,567	86.4%	3,203,832	98.1%	973,734	65.6%	-	0.0%	397,044	98.2%
Ceará	1,651,263	95.8%	1,268,521	97.6%	382,742	90.1%	631,232	97.8%	1,164,268	96.0%
Rio Grande do Norte	1,827,587	99.4%	1,427,764	99.9%	399,823	97.9%	302,181	99.4%	403,391	100.0%
Paraíba	4,337,396	97.4%	3,563,605	99.3%	773,791	91.2%	240,884	99.6%	362,241	99.8%
Pernambuco	1,550,069	97.2%	1,143,592	99.6%	406,477	87.4%	1,102,773	99.8%	740,409	99.4%
Alagoas	1,076,748	96.9%	784,508	99.3%	292,240	90.6%	113,089	99.3%	470,334	99.8%
Sergipe	7,042,890	98.8%	5,242,194	99.7%	1,800,695	96.2%	143,458	99.8%	300,116	99.7%
Bahia	41,483,913	95.8%	38,467,533	99.3%	3,016,380	86.8%	500,746	98.9%	1,366,546	99.8%
Southeast	10,113,428	99.7%	8,712,785	99.8%	1,400,643	98.2%	9,299,778	99.9%	10,108,867	99.7%
Minas Gerais	1,918,218	99.4%	1,613,196	99.9%	305,021	96.5%	1,341,276	100.0%	1,175,122	99.9%
Espírito Santo	7,953,061	99.6%	7,644,415	99.7%	308,646	99.6%	743,591	99.6%	169,995	100.0%
Rio de Janeiro	21,499,207	99.9%	20,497,136	99.8%	1,002,070	100.0%	2,723,769	99.8%	3,048,539	99.9%
São Paulo	14,248,899	99.8%	12,144,239	99.8%	2,104,659	99.6%	4,491,142	100.0%	5,715,212	99.5%
South	5,422,823	99.6%	4,689,656	99.8%	733,167	98.8%	2,352,313	99.9%	1,811,878	99.8%
Paraná	3,399,107	99.6%	2,841,062	99.8%	558,044	98.5%	780,990	99.8%	892,896	99.9%
Santa Catarina	5,426,969	99.8%	4,613,521	99.9%	813,448	99.3%	257,437	99.9%	224,857	100.0%
Rio Grande do Sul	7,569,027	99.6%	6,790,768	99.7%	778,259	98.7%	1,313,886	99.9%	694,125	99.6%
Midwest	1,279,646	99.7%	1,143,968	99.9%	135,678	98.3%	625,874	99.8%	2,784,944	99.9%
Mato Grosso do	1,618,852	99.9%	1,367,432	100.0%	251,420	99.8%	-	0.0%	409,998	100.0%
South Mato Grosso	3,252,848	99.6%	2,954,171	99.9%	298,677	98.0%	143,443	99.8%	273,197	99.9%
Goiás	1,417,681	99.7%	1,325,197	99.9%	92,484	97.6%	482,432	99.8%	684,068	99.9%
Distrito Federal	97,742,966	99.9%	83,565,686	99.9%	14,177,279	99.5%	-	0.0%	1,417,681	99.9%
Brazil		98.2%		99.5%		91.1%	16,068,916	99.5%	23,009,904	99.3%

Source: IBGE, 2017. Elaboration: Ex Ante Consultoria

Table A.18 Male population with access to sanitary sewage system, in persons and (%) of the population, 2016

	Region total		Urban areas		Rural areas		Metropolitan regions		Capital	
	People	(%)	People	(%)	People	(%)	People	(%)	People	(%)
North	332,286	32.5%	92,313	22.0%	239,973	63.6%	128,986	20.7%	1,058,122	40.0%
Rondônia	164,925	37.3%	112,940	14.4%	51,985	96.3%	-	0.0%	60,003	24.2%
Acre	649,028	41.4%	536,328	38.8%	112,700	48.6%	-	0.0%	116,389	63.9%
Amazonas	94,731	33.1%	59,806	33.3%	34,925	32.4%	65,166	36.1%	465,343	45.5%
Roraima	1,192,752	41.1%	379,565	31.6%	813,187	84.9%	-	0.0%	50,796	32.0%
Pará	54,186	29.1%	28,161	13.3%	26,025	64.7%	58,515	15.2%	218,235	32.5%
Amapá	340,381	14.4%	227,481	8.4%	112,900	61.3%	5,305	9.3%	27,720	12.3%
Tocantins	16,420,456	45.1%	10,765,816	37.3%	5,654,640	77.9%	-	0.0%	119,636	90.2%
Northeast	1,183,081	60.0%	491,686	53.9%	691,395	76.6%	1,784,785	55.3%	4,074,240	70.6%
Maranhão	444,945	34.7%	98,541	22.3%	346,404	57.6%	102,135	60.1%	346,192	68.6%
Piauí	2,698,373	28.4%	1,780,087	9.8%	918,286	61.5%	-	0.0%	60,217	14.9%
Ceará	725,186	61.9%	353,644	54.2%	371,541	85.0%	257,285	39.9%	893,362	73.6%
Rio Grande do Norte	1,268,680	43.7%	922,701	27.9%	345,979	95.0%	102,176	33.6%	145,266	36.0%
Paraíba	3,045,608	67.6%	2,387,412	64.2%	658,196	78.9%	78,649	32.5%	278,058	76.6%
Pernambuco	844,967	68.2%	463,850	66.7%	381,118	74.4%	673,625	61.0%	545,939	73.3%
Alagoas	811,670	52.8%	527,536	40.3%	284,134	85.0%	55,263	48.5%	226,173	48.0%
Sergipe	5,397,945	74.4%	3,740,358	67.1%	1,657,588	93.5%	119,297	83.0%	270,033	89.7%
Bahia	38,670,730	73.4%	36,072,335	70.9%	2,598,395	79.9%	396,355	78.3%	1,309,000	95.6%
Southeast	9,067,386	92.9%	7,970,714	93.6%	1,096,672	84.6%	8,425,496	90.5%	9,959,709	98.2%
Minas Gerais	1,702,157	89.1%	1,449,485	91.4%	252,672	75.5%	1,160,202	86.5%	1,159,736	98.6%
Espírito Santo	7,116,421	88.4%	6,831,915	89.5%	284,506	82.5%	654,603	87.6%	168,247	99.0%
Rio de Janeiro	20,784,767	89.3%	19,820,221	89.2%	964,546	92.2%	2,362,281	86.5%	3,003,856	98.4%
São Paulo	10,810,635	96.5%	8,787,404	96.5%	2,023,231	95.9%	4,248,411	94.6%	5,627,870	98.0%
South	4,314,567	75.6%	3,601,623	72.2%	712,944	94.9%	2,062,225	87.5%	1,695,156	93.4%
Paraná	2,216,906	79.3%	1,678,590	76.7%	538,316	95.7%	729,666	93.3%	873,552	97.7%
Santa Catarina	4,279,163	65.1%	3,507,192	59.0%	771,971	95.8%	157,951	61.3%	150,504	66.9%
Rio Grande do Sul	4,689,655	78.5%	3,926,183	75.8%	763,472	93.7%	1,174,608	89.3%	671,100	96.3%
Midwest	639,536	61.8%	508,733	57.8%	130,803	96.5%	238,315	38.0%	2,345,448	84.1%
Mato Grosso do	810,948	49.9%	563,794	44.5%	247,154	96.2%	-	0.0%	306,496	74.8%
South Mato Grosso	1,962,005	49.9%	1,665,955	41.2%	296,050	96.3%	72,473	50.4%	211,632	77.4%
Goiás	1,277,166	60.1%	1,187,701	56.3%	89,465	96.7%	165,842	34.3%	550,154	80.3%
Distrito Federal	73,419,765	90.0%	60,988,331	89.6%	12,431,434	96.3%	-	0.0%	1,277,166	90.0%
Brazil		73.7%		72.6%		79.8%	12,639,807	78.3%	19,132,676	82.6%

Source: IBGE, 2017. Elaboration: Ex Ante Consultoria

Table A.19. Absences from routine activities due to diarrhea or vomiting, male population in cases per thousand inhabitants,

	Region total		Urban areas		Rural areas		Metropolitan regions		Capital	
	People Incidence (‰)	89.6	People Incidence (‰)	91.0	People Incidence (‰)	85.5	People Incidence (‰)	110.4	People Incidence (‰)	100.5
North	742,837	89.6	563,107	91.0	179,730	85.5	65,141	110.4	250,343	100.5
Roraima	42,861	50.1	42,861	68.1	-	-	-	-	11,830	49.8
Acre	19,572	52.0	17,153	60.6	2,419	26.1	-	-	10,099	60.1
Amazonas	210,425	117.7	167,039	113.3	43,386	138.4	28,368	629.5	76,409	81.7
Roraima	25,216	117.0	21,216	112.5	4,000	148.1	-	-	17,599	117.9
Pará	339,275	85.2	237,829	88.6	101,446	78.2	30,812	340.6	95,345	143.3
Amapá	40,641	114.4	38,942	120.6	1,700	52.4	5,961	590.5	25,482	122.0
Tocantins	64,846	90.0	38,068	62.7	26,778	237.0	-	-	13,579	108.1
Northeast	2,349,105	87.3	1,891,619	96.1	457,487	63.3	212,944	69.8	539,514	95.7
Maranhão	649,726	194.6	610,097	289.1	39,629	32.3	-	201.8	31,728	64.7
Piauí	79,514	50.9	59,128	60.1	20,385	35.2	-	-	24,460	64.5
Ceará	346,128	81.1	179,746	55.3	166,382	164.0	26,813	224.0	104,512	86.3
Rio Grande do Norte	130,750	82.1	116,687	91.2	14,063	45.0	27,400	-	46,308	114.8
Paraíba	131,463	70.9	69,872	49.9	61,591	-	-	-	37,393	104.8
Pernambuco	445,337	101.8	392,641	113.6	52,697	57.2	100,786	184.1	95,164	129.2
Alagoas	109,416	69.4	109,416	96.3	-	-	6,776	-	71,719	157.0
Sergipe	57,810	54.2	50,742	65.5	7,068	24.2	-	-	25,363	90.5
Bahia	398,961	54.8	303,289	57.2	95,671	48.3	51,170	315.7	102,866	77.8
Southeast	2,638,644	65.6	2,416,919	65.2	221,724	70.7	686,934	76.7	724,940	74.7
Minas Gerais	977,129	98.6	834,052	101.1	143,077	86.3	152,463	171.9	62,181	54.3
Espírito Santo	111,893	60.5	111,893	74.7	-	-	37,537	66.1	9,247	54.4
Rio de Janeiro	301,408	39.7	301,408	41.1	-	-	113,075	-	165,968	57.6
São Paulo	1,248,214	59.8	1,169,567	58.5	78,647	91.3	383,860	-	487,544	88.5
South	789,309	56.8	685,076	58.7	104,234	46.5	149,826	66.3	76,148	43.5
Paraná	433,423	81.4	364,593	81.5	68,829	80.8	25,884	85.2	38,449	42.8
Santa Catarina	167,561	51.4	167,561	61.7	-	-	44,417	248.0	13,453	64.1
Rio Grande do Sul	188,326	35.4	152,921	34.1	35,405	41.9	79,525	81.5	24,246	37.8
Midwest	555,663	76.8	493,940	75.8	61,724	-	44,954	72.6	188,464	71.8
Mato Grosso do	229,034	186.2	214,458	190.4	14,576	-	-	-	59,922	148.3
South Mato Grosso	34,845	22.1	15,585	12.1	19,261	-	-	106.5	15,585	-
Goiás	178,827	57.0	156,656	55.0	22,171	-	44,954	95.1	-	-
Distrito Federal	112,957	87.3	107,241	85.6	5,715	-	-	-	112,957	87.3
Brazil	7,075,559	73.3	6,050,660	74.6	1,024,899	66.4	1,159,800	189.9	1,779,408	80.1

Source: IBGE, 2015. Elaboration: Ex Ante Consultoria Economica

Table A.20. People bedridden due to diarrhea or vomiting, in cases per thousand inhabitants, 2013

	Region total		Urban areas		Rural areas		Metropolitan regions		Capital	
	People Incidence (%)	People Incidence (%)	People Incidence (%)	People Incidence (%)	People Incidence (%)	People Incidence (%)	People Incidence (%)	People Incidence (%)	People Incidence (%)	People Incidence (%)
North	378,465	45.6	298,279	48.2	80,186	38.1	47,779	268.7	110,796	44.5
Roraima	12,735	14.9	12,735	20.2	-	-	-	-	-	-
Acre	19,572	52.0	17,153	60.6	2,419	26.1	-	-	10,099	60.1
Amazonas	112,581	63.0	79,583	54.0	32,998	105.3	22,400	236.5	16,968	18.1
Roraima	13,554	62.9	11,701	62.1	1,853	68.6	-	-	8,084	54.1
Pará	144,979	36.4	125,118	46.6	19,860	15.3	19,418	191.2	51,392	77.2
Amapá	32,878	92.5	31,178	96.6	1,700	52.4	5,961	511.1	21,253	101.8
Tocantins	42,166	58.5	20,811	34.3	21,355	189.0	-	-	3,000	23.9
Northeast	848,198	31.5	621,419	31.6	226,779	31.4	71,886	95.2	218,680	38.8
Maranhão	146,232	43.8	146,232	69.3	-	-	-	108.7	17,089	34.8
Piauí	26,610	17.0	18,116	18.4	8,493	14.7	-	-	6,959	18.4
Ceará	199,277	46.7	74,463	22.9	124,814	123.0	26,813	127.0	47,650	39.3
Rio Grande do Norte	44,160	27.7	30,097	23.5	14,063	45.0	-	-	14,177	35.2
Paraíba	32,825	17.7	16,154	11.5	16,672	-	-	-	16,154	45.3
Pernambuco	144,974	33.1	112,466	32.5	32,508	35.3	45,073	105.7	67,393	91.5
Alagoas	13,779	8.7	13,779	12.1	-	-	-	-	13,779	30.2
Sergipe	25,380	23.8	25,380	32.7	-	-	-	-	-	-
Bahia	214,961	29.5	184,733	34.9	30,228	15.2	-	72.7	35,480	26.8
Southeast	1,109,904	27.6	1,030,777	27.8	79,127	25.2	202,763	54.9	289,000	29.8
Minas Gerais	481,709	48.6	443,205	53.7	38,504	23.2	58,082	59.7	16,408	14.3
Espírito Santo	18,707	10.1	18,707	12.5	-	-	-	-	-	-
Rio de Janeiro	109,610	14.4	109,610	15.0	-	-	69,234	-	40,376	14.0
São Paulo	499,878	24.0	459,255	23.0	40,623	47.2	75,448	-	232,215	42.1
South	375,393	27.0	361,970	31.0	13,423	6.0	85,409	43.6	13,152	7.5
Paraná	193,716	36.4	180,293	40.3	13,423	15.8	13,423	35.2	13,152	14.6
Santa Catarina	154,108	47.3	154,108	56.8	-	-	44,417	190.3	-	-
Rio Grande do Sul	27,569	5.2	27,569	6.2	-	-	27,569	21.7	-	-
Midwest	167,816	23.2	148,528	22.8	19,288	-	-	84.4	52,197	19.9
Mato Grosso do Sul	42,320	34.4	36,300	32.2	6,020	-	-	-	21,437	53.1
South Mato Grosso	-	-	-	-	-	-	-	-	-	-
Goiás	94,737	30.2	87,184	30.6	7,552	-	-	-	-	-
Distrito Federal	30,760	23.8	25,044	20.0	5,715	-	-	-	30,760	23.8
Brazil	2,879,775	29.8	2,460,973	30.3	418,802	27.1	407,837	70.5	683,824	30.8

Source: IBGE, 2015. Elaboration: Ex Ante Consultoria Economica.

Table A.21. Hospitalizations in the SUS network due to diarrhea or vomiting *, male population, in cases per thousand inhabitants, 2013

	Region total		Metropolitan regions		Capitals		Demais cidades	
	Hospitalizations Incidence		Hospitalizations Incidence		Hospitalizations Incidence		People Incidence (%)	
North	29,527	3,560	7,012	2,276	3,773	1,515	22,515	4,319
Rondônia	2,207	2,579	-	-	173	0,728	2,034	3,290
Acre	1,302	3,462	-	-	81	0,482	1,221	5,870
Amazonas	2,545	1,424	1,298	1,178	974	1,041	1,247	1,818
Roraima	339	1,573	269	1,801	200	1,339	70	1,057
Pará	20,894	5,246	4,441	4,288	1,950	2,931	16,453	5,582
Amapá	487	1,371	318	1,213	228	1,092	169	1,813
Tocantins	1,753	2,434	686	5,459	167	1,329	1,067	1,795
Northeast	86,752	3,223	16,911	1,946	7,088	1,258	69,841	3,831
Maranhão	22,256	6,667	1,575	2,431	414	0,844	20,681	7,687
Piauí	8,525	5,454	1,156	3,051	573	1,512	7,369	6,223
Ceará	10,163	2,381	2,953	1,643	2,060	1,701	7,210	2,919
Rio Grande do Norte	4,656	2,925	411	0,597	171	0,424	4,245	4,698
Paraíba	5,888	3,174	3,773	6,456	754	2,112	2,115	1,664
Pernambuco	7,453	1,703	2,111	1,172	1,388	1,884	5,342	2,074
Alagoas	4,213	2,673	3,899	6,855	1,179	2,580	314	0,312
Sergipe	718	0,673	187	0,453	175	0,625	531	0,811
Bahia	22,880	3,142	846	0,468	374	0,283	22,034	4,026
Southeast	23,435	0,583	7,109	0,381	2,870	0,296	16,326	0,758
Minas Gerais	8,403	0,848	952	0,398	584	0,510	7,451	0,992
Espírito Santo	2,442	1,321	329	0,375	157	0,923	2,113	2,175
Rio de Janeiro	2,920	0,384	1,591	0,284	293	0,102	1,329	0,665
São Paulo	9,670	0,464	4,237	0,432	1,836	0,333	5,433	0,491
South	15,343	1,103	5,268	1,313	1,246	0,712	10,075	1,018
Paraná	7,325	1,376	3,343	2,021	531	0,591	3,982	1,085
Santa Catarina	2,891	0,887	456	1,029	52	0,248	2,435	0,865
Rio Grande do Sul	5,127	0,963	1,469	0,768	663	1,035	3,658	1,073
Midwest	11,138	1,539	3,356	1,034	2,123	0,808	7,782	1,949
Mato Grosso do	1,768	1,437	593	1,468	98	0,243	1,175	1,422
South Mato Grosso	2,628	1,669	-	-	136	0,502	2,492	2,153
Goiás	5,832	1,858	1,853	1,639	979	1,488	3,979	1,980
Distrito Federal	910	0,704	910	0,704	910	0,704	-	-
Brazil	166,195	1,721	39,656	1,052	17,100	0,770	126,539	2,149

Source: Datasus, 2017. Elaboration: Ex Ante Consultoria Econômica. (*) ICD 10: Cholera, shigellosis, amebiasis, diarrhea and presumed infectious gastroenteritis, other intestinal infectious diseases

Table A.22. Hospitalizations in the SUS network due to diarrhea or vomiting *, male population, in cases per thousand inhabitants, 2016

	Region total		Metropolitan regions		Capitals		Demais cidades	
	Hospitalizations Incidence		Hospitalizations Incidence		Hospitalizations Incidence		People Incidence (%)	
North	24,711	2.836	5,816	1.781	4,026	1.524	18,895	3.469
Rorondônia	1,952	2.190	-	-	195	0.786	1,757	2.732
Acre	763	1.918	-	-	35	0.192	728	3.373
Amazonas	2,470	1.260	1,389	1.154	1,128	1.102	1,081	1.430
Roraima	384	1.665	353	2.223	295	1.858	31	0.431
Pará	17,770	4.334	3,570	3.376	2,158	3.212	14,200	4.666
Amapá	257	0.682	123	0.436	80	0.355	134	1.418
Tocantins	1,115	1.476	381	2.871	135	1.017	734	1.179
Northeast	61,966	2.263	13,300	1.477	6,359	1.101	48,666	2.649
Maranhão	21,707	6.376	1,607	2.383	290	0.575	20,100	7.362
Piauí	6,798	4.343	1,011	2.501	511	1.264	5,787	4.984
Ceará	7,907	1.813	3,025	1.627	2,307	1.902	4,882	1.950
Rio Grande do Norte	2,284	1.375	346	0.489	166	0.412	1,938	2.033
Paraíba	3,916	2.088	2,831	4.682	689	1.899	1,085	0.854
Pernambuco	4,061	0.910	1,626	0.879	1,211	1.626	2,435	0.931
Alagoas	2,234	1.396	2,059	3.519	670	1.422	175	0.172
Sergipe	578	0.530	215	0.483	198	0.658	363	0.562
Bahia	12,481	1.697	580	0.309	317	0.231	11,901	2.173
Southeast	21,675	0.521	6,564	0.337	2,997	0.295	15,111	0.682
Minas Gerais	8,288	0.815	936	0.372	538	0.457	7,352	0.960
Espírito Santo	2,221	1.154	293	0.320	144	0.847	1,928	1.912
Rio de Janeiro	2,202	0.276	1,053	0.182	244	0.080	1,149	0.526
São Paulo	8,964	0.416	4,282	0.418	2,071	0.361	4,682	0.414
South	14,717	1.029	4,892	1.173	1,206	0.664	9,825	0.970
Paraná	6,517	1.197	3,002	1.791	396	0.443	3,515	0.933
Santa Catarina	3,633	1.066	491	1.017	59	0.262	3,142	1.075
Rio Grande do Sul	4,567	0.838	1,399	0.695	751	1.077	3,168	0.921
Midwest	8,817	1.162	2,304	0.675	1,873	0.672	6,513	1.560
Mato Grosso do	1,747	1.364	298	0.727	65	0.159	1,449	1.665
South Mato Grosso	2,274	1.398	-	-	114	0.417	2,160	1.787
Goiás	3,620	1.109	830	0.711	518	0.756	2,790	1.332
Distrito Federal	1,176	0.829	1,176	0.829	1,176	0.829	-	-
Brazil	131,886	1.245	32,876	0.836	16,461	0.711	99,010	1.486

Source: Datasus, 2017. Elaboration: Ex Ante Consultoria Econômica. (*) ICD 10: Cholera, shigellosis, amebiasis, diarrhea and presumed infectious gastroenteritis, other intestinal infectious diseases

Table A.23. Deaths due to diarrhea or vomiting *, male population, in cases per thousand inhabitants, 2013

	Region total		Metropolitan regions		Capitals		Demais cidades	
	Death	Incidence*	Deaths	Incidence*	Deaths	Incidence*	Death	Incidence*
North	S	2.809	85	2.759	67	2.690	S	2.839
Rorôndia	233	1.168	-	-	3	1.262	148	1.132
Acre	10	1.330	-	-	2	1.190	7	1.442
Amazonas	5	4.699	36	3.267	31	3.314	3	6.999
Roraima	84	6.495	7	4.688	2	1.339	48	10.573
Pará	14	2.636	34	3.283	23	3.457	7	2.409
Amapá	105	1.126	4	1.526	4	1.915	71	-
Tocantins	4	1.527	4	3.183	2	1.591	-	1.177
Northeast	11	4.257	411	4.730	172	3.052	7	4.032
Maranhão	1,146	3.505	30	4.631	18	3.669	735	3.234
Piauí	117	4.286	31	8.181	20	5.278	87	3.040
Ceará	67	3.819	38	2.114	22	1.816	36	5.060
Rio Grande do Norte	163	4.083	28	4.068	16	3.968	125	4.095
Paraíba	65	3.450	43	7.357	10	2.802	37	1.653
Pernambuco	64	6.055	73	4.054	26	3.530	21	7.455
Alagoas	265	7.613	114	20.044	30	6.566	192	0.595
Sergipe	120	3.372	9	2.179	6	2.141	6	4.125
Bahia	36	3.419	45	2.487	24	1.816	27	3.728
Southeast	249	2.004	274	1.468	125	1.287	204	2.470
Minas Gerais	806	2.332	37	1.545	13	1.135	532	2.583
Espírito Santo	231	1.947	10	1.139	3	1.764	194	2.677
Rio de Janeiro	36	1.685	44	0.786	28	0.971	26	4.206
São Paulo	128	1.970	183	1.868	81	1.470	84	2.061
South	411	2.222	138	3.441	31	1.772	228	1.728
Paraná	309	2.310	57	3.447	18	2.002	171	1.798
Santa Catarina	123	1.811	49	11.054	2	0.953	66	0.355
Rio Grande do Sul	59	2.386	32	1.672	11	1.717	10	2.786
Midwest	127	1.962	34	1.048	29	1.104	95	2.705
Mato Grosso do	142	3.903	8	1.980	6	1.485	108	4.842
South Mato Grosso	48	1.905	-	-	4	1.477	40	2.246
Goiás	30	1.338	17	1.504	10	1.520	26	1.244
Distrito Federal	42	1.701	9	0.696	9	0.696	25	-
Brazil	22	2.730	942	2.499	424	1.909	13	2.877

Source: Datasus, 2017. Elaboration: Ex Ante Consultoria Economica. (*) ICD 10: Cholera, shigellosis, amebiasis, diarrhea and presumed infectious gastroenteritis, other intestinal infectious diseases

Table A.24. Deaths due to diarrhea or vomiting *, male population, in cases per thousand inhabitants, 2016

	Region total		Metropolitan regions		Capitais		Demais cidades	
	Deaths	Incidence*	Deaths	Incidence*	Deaths	Incidence*	Deaths	Incidence*
North	69	0.792	35	1.072	27	1.022	34	0.624
Rorônia	4	0.449	-	-	-	-	4	0.622
Acre	6	1.508	-	-	4	2.197	2	0.927
Amazonas	12	0.612	8	0.665	8	0.782	4	0.529
Roraima	8	3.468	8	5.039	8	5.039	-	-
Pará	33	0.805	17	1.608	7	1.042	16	0.526
Amapá	1	0.265	-	-	-	-	1	1.058
Tocantins	5	0.662	2	1.507	-	-	3	0.482
Northeast	394	1.439	125	1.388	61	1.056	269	1.464
Maranhão	42	1.234	8	1.186	3	0.595	34	1.245
Piauí	25	1.597	9	2.226	9	2.226	16	1.378
Ceará	62	1.421	9	0.484	4	0.330	53	2.117
Rio Grande do Norte	18	1.084	2	0.283	2	0.496	16	1.678
Paraíba	27	1.439	16	2.646	2	0.551	11	0.865
Pernambuco	39	0.874	34	1.839	21	2.820	5	0.191
Alagoas	25	1.562	25	4.272	7	1.485	-	-
Sergipe	13	1.192	9	2.024	6	1.994	4	0.620
Bahia	143	1.945	13	0.693	7	0.511	130	2.373
Southeast	273	0.656	113	0.581	50	0.493	160	0.722
Minas Gerais	87	0.855	8	0.318	1	0.085	79	1.032
Espírito Santo	11	0.571	4	0.436	1	0.588	7	0.694
Rio de Janeiro	28	0.352	13	0.225	3	0.098	15	0.687
São Paulo	147	0.682	88	0.860	45	0.783	59	0.522
South	157	1.098	79	1.894	17	0.936	78	0.770
Paraná	61	1.121	33	1.968	3	0.336	28	0.743
Santa Catarina	26	0.763	8	1.658	-	-	18	0.616
Rio Grande do Sul	70	1.284	38	1.888	14	2.008	32	0.931
Midwest	60	0.791	20	0.586	19	0.682	40	0.958
Mato Grosso do	20	1.562	3	0.732	3	0.732	17	1.953
South Mato Grosso	14	0.861	-	-	1	0.366	13	1.075
Goiás	15	0.460	6	0.514	4	0.584	9	0.430
Distrito Federal	11	0.775	11	0.775	11	0.775	-	-
Brazil	953	0.900	372	0.946	174	0.751	581	0.872

Source: Datasus, 2017. Elaboration: Ex Ante Consultoria Econômica. (*) ICD 10: Cholera, shigellosis, amebiasis, diarrhea and presumed infectious gastroenteritis, other intestinal infectious diseases

Table A.25. Distribution of Brazilian students among regions, male population, 2016

	Region total			Urban areas			Rural areas			Metropolitan regions**			Capital		
	Students	(%)*	of men*	Students	(%)*	of men*	Students	(%)*	of men*	Students	(%)*	of men*	Students	(%)*	of men*
North	2,712,687	33.8%		2,022,080	32.0%		690,607	40.3%		204,330	36.4%		832,964	34.3%	
Roraima	72,623	34.7%		59,481	34.6%		13,142	35.5%		-	-		50,421	35.1%	
Pará	1,257,575	33.4%		849,713	32.5%		407,862	35.4%		123,124	35.1%		186,314	29.5%	
Amapá	126,483	37.3%		112,385	37.3%		14,098	37.5%		20,261	39.6%		75,026	36.9%	
Tocantins	214,321	30.6%		175,637	30.9%		38,684	28.9%		-	-		45,422	37.0%	
Northeast	7,371,638	29.0%		5,389,171	29.1%		1,982,467	28.9%		852,625	28.5%		1,556,947	28.8%	
Maranhão	998,952	32.1%		632,985	31.3%		365,967	33.6%		48,130	31.3%		145,633	30.4%	
Piauí	451,270	31.0%		300,146	32.3%		151,125	28.7%		-	-		124,782	33.3%	
Ceará	1,147,539	28.3%		872,957	28.7%		274,582	27.2%		181,644	30.2%		315,275	27.9%	
Rio Grande do Norte	416,589	26.9%		328,700	27.7%		87,888	24.2%		76,315	27.4%		107,003	28.3%	
Paraíba	511,720	29.4%		396,365	29.7%		115,354	28.1%		70,685	32.0%		101,522	29.8%	
Pernambuco	1,140,398	27.4%		907,683	27.2%		232,715	28.0%		269,432	26.1%		201,225	28.8%	
Alagoas	459,552	30.9%		324,898	30.4%		134,654	32.3%		28,872	27.4%		132,838	30.0%	
Sergipe	286,256	28.1%		206,598	28.0%		79,658	28.4%		38,973	29.0%		77,865	27.8%	
Bahia	1,959,362	28.8%		1,418,839	29.1%		540,523	28.0%		138,575	29.9%		350,805	27.3%	
Southeast	9,823,611	25.1%		9,182,758	25.4%		640,854	22.3%		2,371,853	27.2%		2,416,196	25.2%	
Minas Gerais	2,410,923	25.3%		2,119,510	26.0%		291,413	21.3%		337,313	27.2%		291,132	26.4%	
Espírito Santo	454,995	25.4%		395,565	26.2%		59,429	20.7%		190,351	27.5%		40,464	25.1%	
Rio de Janeiro	1,849,017	24.5%		1,787,739	24.7%		61,278	21.3%		628,081	24.4%		710,586	24.5%	
São Paulo	5,108,676	25.3%		4,879,943	25.3%		228,733	24.5%		1,216,107	28.8%		1,374,014	25.3%	
South	3,396,982	25.3%		2,956,133	25.9%		440,849	21.8%		551,266	24.9%		464,691	27.2%	
Paraná	1,345,896	26.4%		1,168,864	26.6%		177,032	25.1%		189,591	26.0%		223,785	26.4%	
Santa Catarina	803,785	25.2%		683,070	25.7%		120,716	22.8%		60,486	25.3%		56,644	26.8%	
Rio Grande do Sul	1,247,300	24.3%		1,104,199	25.3%		143,102	18.2%		301,189	24.2%		184,263	28.3%	
Midwest	1,984,895	28.1%		1,808,958	28.5%		175,936	24.0%		143,014	24.4%		755,842	29.1%	
Mato Grosso do Sul	338,889	28.7%		309,374	29.3%		29,515	23.6%		-	-		111,509	29.2%	
South Mato Grosso	428,261	28.4%		368,439	28.9%		59,822	25.4%		29,587	22.7%		73,690	28.6%	
Goiás	824,433	27.0%		761,135	27.6%		63,298	22.0%		113,428	24.9%		177,331	27.9%	
Distrito Federal	393,311	29.6%		370,009	29.8%		23,302	27.4%		-	-		393,311	29.6%	
Brazil	25,289,812	27.2%		21,359,099	27.2%		3,930,713	27.1%		4,123,089	27.3%		6,026,641	27.7%	

Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Economica. (*) More than 5 years old. (**) Excluding capitals

Table A.26. Average school delay of the male population aged 5 to 19 years, 2016

	Region total			Urban areas			Rural areas			Metropolitan regions*			Capital	
	Years of school delay	In relation to the average	Years of school delay	In relation to the average	Years of school delay	In relation to the average	Years of school delay	In relation to the average	Years of school delay	In relation to the average	Years of school delay	In relation to the average	Years of school delay	In relation to the average
North	4.26	4.2%	4.21	4.5%	4.41	0.1%	3.93	0.0%	4.03	2.3%				
Rorônia	4.53	10.8%	4.59	13.9%	4.36	-1.1%	-	-	4.48	13.7%				
Acre	3.95	-3.5%	3.77	-6.4%	4.39	-0.3%	-	-	3.77	-4.5%				
Amazonas	3.94	-3.8%	3.86	-4.3%	4.29	-2.8%	4.07	3.5%	3.94	-0.2%				
Roraima	3.97	-2.9%	3.93	-2.6%	4.19	-4.9%	-	-	3.93	-0.3%				
Pará	4.43	8.2%	4.38	8.8%	4.52	2.5%	3.96	0.7%	3.98	1.1%				
Amapá	4.15	1.4%	4.09	1.4%	4.64	5.2%	3.30	-16.1%	4.30	9.1%				
Tocantins	4.24	3.6%	4.30	6.7%	3.93	-10.7%	-	-	4.20	6.5%				
Northeast	4.32	5.7%	4.21	4.5%	4.61	4.6%	4.12	4.9%	4.04	2.4%				
Maranhão	4.22	3.2%	4.18	3.6%	4.30	-2.5%	4.23	7.6%	3.73	-5.4%				
Piauí	4.19	2.5%	3.84	-4.7%	4.79	8.7%	-	-	3.89	-1.4%				
Ceará	4.31	5.2%	4.30	6.6%	4.33	-1.6%	4.15	5.6%	4.37	10.8%				
Rio Grande do Norte	4.28	4.5%	4.15	3.0%	4.69	6.5%	3.94	0.2%	3.96	0.5%				
Paraíba	4.23	3.3%	4.22	4.7%	4.26	-3.4%	4.28	8.9%	4.15	5.2%				
Pernambuco	4.28	4.5%	4.20	4.1%	4.57	3.8%	4.08	3.8%	3.91	-0.8%				
Alagoas	4.45	8.7%	4.31	6.8%	4.78	8.4%	4.20	6.8%	4.02	1.8%				
Sergipe	4.47	9.2%	4.20	4.2%	5.11	15.9%	4.23	7.5%	4.10	4.1%				
Bahia	4.42	8.1%	4.25	5.4%	4.85	10.1%	4.14	5.3%	3.95	0.1%				
Southeast	3.85	-5.8%	3.83	-4.9%	4.10	-7.0%	3.74	-4.8%	3.78	-4.1%				
Minas Gerais	4.09	0.1%	4.09	1.4%	4.14	-6.0%	3.91	-0.6%	4.17	5.7%				
Espírito Santo	4.15	1.4%	4.07	1.0%	4.59	4.2%	4.26	8.5%	3.61	-8.4%				
Rio de Janeiro	4.11	0.5%	4.07	1.0%	5.05	14.6%	4.36	10.9%	3.85	-2.4%				
São Paulo	3.62	-11.6%	3.62	-10.2%	3.58	-18.6%	3.23	-17.9%	3.67	-6.9%				
South	4.16	1.8%	4.18	3.8%	4.05	-8.1%	4.18	6.2%	4.31	9.3%				
Paraná	4.10	0.1%	4.17	3.5%	3.58	-18.7%	4.14	5.4%	4.09	3.9%				
Santa Catarina	4.14	1.2%	4.13	2.4%	4.21	-4.4%	4.37	11.2%	4.44	12.6%				
Rio Grande do Sul	4.25	3.8%	4.23	4.9%	4.36	-1.0%	4.16	5.8%	4.55	15.3%				
Midwest	4.09	0.0%	4.06	0.8%	4.33	-1.8%	5.05	28.5%	3.96	0.5%				
Mato Grosso do	3.96	-3.1%	3.85	-4.5%	4.97	12.9%	-	-	3.43	-13.0%				
South Mato Grosso	4.34	6.1%	4.33	7.3%	4.45	0.9%	6.13	56.0%	4.08	3.5%				
Goiás	4.03	-1.4%	4.05	0.5%	3.83	-13.0%	4.73	20.4%	4.06	3.0%				
Distrito Federal	4.05	-1.1%	4.00	-0.8%	4.69	6.3%	-	-	4.05	2.6%				
Brazil	4.09	0.0%	4.03	0.0%	4.41	0.0%	3.93	0.0%	3.94	0.0%				

Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica. (*) Excluding capitals

Table A.27. Male population employed in economic activity and unemployment rate, by region, 2016

	Region total			Urban areas			Rural areas			Metropolitan regions**			Capital	
	Occupied		Unemployment	Occupied		Unemployment	Occupied		Unemployment	Occupied		Unemployment	Occupied	
	Men	rate*	rate*	Men	rate*	rate*	Men	rate*	rate*	Men	rate*	rate*	Men	rate*
North	4,346,288	9.5%	11.8%	3,188,370	11.8%	2.8%	1,157,918	2.8%	9.9%	-	-	9.9%	1,330,729	12.3%
Rorônia	484,404	7.8%	10.0%	334,115	10.0%	2.4%	150,289	2.4%	-	-	-	-	120,433	10.5%
Acre	174,595	8.5%	9.6%	128,671	9.6%	5.1%	45,924	5.1%	-	89,410	-	-	88,483	10.8%
Amazonas	948,433	10.2%	12.2%	764,712	12.2%	0.9%	183,722	0.9%	6.8%	-	-	6.8%	511,025	13.7%
Roraima	117,301	6.1%	6.4%	98,232	6.4%	4.3%	19,069	4.3%	-	195,339	-	-	83,333	6.5%
Pará	2,068,292	9.6%	12.4%	1,406,534	12.4%	2.9%	661,758	2.9%	10.9%	26,898	-	10.9%	347,010	12.8%
Amapá	173,825	12.8%	13.7%	153,635	13.7%	5.9%	20,190	5.9%	12.8%	-	-	12.8%	110,097	13.1%
Tocantins	379,439	10.0%	11.5%	302,473	11.5%	3.6%	76,966	3.6%	-	1,476,360	-	-	70,348	10.0%
Northeast	12,720,382	12.2%	12.9%	9,532,474	12.9%	10.0%	3,187,909	10.0%	16.9%	79,250	-	16.9%	2,986,867	12.5%
Maranhão	1,499,631	10.9%	12.2%	1,005,749	12.2%	8.2%	493,883	8.2%	15.8%	-	-	15.8%	254,033	14.7%
Piauí	751,621	10.0%	10.1%	486,838	10.1%	9.7%	264,782	9.7%	-	310,272	-	-	216,653	7.3%
Ceará	2,032,204	10.5%	10.7%	1,581,907	10.7%	9.9%	450,297	9.9%	13.4%	149,495	-	13.4%	634,933	10.2%
Rio Grande do Norte	764,998	12.3%	12.4%	609,584	12.4%	11.9%	155,414	11.9%	12.7%	112,988	-	12.7%	206,244	13.3%
Paraíba	870,653	10.1%	11.2%	680,234	11.2%	6.0%	190,419	6.0%	10.9%	506,007	-	10.9%	191,103	8.8%
Pernambuco	2,060,677	13.7%	13.7%	1,692,789	13.7%	13.6%	367,889	13.6%	16.1%	46,926	-	16.1%	382,122	12.9%
Alagoas	658,679	13.2%	13.7%	494,731	13.7%	11.7%	163,948	11.7%	14.0%	57,518	-	14.0%	225,251	14.4%
Sergipe	534,483	10.5%	11.1%	391,840	11.1%	8.8%	142,642	8.8%	20.6%	213,906	-	20.6%	157,466	11.0%
Bahia	3,547,436	13.8%	15.2%	2,588,802	15.2%	9.9%	958,634	9.9%	27.5%	4,791,852	-	27.5%	719,063	15.3%
Southeast	22,497,663	10.8%	11.0%	20,804,540	11.0%	7.1%	1,693,123	7.1%	13.8%	717,939	-	13.8%	5,635,142	10.3%
Minas Gerais	5,490,443	10.1%	10.7%	4,702,832	10.7%	5.9%	787,611	5.9%	14.1%	384,334	-	14.1%	658,610	10.9%
Espírito Santo	1,035,064	10.6%	12.1%	849,794	12.1%	3.2%	185,270	3.2%	14.8%	1,364,106	-	14.8%	88,559	11.3%
Rio de Janeiro	4,125,720	10.7%	10.7%	3,950,971	10.7%	10.7%	174,750	10.7%	12.7%	2,325,473	-	12.7%	1,647,566	7.7%
São Paulo	11,846,435	11.1%	11.2%	11,300,943	11.2%	8.8%	545,493	8.8%	14.2%	1,275,876	-	14.2%	3,240,407	11.4%
South	8,164,589	6.6%	7.3%	6,888,087	7.3%	2.8%	1,276,502	2.8%	9.7%	416,206	-	9.7%	1,030,106	8.4%
Paraná	3,083,822	7.1%	7.5%	2,664,132	7.5%	4.0%	419,690	4.0%	9.2%	147,284	-	9.2%	515,281	9.4%
Santa Catarina	1,945,535	5.4%	5.9%	1,617,752	5.9%	2.9%	327,784	2.9%	6.2%	712,385	-	6.2%	129,073	5.9%
Rio Grande do Sul	3,135,231	6.9%	7.9%	2,606,203	7.9%	1.7%	529,029	1.7%	10.7%	354,590	-	10.7%	385,752	8.0%
Midwest	4,208,535	8.8%	9.3%	3,734,180	9.3%	4.7%	474,355	4.7%	12.1%	-	-	12.1%	1,537,309	9.1%
Mato Grosso do Sul	712,678	6.7%	7.1%	625,134	7.1%	3.3%	87,544	3.3%	-	79,050	-	-	226,834	7.3%
South Mato Grosso	907,018	7.9%	8.8%	748,147	8.8%	3.4%	158,871	3.4%	8.7%	275,540	-	8.7%	151,796	10.5%
Goiás	1,824,996	9.4%	9.8%	1,648,951	9.8%	4.9%	176,045	4.9%	13.0%	-	-	13.0%	394,837	7.4%
Distrito Federal	763,842	10.2%	10.2%	711,947	10.2%	10.3%	51,894	10.3%	-	8,210,325	-	-	763,842	10.2%
Brazil	51,937,457	10.2%	10.8%	44,147,650	10.8%	6.9%	7,789,807	6.9%	13.6%	12,520,153	-	13.6%	12,520,153	10.8%

Source: IBGE, 2017. Elaboration: Ex Ante Consultoria Econômica. (*) More than 5 years old. (**) Excluding capitals

BRK Ambiental and Instituto Trata Brasil present

Women & Sanitation



Global Compact
Network Brazil

