

**INDICATORS IN WATER AND SANITATION SYSTEMS AND ENVIRONMENTAL  
RACISM: IN SEARCH OF OTHER PATHS IN MACEIÓ**

**INDICADORES NOS SISTEMAS DAS ÁGUAS E SANEAMENTO E RACISMO  
AMBIENTAL: EM BUSCA DE OUTROS CAMINHOS EM MACEIÓ**

**INDICADORES EN SISTEMAS DE AGUA Y SANEAMIENTO Y RACISMO  
AMBIENTAL: EN BUSCA DE OTROS CAMINOS EN MACEIÓ**



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**ABSTRACT:** The environmental problems perceived in Maceió – AL linked to water show how the urban occupation of the region and the relationship between humans and the environment occurred, following a Western hegemonic logic of domination over nature. Imagining other ways of relating to the environment based on other cosmoperceptions is one of the bases of this work, which aims to demonstrate how the social and racial inequalities observed in Brazil are linked to the way in which humans relate to nature and among themselves, including here the problem of the racialization of a portion of them. One hypothesis is that the technical water system is racist and that the control of water as a resource is one of the causes of ecosystem imbalances and social inequalities. Opening up to other cosmoperceptions of the world, the aim is to create counter-colonial, non-racist and ecosystemic indicators for the technical water and sanitation system.

**KEYWORDS:** Public policies. Sanitation. Socio-environmental indicators. Environmental racism. Ecosystem balance.

**RESUMO:** Os problemas ambientais percebidos em Maceió – AL ligados às águas mostram como se deu a ocupação urbana da região e a relação dos humanos com o meio, seguindo uma lógica hegemônica ocidental de domínio sobre a natureza. Imaginar maneiras outras de se relacionar com o meio a partir de outras cosmopercepções é uma das bases desse trabalho, que pretende demonstrar como as desigualdades sociais e raciais observadas no Brasil tem um elo com a forma como se relaciona com a natureza e entre os humanos, inserindo aqui o problema da racialização de uma parcela deles. Uma hipótese é que o sistema técnico das águas é racista e de que o domínio das águas enquanto recurso é uma das causas dos desequilíbrios ecossistêmicos e das desigualdades sociais. Abrindo-se para outras cosmopercepções de mundo, pretende-se criar indicadores de caráter contracolonial, não-racistas e ecossistêmicos para o sistema técnico de água e saneamento.

**PALAVRAS-CHAVE:** Políticas públicas. Saneamento. Indicadores socioambientais. Racismo ambiental. Equilíbrio ecossistêmico.

**RESUMEN:** Los problemas ambientales percibidos en Maceió – AL vinculados al agua muestran cómo se produjo la ocupación urbana de la región y la relación entre el hombre y el medio ambiente, siguiendo una lógica hegemónica occidental de dominación sobre la naturaleza. Imaginar otras formas de relacionarse con el medio ambiente a partir de otras cosmopercepciones es una de las bases de este trabajo, que tiene como objetivo demostrar cómo las desigualdades sociales y raciales observadas en Brasil tienen un vínculo con la forma de relacionarse con la naturaleza y entre los humanos. Una hipótesis es que el sistema técnico del agua es racista y que el predominio del agua como recurso es una de las causas de los desequilibrios ecossistémicos y las desigualdades sociales. Abriéndose a otras cosmopercepciones del mundo, el objetivo es crear indicadores de carácter contracolonial, no racista y ecossistémico para el sistema técnico de agua y saneamiento.

**PALABRAS CLAVE:** Políticas públicas. Saneamiento. Indicadores socioambientales. Racismo ambiental. Equilibrio de los ecosistemas.

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## Introduction: the relations of relations with water

“The waters in Alagoas do what they want, they rule everything” (Lindoso, 2011, p. 44, our translation). Therefore, there is a region that coexists within this aquatic domain, the one that covers the wetland. Is covering the wetland a constant occurrence? Or does the wetland also cover what previously covered it? Is this movement, which can happen from time to time, a problem? For whom?

The environmental and social problems faced in Maceió, mainly related to flooding, pollution of rivers and streams, and lack of basic sanitation, demonstrate how the relationship between urban occupation and space has developed. Returning to the indigenous origin of the city’s name, meaning “that which covers the swamp,” it becomes clear that the region’s natural characteristic is the movement of water, which sometimes floods and sometimes is covered by the soil (Melo, 2014 *apud* Tibiriçá, 1985). Therefore, there is a tension between how the city has been built and how the space in question behaves naturally.

This amphibious characteristic of Maceió is brought into the discussion to reflect on the cyclical and ecosystemic nature of the region. This contrasts with what has been observed throughout its colonial occupation process, which began at the end of the 18th century (Costa, 1939), and since then there have been attempts to dominate and stabilize the behavior of the waters. By dynamic ecosystem equilibrium, I follow the idea of the ecosystem as originally conceived by Arthur G. Tansley in 1935, where, according to Siqueira *et al.* (2023), it would be the basic unit of ecology. The ecosystem would then be this composite of beings that interact with each other and can produce energy and forces that generate life (Siqueira *et al.*, 2023). When imagining dynamic ecosystem equilibrium, the aim is to highlight the continuous movement of ecosystems in search of balance towards life, through syntropy, which organizes the production of life.

In general, there is no concern for integration between humans and other elements of nature; instead, control and domination are sought. Perhaps the indigenous people understand better what Lindoso (2011) wrote about the waters ruling in Alagoas, as there is a relationship of respect with the environment in their way of naming places and the world around them. It is a relational, dynamic naming, in the sense of conveying the movement present in life in relation to humans within nature, since they are also part of it; that is, it is a relationship between humans (which is natural in itself, being a relationship of nature with nature); between humans and non-humans; and between non-humans, whether these non-humans are living or non-living.

Furthermore, within the idea of dynamic ecosystem equilibrium, the constant creation of life, or its production, stands out. Here, the concept of self-organization, or autopoiesis, by Maturana and Varela, is relevant, which is this “capacity of living beings to produce themselves” (Siqueira *et al.*, 2023, p. 2, our translation). In this perception, in addition to external regulation that may come from the State or another power force, the relationship of human beings with each other and with the environment should be the focus of reflection, because the objective would be to maintain equilibrium to produce life, promoting changes and transformations that make this possible.

Human autopoiesis passes through languaging, this coordination of coordinations of relationships between human biology, language, cognition, and so-called mental or psychological phenomena such as reason, consciousness, and emotion. This affirmation of the experience of humans as historical beings who live in language allows us to question how we converse about indicators, or about the rational technique (as the language of logic and reason, not emotion) of sanitation as absolute truths that impose themselves on the natural and cultural world, without perceiving (consciously/unconsciously) the patterns of racism that these indicators created by the language of this network of conversations create.

Still within these perceptions about naming (about the relationship between emotioning and the power to name, calling this relationship subjectivity, in the perception of subjectivity studies brought by Kastrup and Barros (2015), as relational and dynamic), I bring a concept that will contribute to this work and that is also something processual and relational, which is cartography (Kastrup; Barros, 2015). Here, the intention is not to conceive it as an instrument to produce materials and representations of spaces, such as maps, but rather, bringing a broader interpretation, within a perception of cartography as a method that is not pre-prepared, as proposed by Deleuze and Guattari (1995), and discussed later by Kastrup and Barros (2015). It consists of a process or procedure that is constructed case by case and in a dynamic way, according to Kastrup and Barros (2015), cartography is not applied, but rather cartography is practiced, being constructed during the process, there also being a relationship between the practitioner and everything around them, having great possibilities of being affected through contact with and perception of the surrounding environment, following an abductive logic rather than an inductive or deductive one (Kastrup; Barros, 2015).

In this direction, this naming/emotioning expression of the original peoples can configure a cartography that is alive, an oral cartography, or a cartography of orality, being consistent with the idea of dynamic ecosystemic balance. However, the possible lack of

understanding by the colonizing and subsequently colonized peoples regarding this way of naming/emotioning expression of space as an experience of respect for it is a characteristic trait of the colonizing process and reveals much about Western worldviews and their relationship with the land. In this relationship, there is an attempt to dominate and adapt space to rules, norms, and scientific knowledge, which will be called regulation here, within a perception of the land as a thing, as property, a good, or a resource for humankind.

Regulation is the way in which the entity holding power, often represented by the State or by forces of economic power, acts and standardizes society and its environment for a supposed organization and order. From this, laws, norms, and policies are created. This regulation from the hegemonic perspective aligns with what Acselrad (2015) interprets from the Regulation Theory conceived by researchers such as Robert Boyer. This theory attempted to understand the mechanisms that capitalism uses to reproduce itself from crises. Acselrad (2015) questions, in the case of cities, how social relations are maintained and reproduced despite the crises and instabilities perceived over time. He argues that capitalism, through hegemonic powers, promotes a regulation of society to maintain a “social equilibrium,” this equilibrium being based on inequalities, that is, maintaining economic and social power for a patriarchal-familial elite to the detriment of a majority living in situations of economic and social vulnerability. This process will be referred to here as the *regulation of the hegemonic*.

Another possible perception of regulation, imagined from the perspective of dynamic ecosystem equilibrium, would be one that seeks movement and adaptation towards a situation of social and environmental well-being; that is, a reorganization to produce and/or allow the promotion of life. Or, it could seek a syntropic equilibrium that allows for the production of life and the well-being of the entities that are part of this ecosystem. Syntropy here has a circular, recursive, and retroactive character; according to Santos (2022), it acts in transformation, enabling what has degenerated or dissipated to be reused, given new meaning, and reorganized. Entropy acts in conjunction with it, being what degenerates the system and dissipates energy (Santos, 2022). Based on these perceptions, this will be the regulation of ecosystem equilibrium.

Here, a discussion regarding property as described by law is important. According to Costaldello (2006, p. 151), private property has been “elevated to one of the fundamental pillars of political, economic, and social organization.” It is important to understand that this condition of property in this context was constructed historically, politically, and socially. From Roman law, in its earliest codes, according to Costaldello (2006), corroborating with Marnoco and Souza (1910, p. 31), the notion of property began to be constructed, preceded by the notions of

family law and inheritance law. The way of naming/emotioning conveying the concept that allows one to perceive and create conversations about how things—the objects of which one has possession, use, and dominion, ultimately, ownership—could be enjoyed and transmitted to other generations was discussed and considered. Therefore, it is important to understand the role of the father's family and the father of the family (*pater familias*) in this process, as the holder of power over the property and everything connected to it.

The concept of *pater familias*, discussed by Portela (2022), originating in Roman law, reinforced the patriarchal structure, involving its power over the life and death of its heirs and property. Thus, the figure of the father as the holder of power and the father's family as the possessor of the right to inheritance, which was determined by him, was the basis for the construction of Western societies. One can then reflect on the power of these patriarchal families and fathers in the control of territory and everything involved with it, including water and its systems. This relationship of dominance is explored to understand the link between this power over the territory and the entities present within it and the systemic racism constructed from the colonial legacy, showing how this power influences access to water. Property can then be understood here in light of the Brazilian Civil Code, according to Sidou's definition (1997 *apud* Santos, 2023, p. 52, our translation), as “the right to use, enjoy and dispose of things within their social function, provided that they are not used in a way prohibited by law, and to recover them from anyone who unjustly possesses them.”

This way of perceiving water, as a resource/property, has brought, along with other colonial legacies, unequal forms of access to it, generating disparities that greatly reflect Brazilian society itself. Questioning other ways of perceiving water and the relationships within it challenges how environmental public policies are designed in the country. Here, the meaning of “relationships within relationships” comes from Maturana's systemic thinking on the complexity of life, within the context of postmodern science, where there has been a shift in perception regarding how the world is dealt with, with a greater emphasis on the whole, rather than focusing on the parts, that is, on the relationship between the relationships of systems with each other and the elements that compose them (Oliveira; Crepaldi, 2017). Maturana's perception of systemic thinking includes, within its assumptions, the idea that “the properties of a living system or organism are properties of the whole” (Rossetto, 2008, p. 238, our translation). Thus, the perceived relationships between the elements of these systems and between these systems within the world are not isolated and univocal; they are part of a system

of relationships, that is, they represent relationships between relationships, or even relationships of relationships.

Bringing the issue of racism into the discussion, we have a point made on the subject by the thinker Silvio Almeida (2021, p. 20, our translation), in which he says that “racism is always structural, that is, it is an element that integrates the economic and political organization of society.” For Almeida, the forms of reproduction of violence and inequalities observed in society are designed and constructed from the subjectivities, meanings, logic, and technologies provided by racism. The use of the term “structural” in the context that Almeida applies makes some sense; however, when considering how the word “structural” is understood according to French structuralism—referring to a deep, more rigid, unconscious, and static structure—I believe the term becomes limited. Racism is a process and historical phenomenon; thus, it is dynamic and self-reinforcing over time, having a more systemic character. I believe this term is more representative of this process, which is indeed embedded in our society, but is not stagnant. It was not historically created at one point and remained immutable; it has been molded to reality and adapted to the changes undergone by society and the systems that compose it.

Still within this discussion, a reflection on the conception and understanding of racism as a pseudoscience, a legitimizing process of regulation of the Western hegemony, is brought by the thinker Sueli Carneiro (2023, p. 20, our translation):

Racism, as a pseudoscience, seeks to legitimize the production of symbolic and material privileges for the white supremacy that engendered it. These privileges determine the permanence and reproduction of racism as an instrument of domination, exploitation, and, more recently, social exclusion, disregarding all scientific evidence that invalidates any basis for the concept of race. The maintenance of racist ideology depends on its capacity to naturalize its conception of the Other.

Thus, racism would be a tool of hegemonic power to maintain social equilibrium in its favor, promoting the regulation of the hegemonic. A historical example of how Brazilian laws were constructed in a way that hinders or prevents access to certain rights for the Black population is the Land Law of 1850, which had as one of its objectives to create rules for the purchase of vacant state lands by the population. This law did not intend to democratize access to these unused lands belonging to the State for the entire population living in Brazil, but to determine the rules for their purchase by those who had the resources. Of course, this was a period in which the slave regime and imperial power still existed, with a different social structure, but this idea of maintaining land ownership for an elite was already evident then. By

restricting access to land only through purchase and charging a high price, the State was making it clear who could have access to this land and who would not (Gadelha, 1989).

It is also observed that Brazilian legislation, historically, at the end of the 19th and beginning of the 20th centuries, with the advent of the republic, excluded a portion of the population from access to citizens' rights and has not changed satisfactorily over time to reduce social inequalities. Therefore, social inequality in access to sanitation in Brazil is not a legal problem, or even a problem of legality. This leads to the question of whether environmental public policies in Brazil are responsible for maintaining social inequalities in access to sanitation, revealing the racist bias of the country's legislation and public policies, as a plan for the erasure and extermination of the Black population.

In this context, Carneiro's (2023) thinking can further contribute to and challenge these discussions about the roles of regulation, through a theme she discusses within the ways in which racism operates in the structure of society, the so-called "self-fulfilling prophecy," which reinforces negative expectations about the Black population and their inferiorization. This historical reproduction maintains inequalities to this day.

Expanding further on the discussion about the control and domination of nature, I bring up the issue of the hierarchization of spaces, land, and nature in a broader sense. In this regard, two concepts deserve highlighting: preservation and conservation. These concepts were discussed by Diegues (2008), who provided their historical background, from their origins at the turn of the 19th to the 20th century. Preservation is related to the protection of nature from human contact, revering it in the sense of aesthetic and spiritual appreciation, with thinkers such as John Muir and Henry Thoreau; and conservation, which had among its main thinkers Gifford Pinchot, is defined by him as "the use of natural resources by the present generation; the prevention of waste; and the use of natural resources for the benefit of the majority of citizens" (Diegues, 2008, p. 31).

In this discussion of preservation and conservation, one can analyze what one truly wishes to protect, focusing on nature itself, and which nature one wishes to protect. Looking throughout history, one perceives a hierarchy in the importance given to some ecosystems over others, as if preserving a specific type of ecosystem were more prioritized, and this is considered a representation of nature itself, or even nature itself, according to the Western narrative. Considering the ecosystems observed in Brazil, the Atlantic Forest would be at the top of this hierarchy due to its biodiversity, followed by the Amazon rainforest, while other ecosystems

would be placed in second or third category, including the Cerrado, the Caatinga, and the mangroves.

Currently, even with more laws and discussions on the subject, the hierarchical nature of the environment is still very much present, with a weakening of preservation or conservation efforts in areas considered less important, such as the Cerrado and mangrove areas, especially in urban areas. The destruction of mangrove areas can be observed in the city of Maceió, for example. Even though they constituted what the original peoples who inhabited this region said covered the swamp. It was this ecosystem, adapted to the movement of these waters, that coexisted with them.

Therefore, the hypothesis raised is that the language used to shape public policies in Brazil has a racist bias and perpetuates inequalities in access to services for a segment of the population, even if this is not directly stated or written, thus constituting environmental racism.

This leads to a second hypothesis: the socio-environmental indicators used as mechanisms for evaluating environmental health were designed in a way that perpetuates inequalities stemming from systemic racism. These socio-environmental indicators in the sanitation sector mostly focus on analyzing access to water and sanitation (percentage of the population served, coverage level, efficiency level), and environmental quality indices (water quality based on biological, physical, and chemical indices; air quality; soil quality). However, there is a gap in the correlation between these indices, hindering representations that more closely reflect the realities experienced by vulnerable populations—populations that often do not appear in these percentages. Furthermore, these indices become detached from the social context, as if environmental quality were unrelated to local populations.

Based on these hypotheses, it becomes clear that the lack of access to adequate sanitation infrastructure for low-income populations, mostly Black, stems from technical issues and a lack of political action on the part of the State. This is not a matter of political disinterest, as the State, in Maceió and other cities, is controlled by influential families who have been in power for years and represent the local patriarchal system. They possess both territorial ownership and control over these territories, becoming entrenched in various layers of society and perpetuating the systemic racism they helped to build. These issues are reflected in sanitation legislation, which does not mention race as an object of analysis when working with the country's economic and social data. Furthermore, the lack of application or development of techniques and technologies suited to the realities faced in regions with a majority Black population

demonstrates a lack of technical awareness regarding their racist naming conventions, which impacts, or is impacted by, the use of language.

As can be observed in Law No. 14.026/2020, the most recent law in the sanitation sector, which modified Law No. 11.445/2007, no racial analysis criteria are mentioned when dealing with social issues (Brazil, 2020). This neglects the relationship between these racial aspects and socioeconomic issues and access to urban infrastructure in Brazil. Hegemonic regulation has shaped and perpetuates social inequalities, especially regarding urban infrastructure. This allows for an analysis related to environmental vulnerability, which, like social vulnerability, is also historically determined, that is, it was produced for the interest of someone or some specific sector (Acselrad, 2015).

From this perspective, there is a normalization and naturalization within Brazilian society of perceiving racial inequalities in different places, situations, and social practices, as already mentioned in the thought of Sueli Carneiro. In other words, with these subjectivities, the structure of Brazilian society, as it has been conceived throughout time and history, has placed Black populations in a position of inferiority in the most diverse sectors and environments. And this same society often does not identify this as a problem, because it is understood (albeit unconsciously, and therefore systemic) that the inferior position of Black people is natural. So, if there is inequality of access, for example, to water and sanitation, to better professional positions, to health and education, this does not affect the population, especially the most privileged segment, to the same extent as the gravity of the problem.

When we speak of this implicit will of the State, which can be realized in the reality of Alagoas by the will of the large patriarchal families that perpetuate themselves in local governments (at all levels), we mean that the subjectivities created in relation to systemic racism are ingrained in the decisions and conceptions of laws and public policies. Therefore, there is indeed a will to maintain inequalities, since they would not in themselves be a major problem, as structurally they have existed for a long time. These representatives of the patriarchy are the concrete representations of this State; this is important to understand so that we do not speak of the State as an abstract institution, without its own interests, and which represents the will of the people.

Finally, many issues need to be considered and analyzed to understand the current urban configuration of medium and large cities in Brazil. In this work, the spatial focus will be the lagoon area of the city of Maceió. This choice was not made by chance, as the neighborhoods bordering the Mundaú Lagoon have a history of long-standing occupation, dating back to the

beginning of urban development in the Maceió region in the early 19th century. They have a predominantly Black population with varying degrees of access to infrastructure, even though they are located next to so-called central areas of the city. Furthermore, they include a section that was completely abandoned due to the environmental crime of urban mining by Braskem. The film *Saneamento Trágico* (Zazo, 2018), by the Maceió-born journalist Zazo, was one of the motivators for choosing the lagoon region of Maceió, as it denounces many of the inequalities in access to sanitation faced by the region's population.

This work reflects on how the relationship with water has developed in Brazil and its impact on the design of public policies for sanitation, and how this relationship is reflected in social and racial inequalities in access to water. In other words, it examines how systemic/environmental racism appears in environmental public policies and allows for the maintenance of inequalities in access to sanitation through relationships with water. From there, it aims to conceive of other ways to design public sanitation policies that are dynamic, do not promote social inequalities and environmental destruction, based on other perspectives, such as the counter-colonial one of Antonio Bispo. One path that will be pointed out in the research is the creation of socio-environmental indicators with a counter-colonial and non-racist character.

### **Spatializing the waters in Maceió**

Maceió is a city surrounded by water on all sides. This in itself is a striking characteristic of this region. Remember that it flows with all its creations. It is embraced by the Mundaú Lagoon and the Atlantic Ocean and is permeated by several rivers, among them the one that gave rise to its name. Understanding the complexity of this geographical and natural characteristic of the region allows for a much more harmonious experience of the city.

However, despite the native peoples of the region already warning about its natural characteristics, showing in the very name that it is a flooded place, full of water, both salty and fresh, and that the piece of land located there somehow covers and separates these waters, this natural configuration was not respected, or was not understood, or was not even wanted to be understood. The process of occupation of the region, which took place precisely in this portion of land and which intensified at the beginning of the 19th century, both in what is now known as the Jaraguá neighborhood and in the region where the city center is located, did not follow

the course that nature itself determined for the place, with a continuous process of landfill and attempts to control these waters (Oliveira, 2018).

Lindoso (2005) already introduced the concept of an amphibious people for the population of Alagoas, and this term applies well to the city of Maceió, since it is a city that constantly experiences the cycles of its waters, sometimes higher, creating a more aquatic environment, other times lower, characterizing a more terrestrial environment. This perspective aligns much more with an interpretation of the indigenous perception of the word Maceió than with a Eurocentric and developmentalist perspective, because an amphibious city is one that deals with both periods in the water and periods in the dry, there is a coexistence with the movement of the waters and everything around it. While in a Western economic developmentalist perspective, water (especially mangroves, this ecosystem that is amphibious by nature) is often seen as an obstacle to the “progress” of the region, limiting the territory, the perception of staticity, the absence of movement, and the desire for domination and control over the waters.

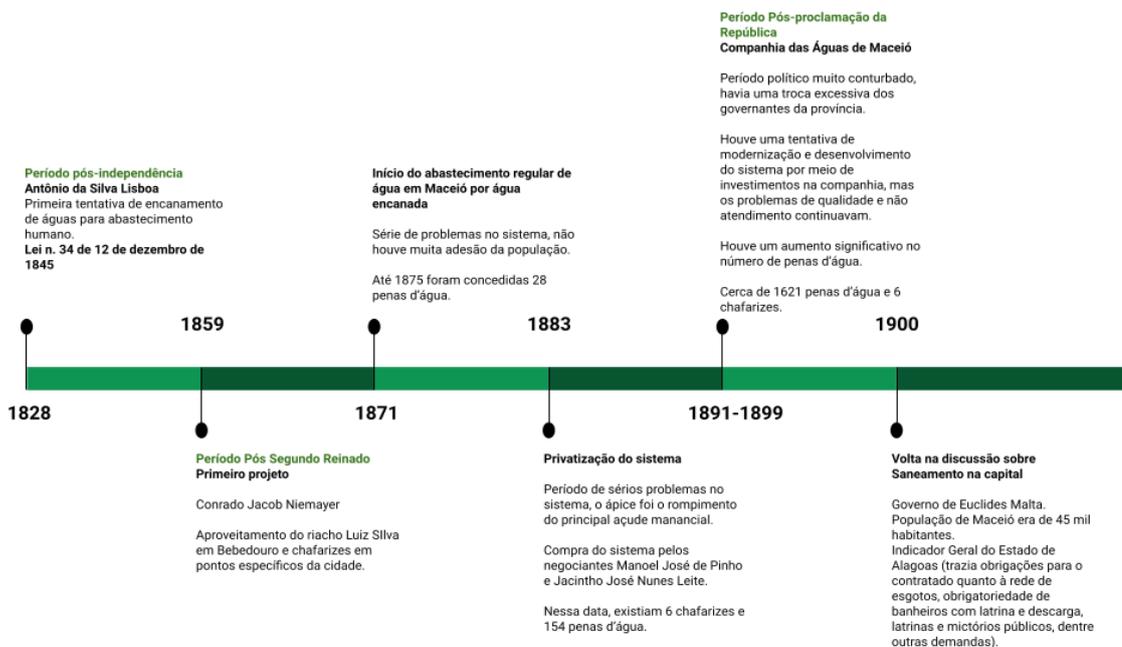
The region’s economic growth, which also occurred via water, starting from the port of Jaraguá, conflicted with this idea. In other words, commerce, urban growth, and the expansion of the city’s urban infrastructure were incompatible with this relationship with water. Flooded areas became a problem; the modern city, which was the ideal sought at the time, did not align with this dependence on the natural cycles of water, without human control, limiting the spaces for occupation. It was necessary to “tame” these waters so that man could control their behavior and thus build his city.

There are several ways to analyze the process of occupation and growth of Maceió throughout history; this analysis will focus on the history of the city’s urban water supply infrastructure, considering the importance of water in identifying the city of Maceió itself and that it is an indicator of development in the mold of Western urban thinking.

Three timelines were created: one referring to the 19th century (Figure 1), another to the first half of the 20th century (Figure 2), and the last to the second half of the 20th century and the beginning of the 21st century (Figure 3). The timelines were constructed based on, among other references, journalistic articles published by Ticianeli in 2021 on the history of water supply in Maceió (Ticianeli, 2021a, 2021b, 2021c). Along the timelines, the main milestones related to this history were highlighted, showing the long period it took to achieve more effective service for the population in a more comprehensive way and to have an efficient

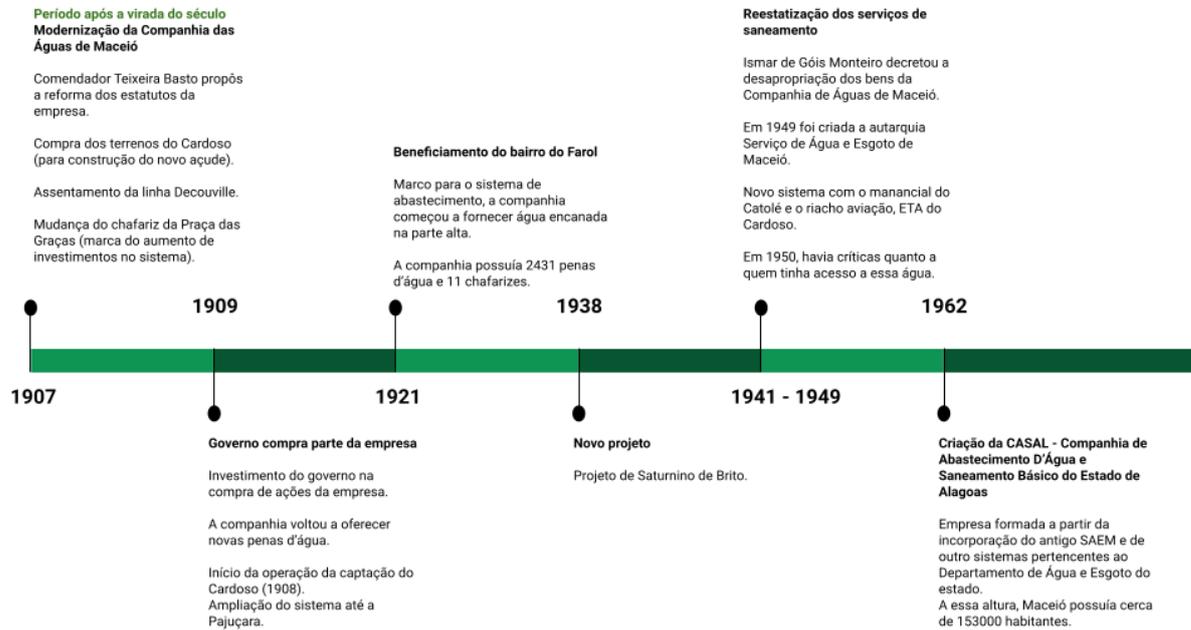
collective system, with little progress throughout the 19th and early 20th centuries (Figures 1 and 2).

**Figure 1** – Timeline relating to the 19th century for the water supply of Maceió



Source: Author (2022).

**Figure 2** – Timeline relating to the first half of the 20th century for the water supply of Maceió



Source: Author (2022).

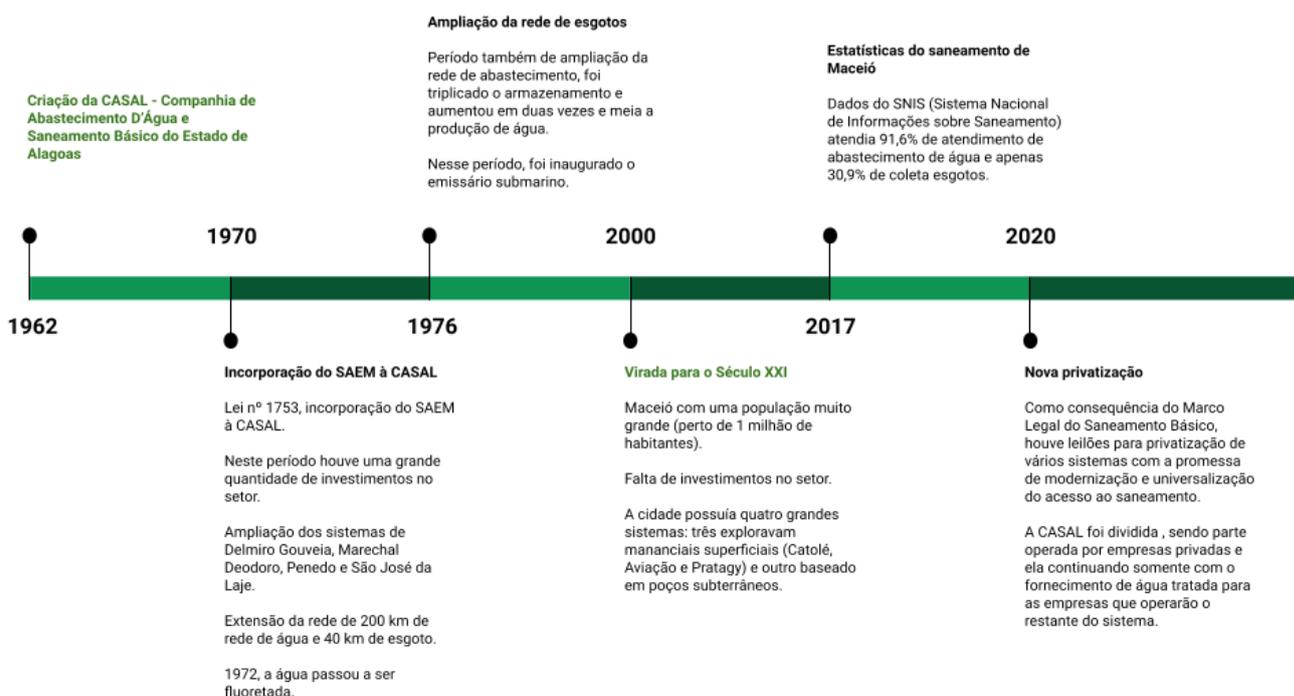
The scenario of pressure for better services and popular dissatisfaction, along with the failure to meet the demands stipulated in several contracts between the Maceió Water Company and the government, fostered government decisions to expand and improve the system. The 20th century was marked by major works to structure the water supply system, as can be seen along the timelines illustrated in Figures 2 and 3. However, it can be observed that this water supply service, although deficient and undersized, only served a small portion of the population, those who lived near central areas of the city and who had greater economic power (Ticianeli, 2021a, 2021b, 2021c).

In this process of implementing more comprehensive projects to improve the system, there was a re-nationalization of sanitation services, which came to be considered of public interest and should receive more investment. Only in 1962 was this process of nationalizing the system fully implemented with the creation of the Water Supply and Basic Sanitation Company of the State of Alagoas (CASAL). From then on, there was a change in the perspective of sanitation management, as the company had a statewide reach. In the following two decades, there was a considerable expansion in investments in water supply both in the capital and in the main cities of the interior of the state, in an attempt to democratize this access; water production more than doubled. There was also a milestone related to sewage treatment, with the

inauguration of the submarine outfall. With it, the lower part of the city began to have sewage collection (CASAL, 2022).

Jumping ahead in time, as can be seen in the statistics presented at the end of the timeline in Figure 3, the excessive population growth in Maceió was not accompanied by the necessary investments in the sewage system. There was a significant expansion in the supply of potable water, with Maceió currently having a water supply system based on three surface water sources (Catolé, Aviação and Pratagy) and a network of underground wells, with adequate water treatment and a complex distribution and storage system throughout the city (Brazil, 2019; CASAL, 2022).

**Figure 3** – Timeline for the second half of the 20th century and the beginning of the 21st century regarding the water supply of Maceió



Source: Author (2022).

In this regard, analyzing the last topic on the timeline in Figure 3, we observe the emphasis given to the new privatization of sanitation services in the state of Alagoas. Sanitation in this case is understood as water supply and sewage services, even knowing that basic sanitation also includes stormwater and solid waste management. The privatization process had begun shortly before 2020, with some public-private partnership projects in some sectors of the company, including a focus on sewage treatment, but it was only with Law No. 14,026/2020,

which modified the legal framework for sanitation (Law No. 11,445/2007), that the auction of a large part of what was CASAL effectively took place (CASAL, 2022).

### ***Racialized waters***

As Acselrad (2015) discusses, the impacts caused by polluting byproducts of water relations are not distributed equally. There is inequality in contact with this pollution and the environmental damage it causes. This is a predominantly Black, racialized population. Almeida (2021, p. 64) states that racialized people are “formed by structural and institutional conditions.” Vulnerability, therefore, is not natural: it is historically, politically, and socially constructed. People are made vulnerable, becoming more exposed to risks—in this case, environmental—and having fewer technical, technological, and political resources to face them.

In this discussion about vulnerable populations, it is also important to include the vulnerability of the environment, or nature. Based on the notion of ecosystem balance, which understands humans and nature as interconnected in a network of relationships, human vulnerability cannot be addressed without considering environmental vulnerability.

According to Almeida (2021, p. 64, our translation), “it is racism that creates race and racialized subjects.” In other words, racism is a social construct in continuous reproduction, whether through state policies or the modes and customs of the hegemonic society. Victor de Jesus (2020) points to the racialization of analyses on public health and sanitation, stating that institutional racism manufactures and multiplies vulnerabilities.

Mathias (2017, p. 31) presents the definition coined by Benjamin Chavis in 1978, in which environmental racism is defined as the practice of racial discrimination in environmental policies. Chavis was an American reverend and environmentalist who used the term in a fight against environmental problems suffered by his community, referring to the dumping of toxic waste in forests in his region. However, the scope of the concept has been broadened, and today it can be seen, especially in the historical context of Brazil, as a differentiation in the treatment of environmental public policies when it comes to predominantly Black communities (Mathias, 2017).

Milton Santos (2007, p. 19, our translation) raises a crucial question: “How many inhabitants in Brazil are citizens? How many don’t even know they aren’t?” The second question is emblematic, as it highlights the erasure and vulnerability of the racialized population, marked by a lack of access to information and recognition of their rights. Without

perceiving themselves as subjects of rights, these people are prevented from legally fighting for them, which perpetuates institutional racism and inequalities to this day.

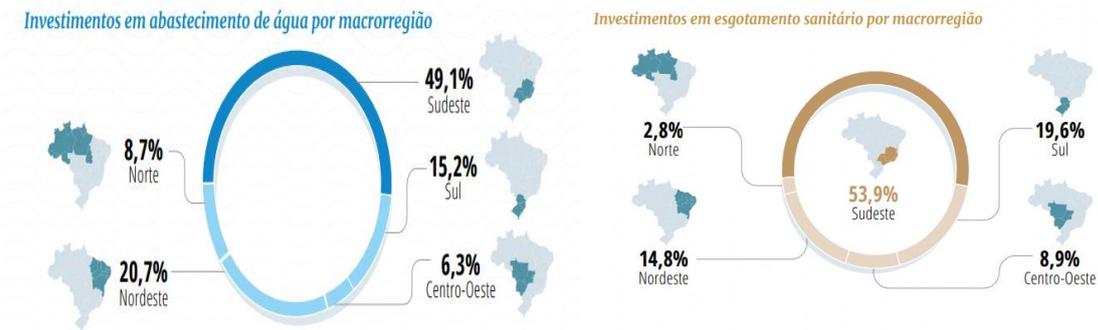
Clóvis Moura (2003) defines *Quilombagem* as a resistance movement originating from the refusal of the condition imposed on the Black population: slavery. This movement persisted over time, spanning the colonial period and manifesting itself as a living sentiment among racialized subjects. It may even be one of the elements that explain their resistance and survival in the face of continuous processes of erasure, functioning as a force in the struggle for citizenship.

In Maceió, since the 19th century, during the imperial slave period, racialized bodies fulfilled functions related to water that met the needs of the privileged classes—transporting water for consumption or removing waste dumped into urban water sources. Victor de Jesus (2020, p. 6) defines these bodies as the very sanitation system of colonial cities. It is also noted that the urban water sources themselves were made vulnerable.

In the national context, Borja and Moraes (2008) discuss access to drinking water and sanitation as essential rights to health and citizenship. Although urban areas have greater access to treated water, rural regions and urban peripheries face a lack of infrastructure. This inequality reveals the process of racialization, even if not explicitly stated by the authors. They also highlight the importance of protecting water sources and investing in improving the water that reaches homes.

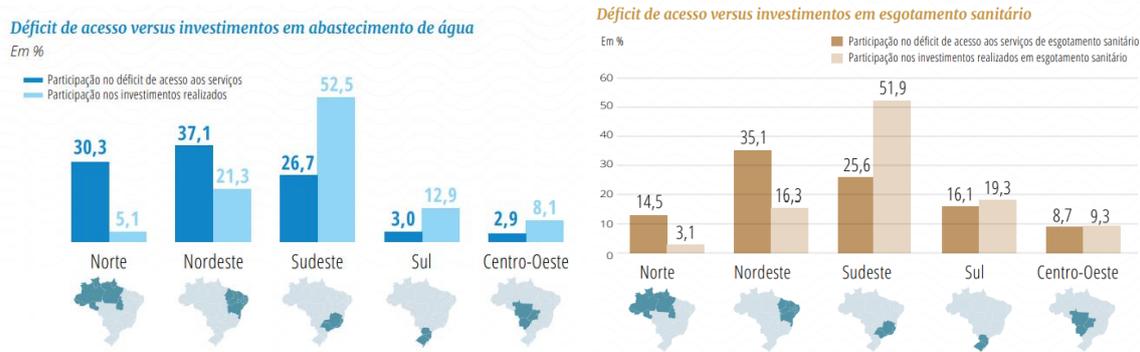
Borja (2014) reinforces that, despite advances in access to treated water, a large disparity persists between regions and social strata. Public investments in sanitation often ignore the real needs of the most vulnerable populations, perpetuating inequality in access. This is confirmed by Figures 4 and 5, which show the disproportion between investments and service deficits by region.

**Figure 4 – (a) Investments in water supply by macro-region and (b) Investments in sanitation by macro-region**



Source: Brazil (2022).

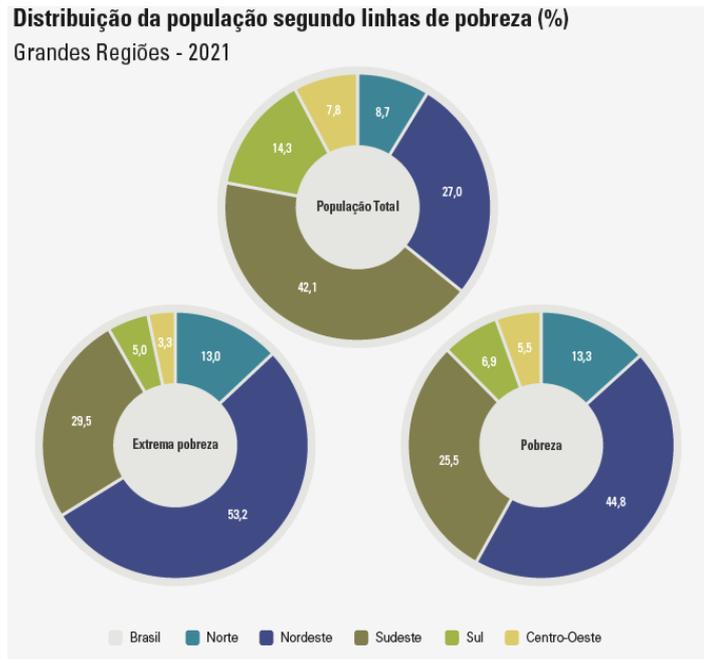
**Figure 5 – (a) Access deficit versus investments in water supply and (b) Access deficit versus investments in sanitation.**



Source: Brazil (2022).

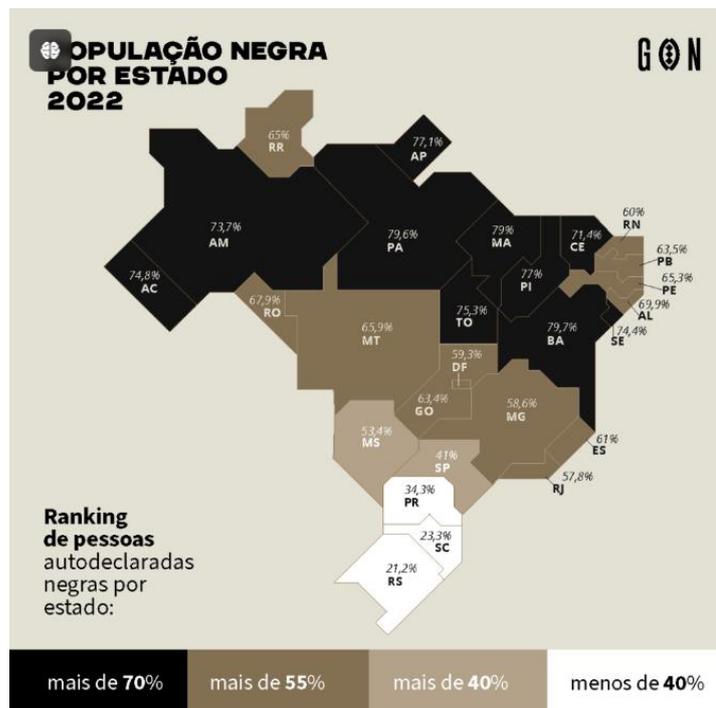
Analysis of Figures 4 and 5 shows that regions with lower levels of investment, such as the Northeast and North, also have the worst service coverage rates, confirming what Borja (2014) pointed out. Therefore, it is essential that more resources, investments, and public policies be directed to these regions to guarantee universal sanitation in the country. This disparity is also reproduced within cities: there are areas with more investment and satisfactory coverage, while others, marked by the absence of the State, remain without access. These less assisted areas coincide, as Figures 6 and 7 show, with territories occupied by vulnerable and racialized populations.

**Figure 6** – Distribution of the population according to poverty lines (%)



Source: IBGE (2022).

**Figure 7** – Black population by State (2022)



Source: Dias (2024).

When analyzing Laws No. 9,433/1997 (known as the Water Law), No. 11,445/2007 (which was the legal framework for sanitation in the country), No. 12,305/2010 (Solid Waste Law), and No. 14,026/2020 (which modified the legal framework for sanitation), which are the

main legislations in the area of water and sanitation in Brazil, it is clear that this approach and analysis of the social aspects related to the topic are only discussed from an economic perspective. The economic classifications of the population and social class govern the analysis of vulnerable populations. In other words, both in academic discussions in the sector and in legislation, this social analysis treated only from economic and class perspectives is what predominates in Brazil.

There are some works in the literature and some legal aspects that attempt to address the issue of regionalization, trying to break down observed inequalities linked to regional issues in the country. However, judging by what has been observed in the most recent sanitation legislation, Law No. 14.026/2020, in practice, the use of only regionalization aspects is not having an impact on the vulnerable population, which remains without access to water and sanitation. Troni and Montenegro (2021) discuss the regionalization process observed in the state of Alagoas based on the guidelines proposed by Law No. 14.026/2020. Troni and Montenegro's (2021) analysis shows that, despite the ideals listed in the aforementioned law regarding the universalization of water and sewage services for the entire population, what was observed in the example developed in Alagoas for the implementation of the law was not this; it did not prove effective in bringing access to water and sanitation to populations that currently do not have them.

Analyzing current data, it was observed that access to water and sanitation has expanded considerably in Maceió, reaching approximately 87% of the population with access to water, with advances even in the lagoon region, the focus of this study (ANA, 2021). However, regarding sewage treatment, this reality is not repeated, with the population having coverage of around 27% of the sewage network (SNIS, 2022). If neighborhoods are considered from a racial perspective, this percentage will further highlight the reality of predominantly Black neighborhoods, with worse data regarding access to sewage treatment.

By presenting the data in this way, through the percentage of the population that has or does not have access to water and sanitation systems, much of the real information about the population's lives and their relationship with these same water and sewage systems is not represented. However, this indicator of access or lack thereof in terms of percentage of inhabitants in the region is one of the most used by the State and academia to refer to the subject, whether in research or public policies. Just to give an example of how flawed they can be, it is enough to consider that having access to the water network does not mean having water

available twenty- four hours a day in your home, which would indicate continuity of access, which is another necessary indicator when thinking about water security and access to water.

Indicators are ways of measuring or translating our perceptions of the environment we are in, or even a segment of nature, in order to interpret the situation of that environment. Subsequently, this collected data can be compared with each other and with data from other environments, allowing for interpretations that aid studies or policies/laws. Therefore, they are of great importance to science and the creation of public policies, as they provide the necessary metrics and databases. Indicators themselves represent a simplification of the real environment, as it is quite complex and constantly changing, making it impossible to capture everything that happens around us. Thus, the function of an indicator is to capture a momentary characteristic of this environment so that, with this characteristic, we can think about and try to understand a particular behavior of that environment under study (Maia *et al.*, 2001).

Based on this idea of indicators, it can be understood that, since they represent a snapshot of reality based on a perception, the definition of that perception is fundamental to how that reality will be interpreted. This already inherently implies a political character. Because the way indicators are defined will reflect how the person who conceived them perceives the world and how the hegemonic power of society is acting, or wishes to act, to define which data are important to measure and which are not.

Leo Heller (2022) offers a different approach to water-related issues by treating it beyond a mere natural resource. He criticizes the traditional method of monitoring the performance of regulatory powers through what he calls “key performance indicators” (Heller, 2022, p. 336). He proposes a more complex approach, in which access to water, for example, is not evaluated solely by the variable/indicator of whether or not access is available, but rather by considering other issues simultaneously, such as availability, accessibility, quality and safety, economic accessibility, acceptability, privacy and dignity, participation and access to information, equality and non-discrimination, among others. In other words, factors that allow us to understand why the population has or does not have access, and not just measure whether it exists or not.

Heller (2022), along with other authors, advanced discussions regarding the guarantee of access to water and sanitation as a human social right, expanding the idea of water from a merely economic resource to its essential role in life. In his book on the human right to water, he comprehensively addresses this alternative perspective, demonstrating an evolution in the way water is conceived within engineering, embedded in a broader network of relationships.

He also introduces concepts related to implementing policies and considering water management as a human right. However, limitations are evident both in this idea of water as a human right—placing the human element outside a more integrated ecosystem perspective, although the author acknowledges his concern for environmental health in a broader and more integrated way—and in the way the indicators were designed, failing to clearly address social and racial issues, ultimately erasing these themes when discussing sanitation.

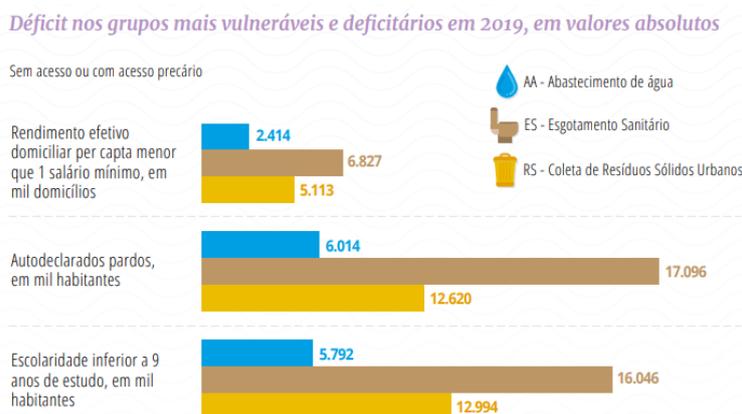
Expanding the discussion to environmental indicators, Acselrad, Mello, and Bezerra (2009), with contributions from Haroldo Torres, discuss how these indicators have been treated by academia and public policymakers. According to them, there has been no interrelation between environmental and social conditions, focusing instead on environmental issues considered as conditions of the place's nature, as if that were what matters in itself, without considering that the social relations that occur in this same environment continuously transform it and should indeed be considered when thinking about indicators. Furthermore, by social relations, they do not only refer to the fact that human beings are in a space and this causes changes in it. They are thinking beyond that, about the fact that there are different social relations according to the social characteristics of the population, be it social class, race, or gender. In other words, social inequalities cause changes in the relationship with the environment. This, then, needs to be considered within the design of the indicators if one wants to translate through them the reality perceived in the environment under analysis.

The authors also commented on a study conducted in São Paulo that defined the IES (Social Exclusion Index), included in the Atlas of Social Exclusion in Brazil. This index includes the following variables: “poverty, employment, inequality, literacy, schooling, youth presence, and violence” (Acselrad; Mello; Bezerra, 2009, p. 51, our translation). The authors cited a study by Torres and Marques that cross-referenced the areas analyzed by the SIE with areas of environmental risk in the city of São Paulo, showing a direct relationship between areas of social exclusion and areas of high risk of environmental accidents. Although it was an advance to address all these social variables in the analysis of social exclusion when considering an indicator, I point out that it is strange not to have a variable for race among them, considering how intertwined it is with these issues in Brazil.

Since, by cross-referencing social data and observing the available indicators, it is already possible to note the direct relationship between race and the deficit in access to adequate basic sanitation conditions, given that a large part of the Black population in cities occupies peripheral and marginalized regions due to the process of exclusion and denial of access to land

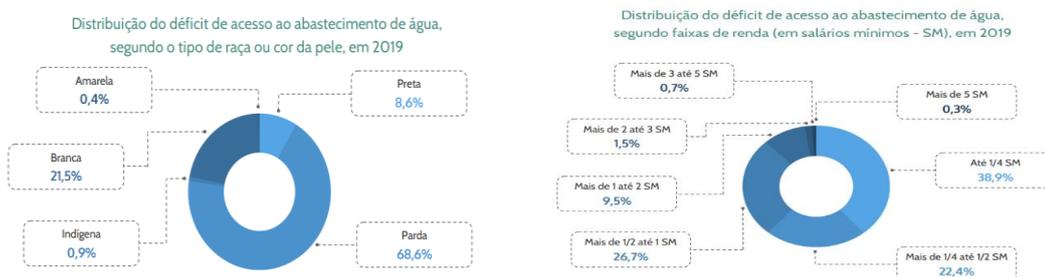
and property, then, also due to their income, what remained for them was to settle in remote, vulnerable locations where the State was absent, a movement still seen today. Figures 8, 9, and 10 reinforce what we are trying to point out.

**Figure 8** – Deficit in the most vulnerable and disadvantaged groups in 2019, in absolute values.



Source: Brazil (2023).

**Figure 9** – Deficit in access to water supply in 2019 by (a) race or skin color (b) income brackets



Source: Brazil (2023).

**Figure 10** – Deficit in access to sanitation in 2019 by (a) race or skin color (b) income brackets



Source: Brazil (2023).

As mentioned, Figures 8, 9, and 10 demonstrate the correspondence between the majority of the population without access to water supply and sanitation, which is probably the largest segment of the population with the lowest income brackets, since this segment has the greatest access deficit.

Returning to the reality of Maceió, within the specific neighborhoods bordering the Mundaú Lagoon, and considering the discussion of access to sanitation, an even worse reality is observed, with several places lacking this access, possessing channels that once corresponded to streams and that today are configured as open sewers, as portrayed in the documentary *Tragic Sanitation* (Canal Zazo Mcz, 2018). In it, one can see the channels overflowing with sewage and the streets flooded during rainy periods, as in Figure 11. Here we return to the reflection on the waters of Alagoas, remembering that they are in charge! Those who racialized and made vulnerable both the waters and the environment where they are found were the humans who came to inhabit this space. But they do not submit to this racialization! I think this is one of the issues that needs to be understood and learned to deal with. Dirty or clean, they will continue to follow their courses. They need movement.

**Figure 11** – Images of the Levada neighborhood in Maceió depicted in the documentary *Tragic Sanitation on Rainy Days*



Source: Zazo Mcz Channel (2018).

Antônio Bispo (2018) spoke extensively about other perceptions regarding this racialization, or objectification, carried out by colonizers in relation to non-human entities of nature, such as water and land, and even ourselves as humans. When, in one of his texts, he discussed how Quilombola communities understand themselves as belonging to the land and not the other way around—that is, not understanding themselves as landowners—he introduced Quilombola thought, which is counter-colonial. He presents a discussion about colonial thinking, which for him is synthetic and linear, and Quilombola thought, which is organic and circular (Santos, 2018). The attempt to understand the confluence in Antônio Bispo's perception has much to contribute to broadening discussions and possibilities regarding sanitation and environmental relations, in the sense of uniting knowledge of formal techniques with other forms of knowledge perceived in various parts of Brazil.

Linear thinking is widely perceived in Brazilian legislation concerning basic sanitation, which advocates a standard sewage and water supply system model for all localities as if we lived in a uniform and homogeneous country. Other possibilities in the practices of certain localities that experience this relationship with water differently are not considered. Most of the time, these other possibilities are seen as irregular.

## **Final Considerations**

When reflecting on Brazilian social inequalities and differences in access to water and sanitation, several questions arise, all related in some way to relationships with water and nature in general. From a historical analysis, it becomes clear that the privileged segment of the population is indeed being covered by the so-called universalization of services, within the percentages of service that are openly disclosed in the form of indicators. But the segment not served from the beginning remains almost the same, which is evidence of the flaw in this way of measuring indicators. These absences are glaringly obvious! And it is precisely these voices that need to be heard through socio-environmental indicators.

To think that universal access to sanitation services in Maceió, and in Brazil in general, is due to a lack of public resources and that this will only be possible through private initiative seems to contradict everything that has been done so far. Expanding the analysis, what is perceived is a new form of hegemonic power controlling processes and maintaining control over public infrastructure services, transferring this power to specific companies and even

receiving resources from state-owned banks, thus configuring a reorganization of hegemonic regulation.

This raises the question of why these banks cannot directly finance public companies to carry out these works/services. Isn't this a way for the State to regulate in service of those holding hegemonic power, in order to maintain this desired balance in favor of those same power holders? One thing that can be understood here is that the focus is not on the population and its universal (effectively for all) and democratic access to infrastructure services. This question of "ineffective universalization" or "directed universalization" is an issue that needs to be explored.

This work, in addition to presenting the history of Maceió through the lens of water, attempted to expand these perceptions, converging issues related to nature with social, racial, technical, and political issues, in order to understand that everything is within this process of water relations, including the means of regulation. Based on all this tension and the reflections proposed here, drawing inspiration from Bispo's (2018) counter-colonial thought, the aim is to consider other socio-environmental indicators that are non-racist and that more effectively characterize the reality experienced by the entire population, thus enabling the design of truly democratic public policies for water that guarantee the desired universal access and dynamic ecosystem balance.

Lindoso's statement is brought up again: in Alagoas, the waters rule. Perhaps broadening this perception and bringing together the technology, movement, and life of the waters and human and non-human beings (living and non-living) could be an alternative. How to think about indicators that enable this confluence is one of the questions of this work. Even when talking about water sanitation, the focus is on how to divert and control the waters so that the health and well-being of human beings are achieved. Perhaps another perspective is needed: how to coexist with these waters in a way that achieves an ecosystemic balance between us (humans) and the human and non-human entities (living and non-living) around us?

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### ***CRediT Author Statement***

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