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Water as a Commodity: Challenges and Implications of the Commercialization of a Vital Resource

Água como Mercadoria: Desafios e Implicações da Comercialização de um Recurso Vital

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ABSTRACT

Water, soil, and air are the planet's natural capitals that have made life viable, and without them, biodiversity will disappear. The drought we are experiencing due to global warming puts everyone on alert to mitigate the risks to these vital common goods. Water is a resource in crisis due to scarcity, misuse, poor distribution to the most vulnerable populations, contamination, and pollution, but it still attracts the private sector's greed. Water privatization, distribution, and basic sanitation services have been touted as a panacea to solve urban problems. Several cities have followed the path of privatization, embracing neoliberal ideologies or using it as a lever to pay off state debts without considering social aspects. Studies demonstrating the positive or negative impacts of privatization are still rare. The objective of this conceptual work was to analyze trends in water management service providers around the world. The methodology was based on works published in journals and online. There has been a trend towards privatization. However, many cities have chosen to go in the opposite direction by municipalizing their water supply and sanitation services.

Keywords: Sustainability; Climatic Changes; Social Development; Human Right; Privatization; Remunicipalization.

RESUMO

Água, solo e ar são os capitais naturais do planeta que tornaram a vida viável e, sem eles, a biodiversidade desaparecerá. As secas que estamos enfrentando devido ao aquecimento global colocam todos em alerta para mitigar os riscos a esses bens comuns vitais. A água é um recurso em crise devido à escassez, mau uso, má distribuição às populações mais vulneráveis, contaminação e poluição, mas ainda atrai a ganância do setor privado. A privatização dos serviços de distribuição de água e saneamento básico tem sido alardeada como uma panaceia para resolver problemas urbanos. Várias cidades seguiram o caminho da privatização, abraçando ideologias neoliberais ou usando-a como alavanca para pagar dívidas estaduais sem considerar os aspectos sociais. Estudos que demonstrem os impactos positivos ou negativos da privatização ainda são raros. O objetivo deste trabalho conceitual foi analisar tendências em prestadores de serviços de gestão de águas ao redor do mundo. A metodologia baseou-se na análise de trabalhos publicados em periódicos e online. Houve uma tendência à privatização. No entanto, muitas cidades tomaram a direção oposta, municipalizando os serviços de abastecimento de água e saneamento.

Palavras-chave: Sustentabilidade; Mudanças climáticas; Desenvolvimento ocial; Direitos Humanos; Privatização; Remunicipalização

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INTRODUCTION

"The wars of the next century will be about water."
In: Water Wars? A Talk with Ismail Serageldin
SERAGELDI, 2009

Water is the planet's natural capital that has made life viable and maintained the evolution of species, playing a crucial role in keeping ecosystems sustaining diversity. It remains critical to the survival and well-being of all living things, as it is the universal solvent that allows biochemical processes and nutrient flow to occur in ecosystems, but also carries sediments and pollutants. Water covers about 70% of the planet, makes up to 60% of an adult human, and is essential for various bodily functions, including temperature regulation, nutrient transport, and waste disposal. Water has shaped and continues to shape the entire geography of the planet through rivers, glaciers, ice sheets, and groundwater (ACREMAN, 1999). For example, in the recent floods in the State of Rio Grande do Sul (Brazil), caused by the unprecedented volume of rainfall, about 2.4 million people were affected by losses in urban and rural infrastructure, approximately 600,000 people were displaced from their homes (PILLAR and OVERBECK, 2024). In this event, the rivers, along with Lagoa dos Patos, were significantly altered due to severe soil erosion caused by intensive agriculture.

The world is facing a huge crisis and water war that worries society, public managers, political scientists, and social media (BISWAS and TORTAJADA, 2019). Water is indispensable for all biodiversity, but it also plays a crucial role in global food security, and climate change may intensify its importance, highlighting the need for groundwater observations and adaptation strategies (TAYLOR et al., 2013). The oceans hold 97% of the water mixed with many salts, 3% corresponds to fresh water and less than 0.001% is as vapor in the atmosphere. Although we have only about 0.3% of the world's water resources in conditions for use, this natural resource is not being used rationally and there is already an almost absolute drought in many planet regions More than four billion people do not have access to adequate drinking water, that is, free of fecal microorganisms, pesticides, heavy metals and microplastics (GREENWOOD, 2024). Environmental water contamination is the world's leading cause of illness and death, largely caused by agribusiness, which is the largest consumer and, additionally, major polluters. The detrimental effects of water pollution extend to all creatures that drink, use, or live in it (MANDALIA, 2012). These contaminants can negatively affect important functions that underpin our entire anatomy and physiology. This situation can

be aggravated by the increase in the population, which today is around 8 billion people. As the world's population increases, so does the need for water (KILIC, 2020).

Humans need water constantly and have the right to use natural sources, but these sources are the property of the states and not the citizens. Therefore, they have the right to access water without organic or inorganic contaminants and at no cost, as it is the fundamental natural capital for health. From the perspective of human needs, water is more valuable than gold or oil, as life itself depends on it. For humans, for decades, the world's underground gold was oil, but modern gold is water. However, many regions around the world still face water scarcity. Water is equally essential as sanitation and is recognized as one of the UN Sustainable Development Goals (SDG 6) (IPEA, 2019).

Among the numerous books covering various historical and physicochemical aspects of water, we highlight three for their convenience and accessibility. Profs. José G. Tundisi and Takako Tundisi describe in their book "Limnology" the main mechanisms of interactions with physical and chemical factors, diversity, and geographic distribution (TUNDISI and TUNDISI, 2008). This book shows, in detail, the mechanisms of operation of the main continental aquatic systems, their dynamics, variability, and characterization: lakes, dams, flooded areas, saline lakes, estuaries, and coastal lagoons. David L. Sedlak, in his book "Water 4.0: The Past, Present, and Future of the World's Most Vital Resource", analyzes the historical water use of water by man during the last 2,500 years (SEDLAK, 2015) and Philip Ball, in turn, deals with groundwater in his work “H_2O. Una Biografia Del Agua” which, even though it was quite comprehensive, did not cover everything important about water (PHILIP, 2010). However, there is an excerpt from his book that sums up the spirit of water well:

> "Even when we strip it of its symbolic ornaments, of the association with purity, with the soul, with motherhood and with life and youth, when we reduce it to a laboratory chemical reagent or a geological phenomenon, water continues to fascinate. Seeming like a simple molecule, water also provides profound science challenges."
>
> (Philip Ball, 2022)

The shortage and improper drinking water use present significant risks to sustainable development, environmental health, human wellness, food security, and industrial growth. This natural capital, indispensable to the survival of human beings, cannot be treated as a commercial product to meet capitalist interests. Water, being a vital resource, carries a symbolic and moral value, and many communities see the privatization

of this resource as a threat to equity and social justice. It is not just about water availability, but distribution: who receives and how much receives it (water justice) and how water is used (sustainability). This crisis sends a clear message that implies the right to water, the organization, and how humans relate to water. However, significant transformations are essential to create a more sustainable and just world.

Privatization is an action that covers a wide variety of activities within the context of water collection, treatment, and distribution, activities that the government can undertake with public services. This action infers the lessening of government controls, the sale of a minority or majority stake in a state-owned enterprise to private buyers, the delegation of management responsibility of a state-owned enterprise to private managers, and the relaxation of the state's monopoly of an essential service to allow private market entry. Proponents of private sector involvement in water services argue that it enhances the human right to water by increasing efficiency and lowering prices. However, opponents contend that the reality is quite the opposite.

The theme of water as a commodity is intriguing because what was a public good is now privatized by political decisions with pressure from businessmen. This mercantilist view of water dates to the 1980s and 1990s, with the World Bank's thesis that privatization of water production and distribution would combat financing problems for infrastructure and improve supply efficiency, that is, water should be managed as an economic good (ICWE, 1992; KESSIDES, 2005). However, this view has become obsolete, and in many cities, there is a contrary movement with the municipalization of water and sewage treatment services. Some time ago, Maude Barlow and Tony Clarke reported in their book "Blue Gold: The Battle Against Corporate Theft of the World's Water" the battle against the corporate theft of the world's water (BARLOW and CLARKE, 2002). They argued that water flows mainly to the rich, limiting consumption by most of the population with exorbitant prices. Transnational corporations are increasingly in control of the world's water supply. In England, Indonesia, and France, water has been privatized, prices have skyrocketed, and the quality of services has worsened, allowing bottled water producers, who generate exorbitant profits and are poorly regulated, to buy freshwater rights and deplete crucial supplies (PUBLIC CITIZEN, 2003).

This article aims to illustrate that water is the most coveted natural resource by capitalist interests, analyze its global management by the private sector and prompt reflection on the implications of treating water as a commodity for human life.

METHODOLOGY

To better understand the evolution of the privatization of water-related services, a search was carried out in publications of articles contained in academic databases and websites using the terms "water purification" and "privatization of water". This article analyzes the recent empirical evidence of authors studying deprivatization, emphasizing water distribution, and corroborates the trend toward a global movement to reevaluate privatization policies (MCDONALD, 2019).

RESULTS AND DISCUSSION

In several countries, goals have been set to privatize as many companies as possible that provide essential services, such as water, energy, and transport. However, the data show that the privatizing trend of companies has decreased significantly, and services have been renationalized in several countries, including water purification and distribution services. Private utilities for public services provision such as water and sewage sanitation emerge as a relatively new economic activity. Public sector water management has been practiced for hundreds of years, but recently water privatization has gained ground in the global economy, with 5% of the world's water services being managed by private companies. In many cities, water and sanitation services continue to be managed by the public sector because private companies are not interested in taking over these services. On the other hand, an interesting phenomenon that is happening around the world is the remunicipalization of water distribution services after years of privatization (including public-private partnerships and outsourcing), indicating that this water and sanitation privatization model has problems (MCDONALD, 2019).

Studies and reports from non-governmental organizations have demonstrated that renationalization is driven not only by economic factors but also by socio-political considerations, particularly in developing countries (ESTRIN and PELLETIER, 2018). Privatizations do not work, as they make the quality of services more expensive and reduce the quality of services, driven by the objective of increasing the profits of these companies, becoming obstacles to local development.

The supply of water by private companies at high costs gained momentum from the 1980s onward, driven by the belief that the private sector would manage services more efficiently than the public sector. The investments would be related to supply, sanitation

services, water resources management, and water-related risks. Several governments have adopted this policy to reduce fiscal deficits, attract investments, and enhance service quality. However, market logic does not always function optimally for goods and services that are public and essential for health and quality of life. Subsequent decades did not validate the thesis that reforming the management of private water systems would enhance the overall system and provide quality service at fair prices for all.

The renationalization of services, particularly in water purification and distribution, has emerged in various regions worldwide as a widespread response to dissatisfaction with private management. This dissatisfaction was often related to high tariffs, poor service quality, lack of investment in infrastructure, corruption with private management, and unsatisfactory customer service (BEL, 2020). This change of course in the debate on the management of essential services reflects a learning experience on the part of many governments and pressure from society. As goods and services of a public nature are fundamental to the citizen's quality of life, the phenomenon of renationalization reminds us that there are cases in which public control can respond more adequately to social and environmental demands.

In Brazil, neoliberal privatists argue that privatization is the solution to the problems of water supply services. Water was included as a vital environmental resource in the Federal Constitution of Brazil and reflects the recognition of the crucial importance of this substance for sustainability and quality of life. In article 225, the Federal Constitution of Brazil highlights the relevance of an ecologically balanced environment as a fundamental right of all, emphasizing that water is good for the common use of the people and essential for the maintenance of a healthy life:

> "Everyone has the right to an ecologically balanced environment, a good for the common use of the people and essential to a healthy quality of life, imposing on the Government and the community the duty to defend and preserve it for present and future generations".
>
> Article 225 of the Federal Constitution of Brazil
>
> (BRASIL, 1988)

The regulation of this article is established by Law No. 9,985, enacted on July 18, 2000, which reinforces these principles by specifically addressing water-related issues in several of its provisions. (BRASIL, 2000). The definition of environmental resources in article 2, item IV, explicitly highlights "environmental resource: the atmosphere, inland,

surface and underground waters, estuaries, territorial sea, soil, subsoil, elements of the biosphere, fauna and flora", expanding the scope of the legislation beyond water and recognizing the interconnection and interdependence between these natural resources. The water extracted free of charge from rivers and aquifers belongs to everyone, not just those who withdraw it without permission and sell it later, because water is a common good (BARLOW and CLARKE, 2002).

The water supply in Brazil has long been viewed by the private sector as a lucrative opportunity for exploitation, particularly since most systems were initially established by the public sector in urban areas. On July 15, 2020, the Federal Government (2019-2022) approved Law 14,026/2020, establishing a new regulatory framework for basic sanitation, boosting water privatization in Brazil following the privatist interests of large national and international capital. The new regulatory framework for sanitation is based on the premise that greater private sector participation can contribute to overcoming the challenges inferred by access to services. This law gives the National Water and Basic Sanitation Agency (ANA) the competence to issue reference standards for the basic sanitation services regulation. In their paper, Silva et al. argue that this law created a branch of private capital by changing the organization previously established for services (SILVA, 2022).

The "Guide: The Regionalization of Basic Sanitation in Law 14.026/2020" produced by the National Observatory of the Rights to Water and Sanitation (ONDAS) details the entire scope of this Law and its deleterious effects on municipalities (ONDAS, 2021). However, given that water is a public natural resource, it is unreasonable to impose charges for its services, especially in an equitable manner. People with higher purchasing power pay the same amount as the most vulnerable people for water sold by companies. In Brazil, data indicates that over 33 million Brazilians lack access to drinking water, while nearly 100 million do not have proper sewage collection and treatment. In the world, one billion people live in extreme poverty without drinking water, that is, they cannot pay for water, and their human rights are not respected (ITB, 2023; ANGEL and LOFTUS, 2019).

The privatization of water and basic sanitation in Brazil and the world shows the failure of this policy (SUDRÉ, 2020). As Brazil contains 13% of the planet's freshwater reserves, it reflects the greed of capitalist forces that have implemented a global strategy to commodify water through privatization, claiming it will serve consumers' interests. (JAYASWAL et al., 2017). The next capital strategy is to expand the commodification

of water through Senate Bill No. 495/2017, which amends Law No. 9,433, of January 8, 1997, to introduce water markets as an instrument to promote more efficient allocation of water resources. Although this project has been shelved and its processing closed, his idea will continue, because water is a very precious asset and subject to great profits (BRASIL, 2017). The private sector's investments in Brazilian water and sanitation are aimed more at profit than at providing quality care for the product distributed to the Brazilian population. Privatists reforms always argue that governments do not have the necessary resources to universalize coverage (COSTA, 2023), but they do not guarantee tariff reductions. Côrtes et al. studied tariffs and showed that privatization leads to an increase, but universalization improves (CÔRTES et al., 2023; BRITO and REZENDE, 2017).

Another serious problem is the quality of the water distributed by private companies. The recent contamination of the water distributed to consumers, in several places in the world, proves the lack of quality and commitment of t The recent contamination of water supplied to consumers in various locations worldwide highlights the lack of quality control and commitment from the companies involved he companies. This does not mean that water distribution companies will deliver water with high purity without heavy metals, micro and nanoparticles, and pesticides. An example of this neglect of the quality of the water offered to the consumer is the recurrent cases of contamination of the water distributed in the metropolitan region of the State of Rio de Janeiro, Brazil, after privatization, demonstrating a decrease in the quality of service, especially in the poorest peripheral areas (UERJ, 2020; JN, 2024). Another notable example is the request made by the Public Prosecutor's Office of the State of Santa Catarina, Brazil, to conduct quality analyses of the drinking water in 100 cities across the region. The results indicated that 22 municipalities receive water with traces of pesticides in the taps (SPAUTZ, 2019).

As pointed out by a study by the Transnational Institute (MURRAY et al.,2023; PIGEON et al., 2012), from 2000 to 2019, 312 cities in 36 countries renationalized their water and sewage treatment services. The big cities have renationalized (or municipalized) or decided not to privatize (MCDONALD, 2019). The cities are Cochabamba (Bolivia, 2000), Paris, Grenoble and Montpellier (France, 2010), Italy (2011), Berlin (Germany, 2013), Buenos Aires (Argentina, 2006), La Paz (Bolivia), Santiago (Chile), Uruguay (2004), Hungary (Budapest, 2012), Malaysia (Selangor, 2019), United States of America (e.g. Indianapolis, Atlanta, etc.), South Africa (Johannesburg and other cities), (RODINA and HARRIS, 2016) Hamilton (Ontario, Canada, 2004), and many others (PIGEON et al., 2012). These examples show a growing

global movement towards the deprivatization of water. The most notable example was the case of Paris, which renationalized its water supply network after decades of privatization. The decision was made after years of criticism of the increase in tariffs and the lack of transparency in private management (MCDONALD, 2019).

Privatization is not the only alternative for water distribution and basic sanitation. It is possible to reconcile efficiency and the logic of producing quality drinking water with sanitation associated with social rights (BRITO and REZENDE, 2017). Despite the tensions, their limited potential, and their weaknesses, current human rights to water and sanitation continue to serve as a tool for including those in the most vulnerable situations. (VAN DEN BERGE et al., 2019). The State should act as the guardian of water distribution and basic sanitation; however, it has become the focal point of political struggles over the right to water and a barrier to achieving water justice. The State cannot think and act against and beyond the water rights.

CONCLUSION

The right to water remains limited for many people around the world. Despite decades of efforts by committed activists, policymakers, and academics, access to water remains deeply contested and unevenly distributed. Concatenated action is needed to reverse current trends of overconsumption, pollution, and growing threats of drought and flooding at local, national, and international levels. Many of the processes of remunicipalization would not have been possible without the mobilization of committed citizens. Likewise, it is illusory to remunicipalise water services at lower costs or free for the most vulnerable people who cannot afford this natural asset that once belonged to everyone.

While Brazil continues with privatization processes (e.g. the State of Rio de Janeiro and the State of São Paulo), in other cities, in several countries, communities and governments have chosen to regain control in search of social justice, sustainability, and long-term efficiency.

Beyond controlling the distribution of water and basic sanitation, cities need to mitigate pollution in natural water sources, as failure to do so results in greater costs for purification later. This contradicts not only the principles of a sustainable city in urbanization and industrial activities but also economic logic, as well as putting the human right to water and sanitation off the political agenda. The path to water justice in

the modern world is very clear and shows that repeating privatizations doomed to failure is a big mistake.

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CONFLICT OF INTEREST

There is no potential conflict of interest on the part of the authors.

REFERENCES

ACREMAN, M. Water and Ecology Linking the Earth's Ecosystems to its Hydrological Cycle. **Revista CIDOB d'Afers Internacionals**, v. 45-46, p. 129-144, 1999.

ANGEL, J.; LOFTUS, A. With-against-and-beyond the human right to water. **Geoforum**, 98, 206-213, 2019.

BALL, P. H_2O. Una Biografia Del Agua. San Diego: Fondo De Cultura Economica, 2010SERAGELDIN, I. Water Wars? A Talk with Ismail Serageldin. **World Policy Journal**, v. 26, p. 25-31, 2009.

BARLOW, M.; CLARKE T. **Blue Gold: The Fight to Stop the Corporate Theft of the World's Water**. New York: Earthscan, 2002.

BEL, G. Public versus private water delivery, remunicipalization and water tariffs, **Utilities Policy**, v. 62, p. 100982, 2020.

BISWAS, A.K.; TORTAJADA, C. Water crisis, and water wars: myths and realities. **International Journal of Water Resources Development**, v. 35, p. 727–731, 2019.

BRASIL. Constituição Federal da República Federativa do Brasil (1988). Disponível em: <http://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm>. Acesso em 23 set. 2024.

BRASIL. Lei Nº 9.985, de 18 de Julho de 2000. Brasília, DF: Diário Oficial da União, 2000. Disponível em: <https://www.planalto.gov.br/ccivil_03/leis/l9985.htm>. Acesso em: 21 set. 2024.

BRASIL. Senado Federal. Projeto de Lei do Senado n° 495, de 2017. Brasília, 2017. Disponível em: <https://www25.senado.leg.br/web/atividade/materias/-/materia/131906>. Acesso em: 21 set. 2024.

BRITTO, A.L.; REZENDE, S.C. A política pública para os serviços urbanos de abastecimento de água e esgotamento sanitário no Brasil: financeirização, mercantilização e perspectivas de resistência. **Cadernos Metropole**, v. 19, p. 557-581, 2017.

CÔRTES, L.S. et al. Impacto da privatização da água e do esgoto nas tarifas e no acesso aos serviços no Brasil. **Revista Brasileira de Estudos Populacionais**, v. 40, p. e0256, 2023.

COSTA, N.R. Basic Sanitation Policy in Brazil: ideas, institutions and challenges in the Twenty-first Century. **Ciência & Saúde Coletiva** v. 28, p. 2595-2600, 2023.

ESTRIN, S.; PELLETIER, A. Privatization in Developing Countries: What Are the Lessons of Recent Experience? **The World Bank Research Observer**, v. 33(1), p. 65–102, 2018.

GREENWOOD, E.E. et al. Mapping safe drinking water use in low- and middle-income countries. **Science**, v. 385(6710), p. 784-790, 2024.

ICWE. The Dublin Statement on Water and Sustainable Development. **Waterlines**, v. 10, n. 4, p. 4–5, 1992.

IPEA. **ODS 6 - Água Potável e Saneamento - Ipea - Objetivos do Desenvolvimento Sustentável.** Disponível em: <https://www.ipea.gov.br/ods/ods6.html#:~:text=At%C3%A9%202030%2C%20melhorar%20a%20qualidade>. Acesso em: 21 set. 2024.

ITB. **Brasil precisará mais do que dobrar investimentos para universalização do saneamento básico, aponta estudo do ITB**. Instituto Trata Brasil. Disponível em: <https://tratabrasil.org.br/brasil-precisara-mais-do-que-dobrar-investimentos-para-universalizacao-do-saneamento-basico-aponta-estudo-do-itb/>. Acesso em: 21 set. 2024.

JAYASWAL, K. et al. Water Pollution, Human Health and Remediation. **Water Remediation**, p. 1127, 2017.

JN. **Contaminação da água que abastece a Região Metropolitana do Rio deixa 2 milhões de pessoas com as torneiras secas**. Jornal Nacional, 05 abr. 2024. Disponível em: <https://g1.globo.com/jornal-nacional/noticia/2024/04/05/contaminacao-da-agua-que-abastece-a-regiao-metropolitana-do-rio-deixa-2-milhoes-de-pessoas-com-as-torneiras-secas.ghtml>. Acesso em: 23 set. 2024.

KESSIDES, I.N. **Reforming Infrastructure Privatization, Regulation, And Competition Reforming Infrastructure A World Bank Policy Research Report**. [s.l: s.n.]. Disponível em: <https://documents1.worldbank.org/curated/en/709301468779183565/310436360_20050007115940/additional/289850PAPER0reforming0infrastructure.pdf>. Acesso em: 21 set. 2024.

KILIC, Z. The importance of water and conscious use of water. **International Journal of Hydrology**, v. 4, p. 239-241, 2020.

MANDALIA, H.C. Earth Blue Gold –Water, Its Pollution and Causes of Cancer. **Health Sciences Research**, v. 1, p. 30-34, 2012.

MCDONALD, D.A. Remunicipalization and the human right to water. A signifier half full? Em: **Water Politics: Governance, Justice and the Right to Water**. SULTANA, F.; E LOFTUS, A. (EDS), 1st ed. Boca Raton: Routledge, 2019.

MCDONALD, D.A. Remunicipalization: The future of water services? **Geoforum**, v. 91, p. 47-56, 2018.

MCDONALD, D.A. Finding common(s) ground in the fight for water remunicipalization. **Community Development Journal** v. 54, p. 59-79, 2019.

MURRAY, A. et al. **Rivers of resistance | Transnational Institute**. Disponível em: <https://www.tni.org/en/publication/rivers-of-resistance>. Acesso em: 21 set. 2024.

ONDAS. **Observatório Nacional dos Direitos à Água e ao Saneamento**. [s.l: s.n.]. Disponível em: <https://ondasbrasil.org/wp-content/uploads/2021/04/Final-Guia-da-Regionalizacao-05072021-atualizado.pdf>. Acesso em: 21 set. 2024.

PIGEON, M. et al. (EDS.). **Remunicipalisation: Putting Water Back into Public Hands**. Amsterdam: Transnational Institute, 2012.

PILLAR, V.D. OVERBECK, G.E. Learning from a climate disaster: The catastrophic floods in southern Brazil. **Science**, v. 385(6713), 2024.

PUBLIC CITIZEN. **Water Privatization Fiascos: Broken Promises and Social Turmoil Public Citizen**. [s.l: s.n.]. Disponível em: <https://es.ircwash.org/sites/default/files/PublicCitizen-2003-Water.pdf>. Acesso em: 21 set. 2024.

RODINA, L.; HARRIS, L. Water Services, Lived Citizenship, And Notions of The State in Marginalised Urban Spaces: The Case of Khayelitsha, South Africa. **Water Alternatives**, v. 9(2), p. 336-355, 2016.

SEDLAK, D.L. Water 4.0: The Past, Present, and Future of the World's Most Vital Resource. New York: Yale University Press, 2015.

SILVA, J.I.A.O. et al. O desmonte da estatalidade brasileira no caso da política pública de saneamento e a falácia da regionalização como vetor de desenvolvimento regional. **Revista Brasileira de Estudos Urbanos e Regionais**, v. 24, p. e202212, 2022.

SUDRÉ, L. **Exemplos no Brasil e no mundo mostram fracasso da privatização do saneamento básico**. Disponível em: <https://www.brasildefato.com.br/2020/07/28/exemplos-no-brasil-e-no-mundo-mostram-fracasso-da-privatizacao-do-saneamento-basico>. Acesso em: 21 set. 2024.

SPAUTZ, D. **Água que chega às torneiras tem resquícios de agrotóxicos em 22 cidades de SC**. Disponível em: <https://www.nsctotal.com.br/colunistas/dagmara-spautz/agua-que-chega-as-torneiras-tem-resquicios-de-agrotoxicos-em-22-cidades>. Acesso em: 23 set. 2024.

TAYLOR, R. et al. Groundwater and climate change. **Nature Climate Change**, v. 3, p. 322-329, 2013.

TUNDISI, JOSÉ G.; TUNDISI, TAKAKO. M. Limnologia. 1st ed. São Paulo: Editora Oficina de Textos, 2008.

UERJ. **Especialista orienta sobre risco de contaminação pela água**. Universidade do Estado do Rio de Janeiro. Disponível em: <https://www.uerj.br/noticia/especialista-orienta-sobre-risco-de-contaminacao-pela-agua/>. Acesso em: 23 set. 2024.

VAN DEN BERGE, J.; BOELENS, R.A.; VOS, J.M.C. Citizen mobilization for water. The case of Thessaloniki, Greece. Em: Water Politics: Governance, Justice and the Right to Water. SULTANA, F.; E LOFTUS, A. (EDS), 1st ed.; Boca Raton: Routledge, 2019.