

Access to water and sanitation in brazilian regions

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ABSTRACT

The lack of urban planning combined with the disorderly occupation of large urban centers results in the lack of sanitation services. This condition generates harmful impacts on social well-being and natural resources. The water crisis in Brazilian regions imposed by the serious pollution of water bodies triggers a series of conflicts related to water scarcity and multiple uses. The present study aims to verify the consequences in the generation of diseases in the face of sanitation conditions in Brazilian regions. The method used in this work is descriptive with a qualitative approach. Indicators related to the share of the population with access to water and sewage collection and hospitalizations due to waterborne diseases in the Brazilian regions were analyzed. The sanitation indicators are intended to measure the impacts generated and provide information that can help in the management and sustainable use of water resources in order to establish priority actions for public policies. As a result, it is observed that the issue of universal sanitation that emerges from this discussion should be of interest to the national policy agenda, considering the negative externalities arising from the lack of this service. This argument is based on promoting the dignity of human life as advocated by the 2030 Agenda. It is important to highlight the implications of the precariousness of access to water and sanitation in the context of productive activities and income generation, since the health of workers in the regions most deprived of these services tends to be precarious.

KEYWORDS: Water. Sanitation. Waterborne diseases.

1 Introduction

The urban space, which has undergone evident transformations due to large populations and the lack of effective public policies in the provision of sanitation services, makes access to sanitation services precarious. Some Brazilian cities still suffer from open sewers, which lack sewage networks and affect the quality of life of the population due to the unhealthy sewage in urban centers, which in most municipalities still does not receive adequate treatment or do not meet all the necessary demand.

The Instituto Trata Brasil provides a macro view of sanitation in Brazil. Sanitation involves measures aimed at preserving or modifying the environment, while providing quality of life through disease prevention, in order to ensure productivity, individual well-being and facilitate economic activity.

Basic sanitation in Brazil is a right guaranteed by the constitution and defined by Law n° 11.445, of January 5, 2007, and establishes sanitation as part of the set of services, infrastructure and facilities in the processes of water supply, sanitary sewage, cleaning roads, drainage, solid waste and rainwater management (BRASIL, 2007). In order to corroborate, the National Health Foundation - Funasa (2015) includes the item on disease vector control in the list, making sanitation services even more efficient, thus promoting a healthier environment for the enjoyment of health and welfare.

In this context, in 1920, Winslon already emphasized that disease prevention is directly linked to the organized efforts of the community, aiming at the sanitation of the environment, fighting transmissible diseases that threaten the community and the maintenance of life.

The worsening of environmental problems, as well as public health problems experienced in 2020, fostered the approval of Law n° 14.026/2020, which updates the regulatory framework for basic sanitation, and aims to encourage free competition, sector decentralization and privatization, in addition to attributing to the National Water and Basic Sanitation Agency - ANA the competence in the provision of public basic sanitation services (BRASIL, 2020).

However, in dealing with major public calamities, this interface is neglected by the Federal Government, so as not to consider water supply, sanitary sewage and capitation as

essential services. A priori, Decree nº 10.282/2020 (BRASIL, 2020a) presented the services as included in the first moment, but Decree nº 10. 329/2020 revoked such measures (BRASIL, 2020b) so that such positioning could cause deleterious effects for the population and environmental resources, in short, affect the water supply.

In this context, the present study aims to verify the consequences in the generation of diseases in the face of sanitation conditions in Brazilian regions.

2. Method

The method of this work is descriptive with a qualitative approach. According to Richardson (2007), this type of study makes it possible to describe the characteristics of a social phenomenon (RICHARDSON, 2007).

In this study, indicators related to the proportion of the population with access to water and sewage collection and hospitalizations due to waterborne diseases in Brazilian regions were analyzed.

The study was based on a research that uses data from the Sanitation Panel of Instituto Trata Brasil, as well as the aggregated data from the database of DATASUS and the National Sanitation Information System (SNIS) in order to discuss the conditions of sanitation in Brazilian regions.

3. Sustainable Development and Sanitation

Sustainable development is based on the recognition of the unsustainability. It is in this perspective that the absence or precariousness of development models became notorious through the understanding of social injustices and dealings with natural resources as finite (ALMEIDA, 2002). This perspective allows States and municipalities to analyze the problem more critically, so that they can visualize a third aspect that can meet the demands imposed by contemporaneity. The use of water supply and sewage indicators makes it possible to monitor and identify possible impacts of anthropic actions.

Discussions about sustainable development incorporate the valuation of natural resources, with the objective of maximizing the productivity of natural capital in the short term and making investments in the long term, through the consonance between natural capital and produced capital. However, economic growth and nature conservation is not something that can be achieved in the short term (VEIGA, 2010). The preservation of biodiversity cannot be equated with the non-use of natural resources, “as important as it is, the institution of natural reserves is just an instrument of conservation strategies” (SACHS, 2009, p. 53).

Water is finite natural capital and essential for life. Planet Earth has 109 thousand km³ (26 thousand miles³) of water throughout its territorial extension, about 98% of the total brackish water existing in seas and oceans, with only 2% of fresh water suitable for human consumption, watering of animals and agriculture (TUNDISI; MATSUMURA-TUNDISI, 2020).

Given the low percentage of fresh water, its scarcity has become a central theme of (inter)national discussions, in order to highlight the ambivalences existing in its externalities, such as the multiplicity in its use and the inefficiency in its distribution. Sachs (2009) and Veiga

(2010) revisit this complexity, proposing to relate consumption with the maintenance and preservation of natural resources, so that the use of natural resources and goods does not compromise availability for future generations.

With the need to establish more adequate means for environmental awareness, given that the current models practiced by society were harmful, the Stockholm Conference (1987) considered environmental issues in the International Agenda, introducing the concept of sustainable development in the Brundtland Report. The preamble of the term sustainable development is based on two key elements: the concept of need, especially of the poor (CMMAD, 1991) and the notions of barriers that social technology processes impose on the environment and society, making future needs impossible.

Agenda 21 recognizes in Chapter 18 the importance of protecting the quality and supply of water resources. The UN document points to water as an impact factor for human, economic and ecological development and proposes programs in the following areas in order to encourage sustainable management: i) Development and integrated management of water resources; ii) Water resources assessment; iii) Protection of water resources, water quality and aquatic ecosystems; iv) Drinking water supply and sanitation; v) Water and sustainable urban development; vi) Water for sustainable food production and sustainable rural development; vii) Impacts of climate change on water resources (AGENDA 21, 1992, s/p).

In this sense, Sustainable Development Goal (SDG) 6 of the 2030 Agenda reinforces the goals regarding access to water and sanitation; establishes water as the centrality of the main dimensions of sustainable, environmental, social and economic development, and outlines the interrelationship between water resources and their services, economic growth and sustainability. It foresees for the eradication of poverty and the promotion of dignity with access to water and sanitation, as recommended by the goals of SDG 6 (UN, 2015).

Environmental, social and economic problems can be unveiled from the principles of sustainability. Issues such as climate change and access to water, as highlighted by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) in 2009 registered 88% of deaths from diarrhea. According to WHO (2009) and UNICEF (2009), in the world water is unsafe, there is poor hygienization and basic sanitation is inadequate.

From this point of view, it is worth reviewing the conceptual apparatus established by the WHO, which considers sanitation as the control of elements of the environment in which human beings live and that can have harmful effects on their biological, social and/or mental well-being (WHO, 1946). The concept adopted by the WHO brings together the articulations between the environment and society, for Heller (1998) the concept allows for broad interpretations of the actions achieved and the disciplines involved so that the delimitation of the field of action highlights peculiar definitions between its limits and amplitudes.

Furthermore, it is important to emphasize the importance of understanding the guiding elements of basic sanitation, which is explained in Article 2 of Law n° 11.445, of January 5, 2007. In this perspective, Law 6.9838/81, which instituted the National Policy for Environment defines aspects of environmental relevance. Thus, it is inferred from such concepts the importance of sanitation as a sustainability bias.

Thus, Article 2nd lists the fundamental principles in the provision of basic sanitation services. According to the Law, aspects of sustainability appear in the environmental, social and economic dimension, especially in items III and VI:

[...] III - water supply, sanitary sewage, urban cleaning and management of solid waste carried out in ways suitable for public health and environmental protection; [...]

[...] VI - articulation with urban and regional development, housing, combating poverty and its eradication, environmental protection, health promotion and others of relevant social interest aimed at improving the quality of life, for which basic sanitation is a determining factor; [...] (BRASIL, 2007, s/p).

According to the PNSB (2007, s/p) sanitation involves "a set of services, infrastructure and operational facilities for the supply of drinking water, sanitary sewage, urban cleaning, solid waste management and drainage and rainwater management". In this way, one can see the connections between sanitation and sustainable development. Therefore, it is important to emphasize that the PNSB must be treated in a way linked to the National Environmental Policy (PNMA).

Thus, the PNMA establishes in Law nº 6938, of August 31, 1981, the definition of the environment as the set of conditions that aim at environmental preservation, adequacy and improvement, in order to establish adequate conditions for socioeconomic development, national security and the protection of the dignity of human life, set out in the following principles:

I- government action to maintain the ecological balance, considering the environment as a public asset to be necessarily ensured and protected, with a view to collective use; II - rationalization of the use of soil, subsoil, water and air; III - planning and inspection of the use of environmental resources; IV - protection of ecosystems, with the preservation of representative areas; V - control and zoning of potentially or effectively polluting activities; VI - incentives for the study and research of technologies aimed at the rational use and protection of environmental resources; VII - monitoring of the state of environmental quality; VIII - recovery of degraded areas; IX - protection of areas threatened with degradation;

X – environmental education at all levels of education, including community education, aiming to enable them to actively participate in the defense of the environment (BRASIL, 1981, s/p).

From the PNSB and PNMA excerpts, it can be seen that there is an alignment between the actions provided for in the documents with sustainability, it is in this aspect that Heller (1998) relates the need for sanitation to development. In general, developed regions have a greater service in sanitation services, consequently populations are healthier. From this point of view, it becomes necessary that less developed regions seek to achieve economic growth and with it the development (CMMAD, 1991).

4. Access to sanitation in Brazilian regions

The water supply process must include aspects of quality and quantity, whether for social, domestic, industrial or agricultural use. Therefore, water supply systems are intended to meet the needs of society, in order to support social well-being and economic development.

According to the 2021 United Nations World Report on Water Resources Development,

amid the current situation of water scarcity and the growing demand from the population, it has placed excessive demands on the resilience of ecosystem dynamics, and highlights the need to strengthen water management, with the purpose of "recognizing, measuring and expressing the value of water, as well as incorporating it into decision-making" (UNESCO, 2021. p. 2), in order to strengthen sustainable and equitable management as established by the Agenda 2030 SDGs.

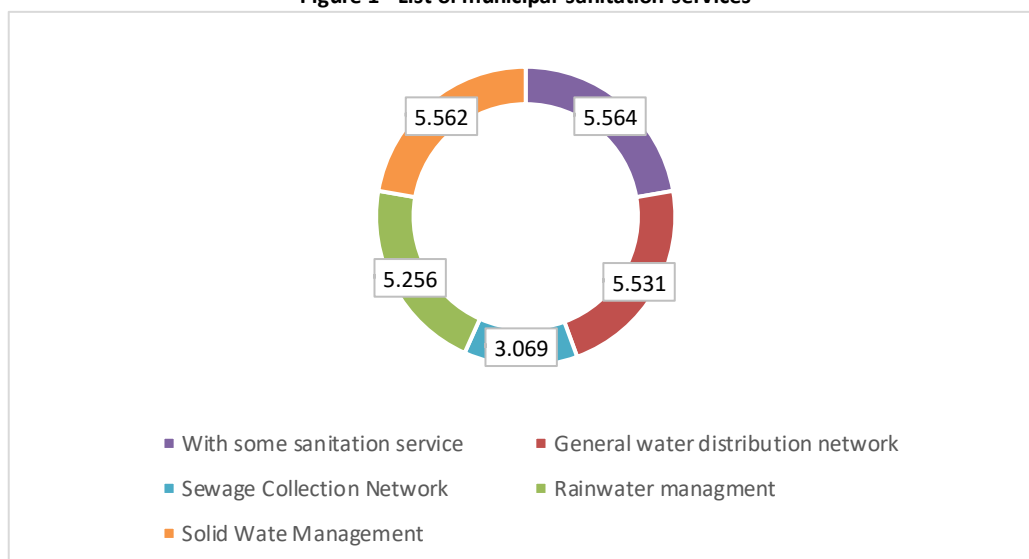
SDG 6 addresses the importance of access to sanitation for all. It is understood that the supply of water and sanitation is vital for human development, especially for the population in a vulnerable situation.

Water has been recognized since 2010 by the United Nations (UN) as a fundamental human right, and from this point of view, the Ministry of Health, through Ordinance nº 2.914, of December 12, 2011, in its Art. 5th provides the definitions adopted for all water availability infrastructure in quality and quantity. Sanitary sewage, on the other hand, can be defined according to the Brazilian Association of Technical Standards (ABNT), in NBR - 9648 according to the Studies on the Design of Sanitary Sewage Systems (1986) as "liquid discharge consisting of domestic and industrial sewage, infiltration water and the parasitic rainfall contribution" (ABNT, 1986, p. 1). This arrangement manages to establish an (inter)relationship towards sustainable development by considering technical, social, economic and environmental aspects.

According to data from the 2010 Demographic Census of the Brazilian Institute of Geography and Statistics (IBGE, 2012), around 6% of the Brazilian population does not have running water in their homes, which represents around 3.3 million inhabitants. These data show the challenges faced with regard to the provision of water supply and sanitary sewage services.

According to the National Basic Sanitation Survey carried out by the IBGE (2017) it is possible to observe the availability of sanitation services in the 5,570 Brazilian municipalities. Figure 1 shows the relationship of sanitation services in municipal management, as well as the grouping of indicators.

Figure 1 - List of municipal sanitation services



Source: Own elaboration based on data from the National Basic Sanitation Survey (IBGE, 2017).

Data from the IBGE survey (2017) reveal that only 55% of Brazilian municipalities have a sewage collection network, in contrast to the list of municipalities that provide a general water distribution network. According to Obraczka et al. (2019), the lack of ownership of the municipalities regarding the sanitation services provided problematizes the equation, contributing in general to the deprivation of sanitation, different from what happens with the management of water and solid waste, as it is perceived that both have an average population service rate of 97%.

Given the information made available by Instituto Trata Brasil on the total populations of the IBGE and the SNIS, this study considered only the reporting population of the SNIS, given that the lack of information is still relatively large, as Nirazawa and Oliveira (2018) pointed out in their search. Table 1 shows the data on the share of the population exemplified by the indicators of access to water and sewage, by region in 2019.

It was observed in Table 1 that the average of the urban population served with water supply was 87.7%. On the other hand, in the Northeast and North regions, it is possible to notice the lack of sanitary sewage services. When comparing the regions, it is noted that there is a discrepancy between the southern and northern regions, however, it is not possible to identify which aspects influenced the sanitation services provided in the aforementioned regions.

Table 1 - Share of population with access to water and sewage by region in 2019

		Midwest	Northeast	North	Southeast	South
Water (%)	Population with access to water	89,7	73,9	57,4	91,1	90,5
	Urban population with access to water	96,3	85,9	62,9	95,4	98,1
Sewage (%)	Population with sewage collection	57,7	28,3	12,3	79,5	46,3
	Urban population with sewage collection	62,8	35,7	14,1	83,3	52,8

Source: Own elaboration based on data from the National Sanitation Information System (SNIS, 2019) and Instituto Trata Brasil (2021).

Similar studies such as the one by Obraczka et al. (2019) reveals that about 55% of sewage is directed to water bodies without receiving any treatment category, contributing to the scarcity of natural resources, ecological imbalance and an increase in waterborne diseases. The study carried out in the Médio Paraíba do Sul Hydrographic Region identified that even in regions with great socioeconomic potential, the indicators point out that this potential is not always reflected in the quality of sanitation services, on the other hand, some regions with lower indices have higher quality.

Thus, it can be seen that sanitation is still a latent problem in the Brazilian reality, one must consider the existence of other actions in addition to aspects of public administration (OBRACZKA et al., 2019). From this perspective, the use of indicators aims to maximize the efficiency of sanitation service management processes in order to corroborate with the aspects of public administration (NIRAZAWA; OLIVEIRA, 2018; OBRACZKA et al., 2019).

For Heller (1998), a focus between health and environment is necessary, in order to provide conditions to guide the main actors on the need for an approach that is capable of

articulating all institutional and governmental communities.

Since the Ottawa Conference (1986), sanitation has established a direct link with the Health Promotion proposed by the WHO, being seen as the guiding principle of health actions throughout the world. It is interesting to guide the socio-sanitary and epidemiological scenario, realizing that over the years a pattern related to the cause of death, morbidity and disability was presented, which characterized a specific population that, in general, occurred due to social, demographic and economic transformations called Epidemiological transition (OMRAM, 2001; SANTOS-PRECIADO et al., 2003).

According to Schramm et al. (2004, p. 898) the process comprises three basic changes: “replacement of communicable diseases by non-communicable diseases; shifting the burden of morbidity and mortality from younger groups to older groups and transforming a situation in which mortality predominates to one in which morbidity is dominant”.

In Table 2 there is an example of the representation of hospitalizations in the age groups from 0 years to 80 years or more, the lowest incidence rate and the highest incidence rate for each age group among Brazilian regions.

Table 2 - Total hospitalizations by age group, by region in 2019

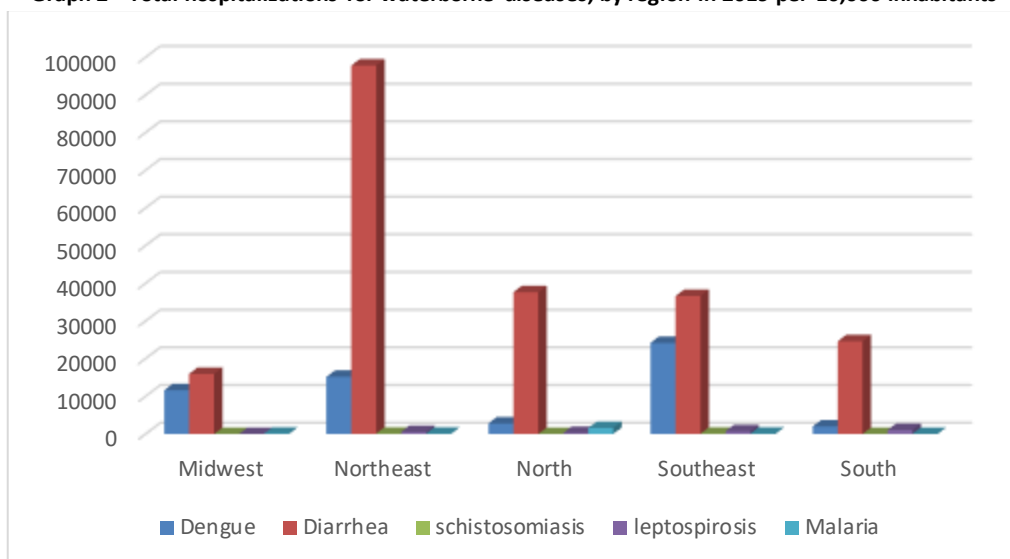
Age Group (years)	Midwest	Northeast	North	Southeast	South	Total
0 a 4	6.695	35.208	17.630	15.642	6.783	81.958
5 a 14	4.243	22.257	6.489	8.158	3.766	44.913
5 a 14	1.331	6.096	1.943	2.305	1.374	13.049
20 a 29	2.645	9.084	3.653	5.166	2.625	23.173
30 a 39	2.614	7.947	2.975	5.268	2.115	20.919
40 a 59	5.175	13.344	4.618	11.262	4.617	39.016
60 a 79	3.836	13.495	3.749	10.179	4.545	35.804
80 and over	1.199	6.317	1.304	3.817	1.934	14.571

Source: Own elaboration based on DATASUS (2019) and Instituto Trata Brasil (2021).

In Table 2, it is possible to note the aspects of Epidemiological Transition with 273,403 cases of hospitalization in Brazil, resulting from waterborne diseases. It is observed that the most vulnerable group are children between the ages of 0 to 14 years, which corresponds to 46% of hospitalizations

Graph 2 shows the incidence level of hospitalizations due to waterborne diseases. It appears that diarrhea, considered an apparently simple disease to contain with adequate access to water and sanitation, corresponds to 46% of waterborne diseases.

Graph 2 - Total hospitalizations for waterborne diseases, by region in 2019 per 10,000 inhabitants



Source: Own elaboration based on DATA (2019) and Instituto Trata Brasil (2021).

According to data from UNICEF (2018), around 13,329,804 children and adolescents do not enjoy their rights regarding sanitation services and 7,647,231 to water from an adequate source. It is noticed that the multiple deprivation of rights predominantly affects the North and Northeast regions, mainly people in conditions of social vulnerability. It is noticed that in the Southeast region, the investment in sanitation results from a historical process of promotion of providing companies, unlike in the North and Northeast regions (ROSSONI et al., 2020).

In the North region, regardless of the abundance of natural resources and significant water networks, sanitation is still one of the biggest problems for public policies. On the other hand, in the Northeast region, there is a chronic problem of water scarcity, and the growing number of waterborne diseases, result from a faulty system for providing adequate water to the population (TUNDISI; MATSUMURA-TUNDISI, 2020).

Leal (2012) emphasizes the importance of water resources management, considering the current legislation Law n° 11.445, which establishes the State as a mediator of conflicts related to the social use of water, considering the need to establish new planning and management units that aim at sustainable water management. Strictly speaking, the articulations that sanitation establishes in the environmental perspectives, specifically with regard to the relationship between environment and society, are clear.

5. Conclusions

The study carried out made it possible to verify that access to water and sanitation in Brazilian regions is still unequal, especially in the North and Northeast regions, which gives rise to the aggravation of waterborne diseases. Thus, the importance of facing questions and potential criticisms about the deficiency of services for this purpose is recognized. Given the emerging reality, it is reasonable to think that, in social terms, precarious access to water and sanitation generates risks and disastrous consequences for the health of the population.

The issue of universal sanitation that emerges from this discussion should be of interest to the national policy agenda, considering the negative externalities arising from the lack of this service. This argument is based on the promotion of the dignity of human life as advocated by Agenda 2030.

It is important to highlight the implications of precarious access to water and sanitation in the context of productive activities and income generation, since the health of workers in regions most deprived of these services tends to be precarious. However, despite the criticisms addressed to policies and strategies for access to water and sanitation, which historically mark the rules of Brazilian politics in the deprivation of this service, a tension is generated between nostalgia for the past and fear of the future.

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