Special section - Water, Sanitation and SDGs in Brazil: challenges, contradictions and governance
Vol. 62, p. 904-918, jul./dez. 2023. DOI: 10.5380/dma.v62i0.89421 e-ISSN 2176-9109

Water and sanitation in Brazil: conflicts, appropriation, and climate injustice

Água e saneamento no Brasil: conflitos, apropriação e injustiça climática

Agua y saneamiento en Brasil: conflictos, apropiación e injusticia climática

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Article received on January 16, 2023, final version accepted on May 3, 2023, published on November 10, 2023.

ABSTRACT: This article addresses the conflicts over water use and the appropriation of sanitation sector by new actors, considering the new legal framework and climatic changes context. The analysis was done under the Sustainable Development Goal 6 lens: "Ensure access to water and sanitation for all". Brazilian sanitation sector has been affected by constant changes in the legal framework that occurred in the past decade. Knowing that the universalization of public water supply and access to sewage infrastructure was not reached yet, added to this the unequal distribution of water and sanitation according to populations and regions, prevailing the access in urban centers in detriment of communities living in peripheral areas, it is necessary to understand those uses considering the theory of conflicts over water uses. Drought events and water governance crisis are added to the problems mentioned and associated to climate Injustice, in a way that make it essential to include climate changes and climate adaptation in the sanitation agenda, so that access to water and sanitation can be guaranteed for all.

Keywords: conflicts over water; climate justice; access to water; sanitation; social participation.

RESUMO: Este artigo aborda os conflitos pelo uso da água e as apropriações do setor de saneamento por novos atores, a partir do novo arcabouço legal e do contexto de mudanças climáticas, sob a ótica do Objetivo de Desenvolvimento Sustentável 6: "Assegurar a disponibilidade e gestão sustentável da água e saneamento para todos". O setor do saneamento básico no Brasil tem sido afetado por constantes modificações no Marco Legal, ocorridas na última década. Na medida em que não se atingiu ainda a universalização dos serviços de abastecimento público de água e de esgotamento sanitário, e que a distribuição do saneamento no território se dá de forma desigual entre as populações e regiões, prevalecendo o acesso nos centros urbanos, em detrimento de populações que vivem às margens das cidades, faz-se necessário compreender essas questões à luz da teoria dos conflitos pelo uso da água. Somam-se a esses problemas eventos de seca e crise de governança da água que, associados à injustiça climática, tornam fundamental a inserção das mudanças climáticas e da adaptação climática na agenda do saneamento, para que o acesso à água e ao saneamento possa ser garantido para todos.

Palavras-chave: conflitos pela água; justiça climática; acesso à água; saneamento; participação social.

RESUMEN: Este artículo aborda los conflictos por el uso del agua y la apropiación del sector del saneamiento por parte de nuevos actores, a partir del nuevo marco legal y el contexto del cambio climático, desde la perspectiva del Objetivo de Desarrollo Sostenible 6: "Garantizar la disponibilidad y la gestión sostenible del agua y el saneamiento para todos". El sector del saneamiento básico en Brasil se ha visto afectado por constantes cambios en el orden jurídico a lo largo de la última década. Dado que los servicios públicos de abastecimiento de agua y alcantarillado aún no se han universalizado y que la distribución del saneamiento en el país es desigual entre poblaciones y regiones, prevaleciendo el acceso en los centros urbanos en detrimento de las poblaciones que viven en los márgenes de las ciudades, es necesario entender estas cuestiones a la luz de la teoría de los conflictos por el uso del agua. Además, los episodios de sequía y la crisis de la gobernanza del agua, combinados con la injusticia climática, hacen que sea esencial incluir el cambio climático y la adaptación climática en la agenda del saneamiento, de modo que se pueda garantizar el acceso al agua y al saneamiento para todos.

Palabras-clave: conflictos por el agua; justicia climática; acceso al agua; saneamiento; participación social.

1. Introduction: The role of the SDGs in water and sanitation policies

The transition to sustainability, as advocated in the 2030 Agenda, emphasizes the importance of looking at the Sustainable Development Goals (SDGs) in an integrated way when formulating public policies for cities. The topic addressed in this article deals more directly with the goals presented in the following SDGs: (1) SDG 6 - *Ensure availability and sustainable management of water and sanitation for all* - which focuses on access to drinking water and sanitation; and (2) SDG 13 - *Action against global change* - which presents as targets both mitigation actions, to curb climate change and maintain a threshold of temperature increase, so that society can adapt, and adaptation actions themselves (IPEA, 2018a), which are measures that seek to reduce the impacts of climate change on the population (IPCC, 2022). Therefore, this article emphasizes a practical relationship between the goals of these two SDGs (6 and 13) and how governments monitor their actions to meet these goals. However, as targets for data analysis, we will be based on SDG 6, which deals with access to basic sanitation.

SDG 6 is made up of eight key targets in the current sanitation debate to be met by 2030: achieve universal and equitable access to safe drinking water for all (6.1); achieve access to adequate and equitable sanitation and hygiene for all (6.2); improve water quality by reducing pollution and discharges, halving the proportion of untreated wastewater (6.3); increase the efficiency of water use in all sectors of human activity, with a focus on reducing the number of people suffering from water scarcity (6.4); implement integrated water resources management (6.5); protect and restore water-related ecosystems (6.6); scale up international cooperation and capacity-building support for developing countries (6.a); and support and strengthen the participation of local communities to improve water and sanitation management (6.b). (ONU-Brasil; IPEA, 2018-b).

Public policies in the sanitation sector in Brazil have been disputed in two different contexts in recent decades. On the one hand, there are social demands for access to sanitation for the poorest populations who live in peripheral areas and lack basic infrastructure. On the other hand, the market's demands are represented by business sectors and political groups interested in turning sanitation services and infrastructure into a commodity. This article raises questions about achieving the goals of SDG 6 in the Brazilian context, taking as a starting point the enactment of Federal Law No. 14,026 of July 15, 2020, known as the revision of the Legal Framework for Basic Sanitation (Federal Law No. 11.445 of 2007).

Law No. 11.445/2007 proposed a democratic and participatory organization for establishing public policies to provide basic sanitation services in municipalities and have a legal environment favorable to inserting the private sector to provide sanitation services. Basic sanitation policies were linked to urban development, water resources, and public health policies through efforts between the Union, states, and municipalities and possibilities for participatory governance. Despite this, major infrastructure works defined in a technical and bureaucratic manner, mostly by representatives of regional and federal governments, have always been privileged to the detriment of decentralized solutions for water supply and sewage services (Alves *et al.*, 2018b).

The 2007 Sanitation Legal Framework, followed by legislation on public-private partnerships and the possibilities for public sanitation companies to enter the stock market - stock exchanges - have indicated that, in recent decades, the Brazilian state has been moving towards advocating the inclusion of private capital in the public sanitation sector.

Since the political coup that ousted the President of the Republic in 2016 and the resumption of power by parties more identified with the Brazilian right and supported by big business (Bastos, 2017), several bills have been proposed by the federal executive branch (through provisional measures) and by the legislative branch, providing for changes to the 2007 Legal Framework for Sanitation, which were not approved as laws and lost their validity in the process of discussion and voting (Miranda & Seabra, 2019). However, the conception of such bills was consolidated with the approval of Federal Law No. 14,026, sanctioned on July 15, 2020, amid social isolation in a unique context of disarticulation between social actors and the non-functioning of discussion fields and forums, such as councils and committees, which were demobilized by the advent of the COVID-19 pandemic. This revision of the

2007 Legal Framework brought guidelines that created institutional arrangements in the sector and has further facilitated the privatization of sanitation companies and services (Calisto, 2022).

In these new legal conditions and the context of the climate emergency, this article will address the conflicts over water use, the appropriation of the sanitation sector by new actors, and the conditions of water and climate injustice being generated. The consequences of climate injustice include inequalities in access to water and sanitation services and the problems faced by populations to climate change, especially those affected by extreme droughts that make access to water difficult.

The study started with an understanding of the changes in the legal framework of the sanitation sector, discussed from the perspective of participation, conflict, and climate justice. To address the issue of climate justice, we used data for climate impact risk from the Information and Analysis System on Climate Change Impacts (MCTI), with data for the present and future scenarios for 2030, the framework of the 2030 Agenda, and for the SDG 6 targets, data presented in annual reports from the National Basic Sanitation Plan - Plansab and data from official sources, such as the National Sanitation Information System (SNIS) and DATASUS, both for 2020.

2. Conflicts over the use of water and its private appropriation

The appropriation of water and the provision of sewage collection, disposal, and treatment services are subject to the generation and intensification of conflicts. According to Castro *et al.* (2021), water conflicts are a type of environmental conflict. According to Fernández-Vargas (2017), the complexity of environmental conflicts requires new perspectives to understand different dimensions and aspects, such as ecosystem, social, economic, cultural, and institutional.

Zhouri & Laschefski (2010, p. 18) point out that unequal access to water is one example of *distributive environmental conflicts*, which "indicate serious social inequalities around access to and use of natural resources". In turn, conflicts arising from sewage pollution are classified by Zhouri and Laschefiski (2010, p. 19) as *spatial environmental conflicts*, whose effects or impacts on the environment "go beyond the boundaries between the territories of various agents or social groups".

Conflicts, both those related to water and those associated with sewage processes, involve transforming the quality and quantity of water after its use by different human activities (Fracalanza & Paz, 2018). In this sense, they are concerned with private appropriation of water and guaranteeing water for populations, which is directly related to SDG 6.

The targets of SDG 6 for Brazil involve, as expressed above, guaranteeing access to water and sanitation. Brazilian legislation considers water a public good (Federal Law No. 9,433/1997), essential to life, and to which everyone has the right. However, its commercialization as a commodity - its commodification - endowing it with economic value establishes a duality concerning this common good since access to water should be guaranteed to all. Still, those who pay for it as a commodity have greater guarantees of obtaining it in quality and quantity suitable for daily activities (Fracalanza *et al*., 2022).

About the provision of water services by the private sector - the processes of water privatization - it is worth considering the limitations and exclusions resulting from the provision of water and sanitation by private companies. Mulas (2013) considers that the private sector, through the market, does not meet or even consider many of the population's interests, needs, and problems, such as the minimum amount of water needed to supply people.

According to Castro (2013, p. 62), in some countries where water and sewage services were initially provided through market-oriented public policies focused on private profit, "long social struggles" resulted in "acceptance of the idea that these services should be accessible to all, provided as a public good and guaranteed by the state". The author highlights four fundamental principles around which public policies and the management of services such as water and sewage were structured in developed countries throughout the 20th century: the central role of the state in defending so-called "public interests"; the categorization of essential goods and services as "public goods"; essential goods and services as social goods, to be provided for the entire population; the central role of the state in providing these services (Castro, 2013, p. 62-63).

Thus, for access to clean water and sanitation services, as established by SDG 6, it is important to observe the socio-environmental conflicts involving the appropriation of a public good, which must be available to all in quantity and quality appropriate to their needs. In addition, given the state's central role in distributing and universalizing services, it is essential to implement public policies aimed at the supply and public provision of services.

3. Inequality in access to water and sanitation in the context of climate change and SDG 6 targets

The impacts of environmental degradation are more intense in countries with greater social inequalities and are perceived more strongly by populations with social, economic, and environmental vulnerability (Alves *et al*., 2021). The IPCC report*(Intergovernmental Panel on Climate Change*, 2022) concludes, based on scientific studies on the subject, that

> The adverse impacts of climate change, development deficits, and inequities exacerbate each other (...); vulnerabilities and inequities are intensified with the impacts of climate change (...); impacts affect marginalized groups disproportionately, amplifying inequities, with a high degree of confidence (IPCC, 2022, p. 1174).

These results, which are increasingly present in recent studies on the relationship between climate change and the way these changes impact different regions of the planet and groups in society, have increased the need to understand climate change from the perspective of the Social Sciences, such as the scientific currents and fields of Ecology of the Poor and Climate Justice. However, the impacts of events such as floods, prolonged droughts, and lack of water availability on social groups in greater socio-economic vulnerability (Milanez & Fonseca, 2011), as well as how they happen, can be considered political decisions and result in what has been called climate injustice.

"Climate change constitutes geopolitical risks, i.e., risks arising from the danger in certain

decisions" (Tilio Neto, 2010, p. 28). In this sense, the political decision of whether or not to make international commitments to reduce the emission of greenhouse gases that contribute to climate change and whether or not to create a climate policy agenda will directly affect the population. In 2015, "Brazil ratified the Paris Agreement, pledging to reduce its greenhouse gas emissions by 37% by 2025 and 43% by 2030, compared to emissions in 2005, and to eliminate illegal deforestation in the Amazon by 2025", among other commitments to the same agenda (Artaxo, 2020, p. 56-57). These goals require political efforts and those of Brazilian society and must be constant (Artaxo, 2020); in fact, a lot was done in the 2010s, resulting in smaller areas detected in the deforestation alert system, especially between 2012 and 2017, figures that have sharply increased since 2019. (PRODES-Amazônia, n.d.). The increase in deforestation in the Amazon rainforest since 2019 has led to an irreversible limit scenario, distancing the country from meeting the target. Hence, actions to combat deforestation start from a political decision, corroborating Tilio Neto's (2010) statement about climate change as a geopolitical risk.

Increasingly, IPCC reports show inequalities in the impacts of such changes (Torres *et al*., 2021; Louback, 2020), which result in inequalities in access to natural resources and climate adaptation policies, which can be perpetuated if there is no change in the standard of living of populations and rich countries insist on maintaining their standard (Tilio Neto, 2010; IPCC, 2022). This issue has been on the agenda since the publication of the latest IPCC report, published between 2021 (physical basis) and 2022 (adaptation and mitigation), which showed that the impacts of climate change will hit vulnerable populations harder.

The Mary Robinson Foundation for Climate Justice (n.d., p. 1) states the following principles:

> Climate justice links human rights and development to achieve a human-centered approach, safeguarding the rights of the most vulnerable people and sharing the burdens and benefits of climate change and its impacts equitably and fairly. Climate justice is informed by science, responds to science, and recognizes the need for equitable stewardship of the world's resources.

Climate justice is related to allocating benefits and adaptation measures among individuals, nations, and generations to equalize the inequalities that already exist in society (IPCC, 2022). Adaptation measures are those adopted to reduce vulnerability in the context of the social production of climate risk. The risk of climate impact is a product of the climate threat (e.g., drought or intense rainfall), exposure, which are the people exposed to this threat, and vulnerability, which make up the sensitivity of socio-ecological systems and the capacity of this system to adapt to the shock (IPCC, 2022).

Therefore, if we have episodes of intense rainfall in a place predisposed to landslides (sensitivity) and people living there, the risk of climate impact will be high. In this example, adaptation measures can range from warning systems to investments in grey infrastructure (traditional works), green infrastructure (nature-based services), and governance, such as civil defense work in conjunction with sectoral policies in the region and social and community mobilization and participation.

Given that extreme weather events are a reality and are getting worse, how adaptation measures are

implemented by society defines which populations will suffer more or less from climate impacts. When we look at the climate risk scenarios for drought in the Brazilian region, we see that the projections for 2030 (given Agenda 2030), both optimistic and pessimistic, show an increase in the area at medium risk, except for the southern region (Figure 1).

Brazil's targets for monitoring the Sustainable Development Goals[1] consider the governance structures surrounding providing basic sanitation services, the quality and quantity of service, and efficiency, considering the finiteness of water (IPEA, 2018b). Therefore, the better the health infrastructure, the greater the ability of a country's municipality, state, or region to adapt to acute water scarcity. Among the regions with an increased risk of impact from drought (MCTI, n.d.) are the two regions with the worst water supply and sewage services (North and Northeast, Figure 2) and the three regions with the highest rates of sanitation-related diseases (Midwest, Northeast, and North, Figure 3), both of which are shown in Figures 2 and 3 below.

The 2010s were marked by low investment in sanitation infrastructure, with investment in the sanitation sector being discontinued, especially in the second half of the 2010s. The last two Plansab monitoring reports (MDR/SNS, 2021, 2022; KUWAJIMA *et al*., 2020) show that there was no increase in the percentage of water supply services between 2015 and 2018, and the percentage increase in sanitation was also lower in the second half of the 2010s (Table 1). Another striking fact is that the latest report did not provide information for 2019 and 2020 for the two basic indicators of households served by water supply and sewage systems (Table 1), even though the data is available from the Natio-

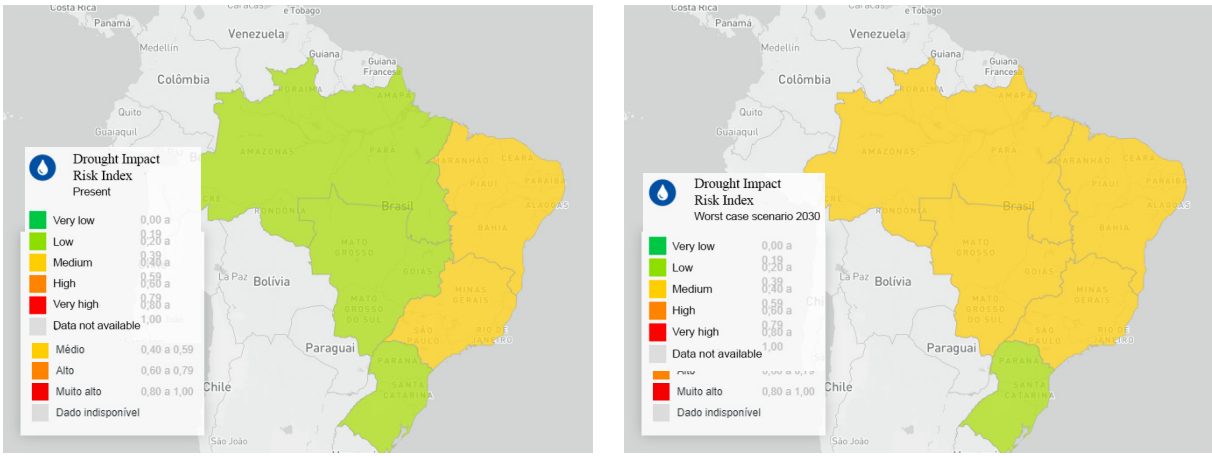

FIGURE 1 - Climate impact risk for drought, by region, at present (2015) and pessimistic scenario for 2030.
SOURCE: MCTI.

[1] Global and national targets for Brazil are described on the website of the Institute for Applied Economic Research (IPEA) - https://www.ipea.gov.br/ods/ods6.html.

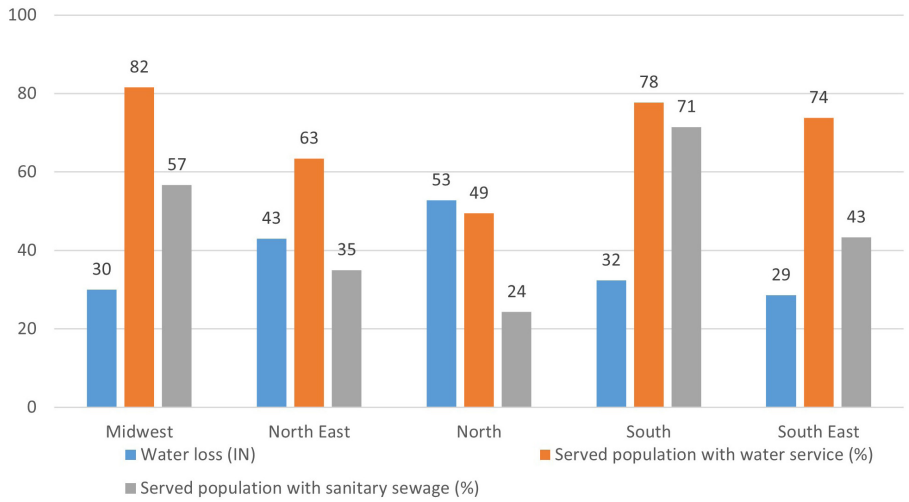

FIGURE 2 - Level of compliance with SDG 6 sanitation infrastructure targets by Brazilian region for 2020. Distribution loss index (SNIS, n.d.); Total population served by water supply (SNIS, n.d.); Total population served by sanitation (SNIS, n.d.).

SOURCE: SNIS.

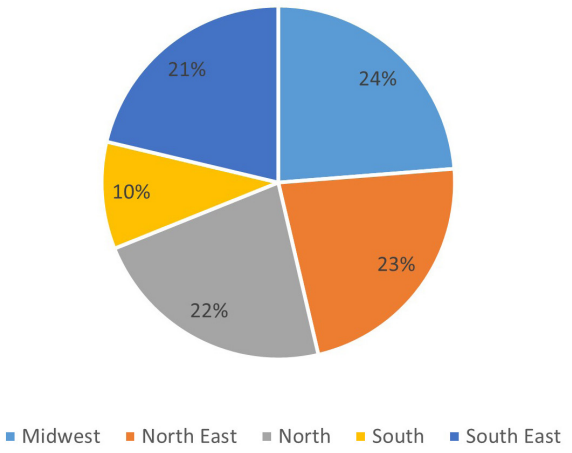

FIGURE 3 - Diseases related to inadequate environmental sanitation (100,000 inhabitants).

SOURCE: DATASUS, 2020.

nal Sanitation Information System (Figure 4). In the same period, the country has suffered more frequent drought events (Gutiérrez *et al.*, 2014). Therefore, it is understood that these figures represent a history of lack of investment in sanitation services, especially in water supply, which has made little

progress (Table 1), precisely at a time when the country was demanding alternative water supplies. As a result, there has been slow progress in serving the population (Figure 4).

For sewage services, investment was slightly higher (MDR/SNS, 2021, 2022; KUWAJIMA *et al*., 2020), with greater progress being made in the 2010-2020 period (Table 1, Figure 4), not least because the coverage base was very low in 2010. However, resources are still insufficient when considering the population most exposed to the climatic risk of drought, sanitation-related diseases, and the lowest water supply levels. Although there have already been major drought events that have never been completely overcome, such as the water supply crisis in the São Paulo Metropolitan Region (Fracalanza & Freire, 2016; Fracalanza & Paz, 2018), those who have the role of leading society towards this global environmental change have not fulfilled this task. It is therefore urgent to look at access to

TABLE 1 - Targets and indicators for monitoring the implementation of Plansab, water supply, and sanitation.

	Mains and wells or springs supply A1. % of urban and rural households with internal plumbing.	**E1. % of urban and rural households served by a collection system or septic tank for excreta or sanitary sewage**
2010	90,0	67,0
2014	92,6	69,8
2015	93,0	72,0
2018	93,0	76,0
2019	Not available	Not available
2020	Not available	Not available

SOURCE: MDR/SNS, 2021, 2022.

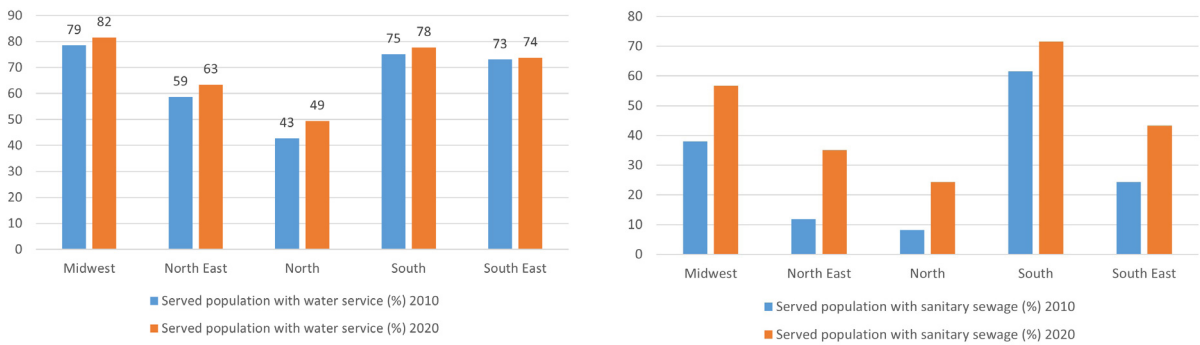

FIGURE 4 - Evolution of public water and sewage services by region between 2010 and 2020.
SOURCE: SNIS.

basic sanitation services, in line with climate justice, as advocated by the IPCC itself, especially for the populations systematically excluded from such services and most intensely affected by the extreme drought event.

4. Limitations of social participation in decisions on water and sanitation

After the approval of Federal Law No. 14,026 of 2020, there were several changes in the legislation on basic sanitation and public infrastructure financing under the justification of universalizing and qualifying the provision of services. However, the opening up of the sanitation sector to the market, stimulated by the new law, which also aims to raise funds to solve the state's fiscal crises and generate profits for private companies, is contradictory to the goals of universal access to water and sewage services, as advocated in the SDGs (Bardanachvili & Heller, 2021). According to the UN Report on the Human Rights to Water and Sanitation, published in 2020 (Heller, 2020), states must make efforts to go beyond what they have been doing and identify the most appropriate way to achieve adequate levels of access to water supply and sanitation services, so that they reach everyone, especially the population currently excluded from access. Actions must be horizontal, which implies planning to reduce gaps in access to water and sanitation among individuals and groups inclusively and comprehensively. To this end, it is necessary to emphasize human rights principles, including accountability, access to information, prevention, the right to redress, and participation (Heller, 2020).

The case for opening up the basic sanitation sector to private initiative is based on the argument that the public sector is financially incapable of guaranteeing universal access to basic sanitation services for populations in urban areas with high environmental vulnerability. However, the new law seems to make this problem even more chronic.

Brazilian municipalities generally have a shortage of water supply and sewage collection and treatment services, especially in areas of precarious urbanization. According to data from the *Diagnosis of Water and Sewerage Services* report prepared by the National Sanitation Information System (SNIS) of the former Ministry of Cities, for 2015, the total sewage collection service levels (Brazil) were 50.3% and, in urban areas are considered, 58.0%; 42.7% of the total generated is effectively treated (MCidades/SNIS, 2017). As for public water supply levels, the proportion of the total population served in the country was 83.3% or 93.1%, considering only urban areas (MDR/SNIS, 2021).

The distribution of supply networks and sewage collection is carried out differently in territories where the populations have high or low socio-environmental vulnerability in the same municipality. This fact is reflected both in the healthiness of the environment, the presence of flood risks, and in the water security of those residents, associated with the precariousness of drinking water reservoir and distribution systems, factors that have contributed, for example, to the water supply crisis in the Metropolitan Region of São Paulo (RMSP) since 2014 (Fracalanza & Freire, 2016).

Previously, under the guidelines of Federal Law No. 11,445 of 2007, municipal governments were the owners of the services and responsible for formulating public policies on the subject by

drawing up plans and programs that set parameters for the execution of services, as well as implementing the legal demand for the participation of civil society (Brasil, 2007). The main role of municipal sanitation policies was to define the physical structures that comprise sanitation services and draw up policy structuring measures, such as providing, regulating, and submitting the necessary services to social control (MCidades/ SNIS, 2017).

The participation of civil society in water management and public policies on water resources and sanitation brings to the fore what can be defined as water governance. Jacobi (2009) conceptualizes water governance as associated with the social power at the heart of relations between the state and civil society and conflicts, alliances, and cooperation between these actors.

According to Empinotti (2021), when it comes to access to drinking water, it is necessary to transform relations between the population and those responsible for the service by promoting social equality and empowering the population. Furthermore, access to water and sanitation are human rights that must be implemented through fair and participatory governance, which is unfeasible under private contracts for water and sewage services governed by market rules (Alves & Silva, 2022).

Under Federal Law No. 11,445 of 2007, the Sanitation Framework, there was a legal framework favorable to participatory governance between representatives of the various levels of government that act in decisions about sanitation in municipalities and the legal provision of space for discussion and presentation of demands in a participatory manner (Alves *et al*., 2018a). However, effective social participation tends to be reduced when the private market in the sector expands, as councils and other participatory forums of civil society will have limited roles since, by law, private companies become the protagonists of decisions on plans and investments in sanitation services when they are contracted.

Integrated and adaptive water and sanitation governance will not be achieved by depoliticizing and insisting on technocratic and financialized management of resources and services, as these are essentially political conditions at all levels - from the global to the local. Transparency in communicating with the population and considering climate change are fundamental factors in planning universal access to water and sanitation (Alves & Silva, 2022).

Finally, it should be noted that, in addition to the participatory issue, it is essential to adopt water resource policies that consider access to water by vulnerable populations. In this case, it is important to prioritize the processes by which low-income populations, who suffer most from the lack of adequate sanitation, gain access to water and sewage in a dignified manner. It is, therefore, a question of changing the focus from "how" to manage to "who" will have access to water (Fracalanza, 2009, p. 152). Thus, the search for governance that seeks to discipline the use of water among human groups is essential, with a focus on those who suffer from climate and water injustice.

5. Conclusions

Given the relevance of SDG 6 for achieving universal access to water and sanitation on a global scale, the analysis of decisions on the legal framework for sanitation in Brazil indicates conflicting paths between the interests of the private sector

and meeting the demand for water and sanitation, especially by the most vulnerable groups living in urban areas.

Given the problems observed on the basic sanitation agenda, with a focus on water supply and sewage, it is clear that socio-economically excluded populations are the ones who suffer most from the problems arising from the lack of these services. About climate issues, the absence and precariousness of water supply and sanitation contribute to situations of climate injustice. Social participation and public investment are pointed out as ways of overcoming the deficits in access to and realizing the country's human rights to water and basic sanitation. However, the public policies adopted in recent decades have presented the state as an intermediary between public and private interests, advocating in favor of the interests of the latter sector more emphatically after the enactment of the revision of the Sanitation Framework (Federal Law No. 14,026 of 2020), distancing itself from achieving universal access.

This also increases the vulnerability of the poorest communities to the consequences of climate change. The results of the state's stance of not prioritizing access to water and sanitation as a human right, instead focusing on encouraging the presence of private initiative in the sector, can be pointed to the increase in water-borne diseases; the predisposition of poor communities to disasters caused by heavy rains; and the difficulty of accessing drinking water in times of drought. It is, therefore, essential to invest in adaptive measures that consider local and regional peculiarities, involving social participation in decision-making processes.

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