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Brazilian Hydropolitics under the United Nations 2030 Agenda

A hidropolítica brasileira sob a Agenda 2030 das Nações Unidas

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Abstract

The global framework set forth by the United Nations 2030 Agenda and its Sustainable Development Goals (SDG) include water resources in their scope, which emphasizes how water assets and society well-being are closely intertwined and how crucial they are to achieving sustainable development. This paper explores the role of hydropolitics in that Post-2015 Development Agenda and uses Brazilian hydropolitics set to reach SDG6 as a case study.

Resumo

A estrutura da Agenda 2030 e dos seus Objetivos de Desenvolvimento Sustentável (ODS) incluem a água em seu escopo, demonstrando que esse recurso natural está entrelaçado com o bem-estar da sociedade e é necessário para o alcance do desenvolvimento sustentável. Este artigo explora como a hidropolítica contribui com essa nova agenda de desenvolvimento, analisando as políticas hídricas brasileiras em relação ao ODS6.

Keywords: 2030 Agenda; Sustainable Development Goals (SDGs); Hydropolitics.

Palavras-Chaves: Agenda 2030; Objetivos do Desenvolvimento Sustentável (ODS); Hidropolítica.

Introduction

In his paper, Bryan Lufkin (2017), the editor of *Future Now*, argues that hydropolitics will shape human society, especially in the 21st century. Lufkin (2017) merely reaffirms what is obvious to the international community: water issues are one of the main challenges of the current century. Despite its historical relationship with human society and its key role in maintaining life, water has been facing constant adversities because of its management, uses, and the models adopted worldwide by the states. Schleifer (2017)

and Moore (2018) argue that our society is facing a global water crisis, and governments, businesses, universities, and citizens around the world must act as soon as possible to come up with solutions to water challenges. With so many uses and so many different interests involved, water management is a complex and frequently contested issue in contemporary international relations. Population growth, climate change, energy security and resource demand for food security are also factors that contribute to severe water resources around the world. The problem is even worse for countries that are beset with a combination of severe water scarcity, poverty, and instability.

According to the United Nations (WWAP; UN-WATER, 2018), more than 2 million people lack access to safe water and 3.6 billion live in potentially scarce areas in water at least one month per year. That number is likely to worsen as forecasts based on population growth point to demand for water rising by almost a third by 2050. Another aggravating factor is that the amount of the world's water is unlikely to change in the future. It is fact that water is a limited resource whose amount is constant in our planet (DINAR; TSUR, 2017). To Pereira and Freitas (2017, p. 1), that fact reaffirms that "*water is the element that interconnects the complex web of food, energy, climate, economic growth, and human security*". Therefore, water has been a strategic natural resource in contemporary society (PIRES DO RIO; DRUMMOND, 2012).

Water has become the subject of heated debates within the national and international agendas, especially after it was recognized both as one of the fundamental human rights in 2010 by the United Nations and included in the new 2015 development agenda named 'Transforming our World, the 2030 Agenda for Sustainable Development'. Known as the 2030 Agenda, it set the 17 Sustainable Development Goals (SDG) which includes the Sustainable Development Goal 6 (SDG6) *'Ensure availability and sustainable management of water and sanitation for all'* (UN-WATER, 2018). The 2030 Agenda thus recognizes water as vital to human security and essential to reach sustainable development. SDG6 states that efficient use and equitable distribution of water —by planning for climate change, balancing water demands and prioritizing the health of natural landscapes can help countries reach their development goals. With those guidelines, the 2030 Agenda expects to foster worldwide cooperation and silence conflicts where water and political issues come into play (ONU-BR – Nações Unidas no Brasil, 2018).

That is where hydropolitics enters the arena. The heated debate around hydropolitics involves questions such as "*who gets what [water], when, where, and how*" (TURTON, 2002, p. 16). Turton (2002) understands that water is part of a dynamic and ongoing process of political decision, influenced by relations between states, citizens and markets. It is also an interaction between state and non-state actors, which takes into consideration power relations, institutions, legislation, technologies and available infrastructure. In this paper, it is argued that hydropolitics analysis helps and connects with the 2030 Agenda. It shows how features of water politics can substantiate actions that contribute to achieving SDG6 within a national state. As demonstrated by Moore (2018), subnational hydropolitics, especially in territorially large countries such as Brazil, is considerably more common, given the geographical and political diversity. Institutional overlapping, scalar mismatching and decentralization

of water governance are responsible for a lack of congruence between policy goals and a sustainable development path.

Against that backdrop and considering Brazil hydropolitics as a case study, this paper analyzes how hydropolitics relate to SDG6 and the 2030 Agenda, by showing how hydropolitics contribute to understand the framework that surrounds the SDG6. The first section of the paper provides an overview of the 2030 Agenda, its SDG's and the SDG relations to water issues. The second section addresses the concept of hydropolitics and its connections with both international and environmental studies and water management and governance. The third section discusses Brazilian hydropolitics. Finally, in the fourth section, the concepts presented in the preceding sections are applied to the Brazilian hydropolitics, where it is discussed to what extent Brazilian water policies contribute to achieve SDG6 by 2030.

Overview: the 2030 Agenda and the importance of water in the global scenario

Since 2015, the international community has been struggling with the 2030 Agenda, which is the milestone that provides a renewed framework for cooperation among countries, companies, international organizations and other actors for the period 2015-2030 (LE-BLANC, 2015). Led by the United Nations (UN) with the participation of the international community, the 2030 Agenda's 17 SDGs, 169 targets, sections on implementations, review, and follow up prioritize sustainable development, balancing social, economic, political and environmental dimensions.

As there are no standards of implementation of the 2030 Agenda's SDGs, governments have to make their own decisions concerning the national process of integration and implementation of the SDGs into their national plans and strategies. The first 16 goals define substantive outcomes and key issues related to sustainable development, crossing social, economic and environmental dimensions. The SDG 17 focuses on the implementation and revitalization of global partnership for sustainable development, covering aspects of technology, trade, finance, capacity-building, multi-stakeholder partnership, data, monitoring, systemic issues, policy, and institutional coherence (LE-BLANC, 2015).

The SDGs are global goals and targets that raise awareness about the main challenges that humanity faces nowadays. They are interdependent and integrated. They are a compromise that reflects concerns and interests of the international community. They each across all sectors and aim to affect all levels of society. With no legal binding, they must be understood as a political agreement on sustainable development at the international level and a non-binding soft law (KALTENBORN; KUHN, 2017). Despite the lack of legal binding, they make reference to a number of international laws and principles.

Moreover, Le-Blanc (2015, p. 178) considers that they are a "*network of targets*" and an "*enabler for integration*" because the 2030 Agenda and its SDGs have political and instrumental values. The

SDGs are global declarations that must be transformed into actions; they are global, regional, national, and local development strategies and policies for the desirable sustainable development. SDG 6, in particular, focuses on ensuring the availability of water and its sustainable management and sanitation for all (UN-WATER, 2018), providing the backdrop against which the water issues are discussed in this paper.

The Agenda 2030 recognizes water as paramount to human security and essential to achieving sustainable development because it is essential to life. But it can also be a threat to life due to its scarcity and quality. Recognized as a fundamental human right and lacking protection, water has been around in international discussions, especially due to its relationship with human well-being and sustainable development. Mollinga (2008) argues that the inclusion of water in the wheels of international debate and academic research is related to some factors. First, the author points out that there is growing concern about a possible global water crisis, which would occur in terms of water quality and quantity. It is appropriate to remember that water is badly distributed along the planet. Furthermore, its consumption has increased in recent years and water pollution has worsened in almost all rivers in Asia, Latin America and Africa, regions that are home to most of the world's population (UNDESA, 2017, WWAP – United Nations World Water Assessment Program, UN-Water, 2018).

Secondly, Mollinga (2008) argues that water is an inherently political issue, especially because it can extend across physical and geographical borders of countries. Mollinga (2008) adds that water includes social relations of power, both inside and outside a sovereign state. These water political relations, or hydropolical relations, integrates economic, social and environmental policies. They engage state and non-state actors in the decision-making process and water management

SDG 6 covers the entire water cycle with its eight targets[1]. It states that efficient use and equitable water distribution —planning climate change, balancing water demands and prioritizing the health of natural landscapes— can help countries achieve their development goals. To achieve SDG 6, access to water must be ensured for all, even to those who cannot afford it. Table 1 below presents the core and extended targets and indicators of SDG 6.

1 "*SDG 6 contains eight targets: six on outcomes in regard to water and sanitation, and two on the means of implementing the outcome targets*" (UN-WATER, 2016, p. 3).

Table 1. SGD6 core and extended targets and its indicators

#	Core and extended targets	Indicators
1	Achieve universal and equitable access to safe and affordable drinking water for all;	– Percentage of population using safely managed drinking water services;
2	Achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations;	– Percentage of population using safely managed sanitation services including a hand washing facility with soap and water;
3	Improve water quality by reducing pollution, eliminating dumping, and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally;	– Percentage of wastewater safely treated; – Percentage of water bodies with good water quality;
4	Substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity;	– Percentage change in water use efficiency over time; – Percentage of total available water resources used, taking environmental water requirements into account (level of water stress);
5	Implement integrated water resources management (IWRM) at all levels, including through transboundary cooperation as appropriate;	– Degree of integrated water resource management (IWRM) and implementation (0-100)
6	Expand international cooperation and capacity-building support to developing countries in water and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies;	– Amount of water and sanitation related to the Official Development Assistance that is part of a government coordinated spending plan;
7	Protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes	– Percentage of change in water-related ecosystems extent over time;
8	Support and strengthen the participation of local communities in improving water and sanitation management.	– Percentage of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management.

Source: Own elaboration on the basis of data published in UN-WATER (2016; 2018)

SDG 6 just reaffirms what was presented. Water is fundamental for economic growth. It is clearly a cross-cutting issue as it is linked to all SDGs (UN-WATER, 2016). Table 2 presents the interdependence of SGD 6 and the other SDGs and corroborates the fact that the 2030 Agenda demands an integrated and holistic approach. Each SDG has the ability to contribute to other SDGs, some directly and others more indirectly. This interdependence must be considered as it is "*critical for advancement and successful implementation of individual and collective SDGs*" (CERF, 2019, p.1). It engages all sectors of society and educates the public to promote a better understanding of the problems related to water resources. It shows that is important to invest in the water sector (including

water supply and sanitation) to reshape legal and institutional frameworks to promote an effective water governance.

Table 2. Interdependence of SDG6 and the other SDGs

#	Links	Relations
1	Water, health, and equality	*"Increasing access to water supply, sanitation, and hygiene (SDG 6.1 and 6.2) reduces the risks of water-borne diseases (SDG 3.1-3.3, 3.9) and malnutrition (SDG 2.2), supports a productive workforce (SDG 8.5, 8.8) and addresses poverty (SDG 1.1, 1.2, 1.4), gender, and inequality (SDG 5.1, 5.2, 5.4, 5.5, 10.1 – 10.3)"* (BROGAN *et al.*, 2016, p. 13).
2	Water, food, and environment	*"Water is essential to meet the targets of sustainable food production (SDG 2.4). Doubling agricultural productivity as stated in SDG 2.3 could potentially lead to negative impacts on water resources and water-related ecosystems. Targets must, therefore, be implemented in an integrated way to ensure they support targets on increasing recycling and safe reuse of water (SDG 6.3), increasing efficiency and ensuring sustainable withdrawals (SDG 6.4) and protecting water-related ecosystems (SDG 6.6)"* (BROGAN *et al.*, 2016, p. 13).
3	Water, climate change, and disasters	*"Using water sustainably and efficiently, reducing water scarcity (SDG 6.4), and implementing IWRM (SDG 6.5) are interlinked with reducing the impact of water-related disasters (SDG 11.5) and helping to build the resilience of vulnerable populations (SDG 1.5). Therefore, prioritizing the use of water resources is needed, particularly when they are scarce"* (BROGAN *et al.*, 2016, p. 13).

Source: Own elaboration based on information published in NAÇÕES UNIDAS (2015) and BROGAN *et al.* (2016).

Hydropolitics: the political sphere surrounding water

'Hydropolitics' has been a political buzzword and a hot topic since the end of the Cold War. It is connected to the emergence of new international political issues. Among the reasons that explain its momentum are: (1) the acknowledgement of the mismatch between population growth in the 21th century and water availability, which projects a water scarcity scenario (FALKENMARK, 1986; VOROSMARTY *et al.*, 2000); (2) the unequal distribution of water, either in rivers and aquifers, and the lack of their correspondence with international boundaries (SHIKLOMANOV, 1993; GLEICK, 2003; YOFFE *et al.*, 2003; WOLF *et al.*, 2003; UN, 2008); (3) given those two former reasons, the inevitable international political interactions, because water has become a source of both political tension and political cooperation between national states and international organizations (SADOFF; GREY, 2002; UITTO; WOLF, 2002; ZEITOUN; MIRUMACHI, 2008; ZEITOUN *et al.*, 2011).

Thus, hydropolitics involves dealing with foreign affairs in national and international realms. Although the consequences of political actions over shared waters are felt over the regional and local scales, the concept of hydropolitics, as given, leads the attention towards affairs across nations. Many features of hydropolitical analysis, however, can be applied at several scales: the notion of hydrological interdependence between territorial units and economic and geographic variables, like extraction capabilities, hydropower potential, position, etc. Since water distribution is uneven along space, the capability to control, use and allocate water is dependent on power endowments, hence a matter of hydropolitics (CASCÃO; ZEITOUN, 2010).

The connection of hydropolitical analysis with international politics and, consequently, with extensive transboundary river basins stems from its theoretical affiliation with International Relations and its analytical tools (FURLONG, 2006; WARNER; ZEITOUN, 2008; KAUFFER, 2009; DINAR, 2012; JULIAN, 2012). Because of this theoretical and analytical affiliation, among the widely studied issues in hydropolitics are the asymmetries of power between sovereign countries and the establishment of hegemonic cooperative/conflictive political interactions between riparian countries (ZEITOUN; WARNER, 2006; MIRUMACHI; ALLAN, 2007; ZEITOUN; MIRUMACHI, 2008; ZEITOUN *et al.*, 2011; WARNER; ZAWAHRI, 2012). Another set of studies analyze the efficiency of treaties, agreements, conventions and organizations created to govern and manage transboundary water and river basins (LANKFORD, 2013; SCHMEIER, 2013; LEB, 2015).

Furlong (2006) carried out one of the first and widespread reviews of the hydropolitical thinking concerning its implicit connections with IR theories, which instituted the prevailing water discourse. Given its rationalist foundations, Furlong states that hydropolitics fails to acknowledge asymmetric power relations between riparian countries, and adopts a critical but pessimist view over cooperation tools. It is assumed that the state is a homogeneous political container. To overcome that drawback, critical theoretical approaches have been considered such as critical geopolitics, political ecology, and social production of nature. Most importantly, those approaches aim to free hydropolitics from the territorial trap, introducing a more appropriate perspective on hegemony, acknowledgment of ecological conditions and understanding of social dynamics.

Departing from the normative emphasis and the international scope of hydropolitics criticism, Sneddon and Fox (2006) and Swyngedouw (1999; 2007) invested in a critical hydropolitics approach, which conceives of water politics as an intricate process that intertwines several social actors that interact on multiple scales. An outcome of the approach is a refinement of the analysis, because the cooperation tools set into motion to manage water resources create a transnational hydropolitical arena. More recently, Warner *et al.*, (2017) assessed the intellectual path of hydropolitical thinking where it is most notable developments are highlighted. The inclusion of more nuanced conceptions of power and hegemony leads to a relativization of the sole role of the state as the driver of transboundary hydropolitics, into the analysis including non-state actors and cautious perspectives of international treaties and organizations as a token of cooperation.

Considering the IR origins of hydropolitics, it is not a surprise that further research has been caught into the territorial trap, be it a state or a river basin trap. Through the hydropolitics lenses, however, one can find the tools to engage in different paths of questioning along distinct geographical scales and institutional powers. The concept of hegemony and its usage under the hydropolitics framework is an example. In hydro-hegemonic discourses, material and ideational powers are constructed and enacted within national, regional and local political structures. On the one hand, in a neo institutionalist perspective, hegemony is engrained in the institutions engaged in the governance and management of water resources, sedimenting procedures and norms beyond the scope of transboundary river basins. On the other hand, within a critical perspective, the hydrohegemony can be built through the production of discourses by elite inside the state bureaucracy or in global

political spheres of production of water paradigm (e.g. GLEICK, 2000) such as World Water Forums (WARNER *et al.*, 2017).

Brazilian hydropolitics

Since Brazil had signed its commitment to the 2030 Agenda and its SDGs, efforts have been made so that their implementation meets the 2030 deadline. However, before tapping into the efforts made by the Brazilian government concerning the SDGs, especially SDG6, it is important to summarize how water resources are managed and organized in the country. Benjamin, Marques, and Tinker (2005) say that the Brazilian regulation system on water has been developed only in the last 70 years. The implementation of water resource management models in Brazil dates from the 1930s. To provide a panoramic view of how water management is treated in Brazil, the following three most important legal instruments are considered: the 1981 Environmental National Policy Act (1981 Act), the 1988 Brazilian Federal Constitution, and the 1997 National Water Act (1997 PNRH).

Benjamin, Marques, and Tinker (2005) consider the 1981 Act (Law n. 6.938) to be responsible for some major changes concerning the legal water regime in Brazil. It recognizes freshwater and groundwater important to the "*socio-economic development, preserving the environment and ecological balance qualities*" (BRASIL, 1981). Accordingly, they argue that the 1981 Act states that water has an environmental value. It recognizes surface or groundwater water, estuaries and the territorial sea as environmental resources, outlines the sustainable use of water resources, and holds the National Council on the environment responsible for the establishment of "*norms, criteria, and methods for the control and maintenance of the quality of the environment, with a view towards the rational use of environmental resources, manly waters*" (art. 8, VII).

The 1988 Brazilian Federal Constitution drafted after the end of the military regime established in 1964, guaranteed water as a public good and its ownership is shared between the Union and the individual states. Benjamin, Marques, and Tinker (2005, p. 2195) pointed out that the 1988 Brazilian Federal Constitution revoked the provision for municipal river ownership and the private ownership system. The Article 20, paragraph III, states that water is public property, belonging to the Union: "*lakes, rivers, and whichever streams of water in soil under its domain, or that bathe more than one state, serve as boundary with other countries, get or extend to foreign territory and also marginal lands and fluvial beaches*" (BRASIL, 1988).

According to Aith and Rothbarth (2015), it is within the competence of the Union to explore, directly or under authorization, concession or permission, services and electrical energy installations, as well as the energetic exploitation of waterways. Concerning the hydroelectric reservations located in the states, every Union or state action must be performed in a well-coordinated manner. The Article 26 guarantees that the participant states are also holders of the water in the following circumstances:

> I – superficial or underground, flowing, emergent and repository waters, except, according to the law, the ones resulting from the Union's works;
> II – the areas in the ocean and border islands which are in their domain, except those under the Union's domain, cities, or third party;
> III – river and lake islands not included among the ones belonging to the Union (BRASIL, 1988).

In this sense, the 1988 Brazilian Federal Constitution requires water legislation to be established by the Union but supplemented by the legislation of the individual states and municipalities. Benjamin, Marques, and Tinker (2005, p. 2197) warns that "*general federal laws supersede the effect of state laws passed contrary to national norms*". Thus, each individual state is restricted to make general laws on water that are "*compatible with the union's exclusive legislative power over water issues*".

Finally, Benjamin, Marques, and Tinker (2005) argue that the 1997 PNRH is strongly influenced by the European law and is responsible for setting the objectives, principles, and legal instruments of the National Policy on Water Resources. According to the 1997 PNRH, water policies must be implemented and assessed through democratic management. This management provides for wide social participation, being an example of decentralization and wider participation in the Watershed Plan as unity of implementation of the policy, planning and management of the National System of Water Resources (BRASIL, 1997). The instruments of the 1997 PNRH are: regionalization, integration of water resources and environment management and the articulation with users and regional, state, and national planning (AITH; ROTHBARTH, 2015).

One of the main political and institutional instrument for decentralized and democratic participation stated in PNRH is the river basin committee. Its framework allows the territorialization among water sector's stakeholders interactions to coordinate water uses and conflicts. The responsibility in constructing and coordinating the river basin plan affirm the importance of the river basin committee as a pivotal institution in Brazil's national hydropolitics. Although the central role in the PNRH, the assessment of the river basin committees effectiveness are manifold. Some of the most challenging limitations for its success is the lack of support and participation of scaled stakeholders, such as the state, subnational and local actors, and the non-implementation of management instruments (TRINDADE; SCHEIBE, 2019).

Although the 1988 Brazilian Federal Constitution and the 1997 PNRH still asserting the attributions of Brazil's water resources governance, since the new far-right government took office in 2019, the political structure has being changing towards a more state-centrist organization, thus jeopardizing the democratic management and social participation principles. One of the major changes was to atomize the water related federal institutions between the Ministry of Environment and the Ministry of Regional Development, then hampering the coordination between stances of environmental policies. Another transformation is related to the composition of the most important national water governance institution, the National Council for Water Resources (CNRH), which has the role to promote democratic water planning and management. The collegiate of the CNRH decreased by half the participation of both civil society organizations and water users, hence concentrating the participation on state stakeholders.

This overview, which outlines how water resources are managed and organized in Brazil, sets the scenario to the next section, where the discussion addresses the efforts that have been made by the Brazilian government to achieve the SDGs, SDG6 in particular, by 2030.

Brazil and SDG6: a case study

Although Brazil was initially committed to achieving the 2030 Agenda and the SDGs, developing its own political and institutional architecture for the theme, the changes produced by the current government compromised the country's resourcefulness. There were no changes in policies, but there is a progressive deinstitutionalization and emptying of various components of its management structure. Despite this, it is pertinent to explain the path taken by the country with regard to Agenda 2030 and the SDGs.

One of the first measures adopted by the Brazilian government was the creation of the SDG National Commission (in Portuguese *Comissão Nacional para os Objetivos de Desenvolvimento Sustentável* – CNODS) aimed to internalize, disseminate, and clarify the 2030 Agenda implementation process in the country. The commission counted with 32 representatives from civil society and government, among incumbent and alternate members (BRASIL, 2018). Regarding SDG6, the National Water Agency (ANA)[2] was a strategic ally in the execution and implementation of SDG6, since the agency is the central Brazilian institution responsible for water resources management (AGÊNCIA NACIONAL DAS ÁGUAS, 2018; 2019).

Decree No. 9,759 / 2019, published on April 1, 2019, extinguished CNODS. This decree is one of those responsible for preventing the effective implementation of the 2030 Agenda in the country. To Rede ODS Brasil (2019), a collective created with the objective of contributing to the effective implementation of the UN Development Agendas in Brazil, it is a step backwards and an explicit violation of a Brazilian constitutional right, recognized by the Federal Constitution of 1988, which establishes that Brazil is a Democratic State of Law and legitimizes participatory democracy. In addition, this indiscriminate extinction violates Goal 16.7 of the 2030 Agenda – ensuring responsive, inclusive, participatory and representative decision-making at all levels.

The SDG National Commission was responsible for the constitution of thematic chambers to assess and foster debate on the diverse topics and objectives related to the SDGs. Its scope ranged from elaborating and implementing the 2030 Agenda action plan to backing up discussions about sustainable development in national and international forums. It was also its responsibility to articulate bodies and public entities from federal unities with the state, district and municipal levels, being the municipal level a primary aspect.

2 ANA performs the systematic and regular monitoring of the condition of water resources and its management in the country through statistics and indicators that feed the National Water Resources Information System (SNIRH). ANA is now part of the Ministry of Regional Development (MDR), created by the current federal government, as an attempt to centralize and integrate the water, sewage and water security national policies.

Regarding SDG6, the Ministry of Environment document, named 'Platform of information for the SDG6 indicators', lists the indicators for achieving each of the sub-goals related to SDG6 and the respective agents responsible for each one of those indicators (BRASIL, 2018). ANA is responsible for the SDG6 sub-goal 6.6, showing the centrality of this agency in the SDG6 implementation. One important initiative regarding the topic that allows us to understand the overview of the SDG6 implementation is the document entitled 'Dialogues about the SDG and challenges to the management of water and sanitation in Brazil' (ANA; IPEA; PNUD; IPC-IG, 2018). The document explains how the SDG National Commission worked in relation to SDG6. The four institutions taking part in this project – ANA, Institute for Applied Economic Research, United Nations and the International Policy Center for Inclusive Growth – got together to promote studies about the challenges related to the water management in Brazil and to propose institutional arrangement strategy for the implementation and monitoring of the SDGs.

The document also emphasizes that the responsibility for coordinated implementation of environmental and water policies must be taken on by the executive bodies for policies and by the collegiate instances of the National Environment System (SISNAMA), the National System of Water Resources Management (SINGREH) and the Watersheds Committee. Table 3 lists the SDG6 core and extended targets and the Brazilian institutions and instruments related to each of the mentioned targets.

Table 3. SDG6 core and extended targets, national institutions, and national political instruments

#	SDG6 core and extended targets	Brazilian national institutions	Brazilian national political instruments
1	Achieve universal and equitable access to safe and affordable drinking water for all;	Ministry of Environment Ministry of Regional Development National Water Agency SDG National Commission National Association of Municipal Sanitation Services National Health Foundation Basin Committee for federal waters Brazilian Institute of Environmental and Renewable Natural Resources Ministry for Cities National Councils for Water Resources Intersectoral Committee for Sanitation and Environment National Information System on Water, Sanitation and Solid Waste Ministry of Health National Water Resources Information System	1988 Brazilian Federal Constitution 1997 Water Resources Policy 1981 Environment Policy 2019 Water Security National Plan 2007 Sanitation Policy 2010 Solid Waste Policy 2005 Public Consortia Law

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#	SDG6 core and extended targets	Brazilian national institutions	Brazilian national political instruments
2	Achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations;	Ministry of Environment Ministry of Regional Development National Water Agency SDG National Commission	1988 Brazilian Federal Constitution 1997 Water Resources Policy 1981 Environment Policy 2007 Sanitation Policy
3	Improve water quality by reducing pollution, eliminating dumping, and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally;	Ministry of Environment Ministry of Regional Development National Water Agency SDG National Commission Brazilian Agricultural Research Corporation	2010 Solid Waste Policy
4	Substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity;	Ministry of Environment Ministry of Regional Development National Water Agency SDG National Commission	2013 Irrigation Policy 2019 Water Security National Plan
5	Implement integrated water resources management (IWRM) at all levels, including through transboundary cooperation as appropriate;	Ministry of Environment Ministry of Regional Development National Water Agency SDG National Commission Ministry of Foreign Affairs	1988 Brazilian Federal Constitution 1997 Water Resources Policy 1981 Environment Policy
6	Expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling, and reuse technologies;	Ministry of Environment Ministry of Regional Development National Water Agency SDG National Commission EMBRAPA	1988 Brazilian Federal Constitution 1997 Water Resources Policy 1981 Environment Policy
7	Protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers, and lakes;	Ministry of Environment Ministry of Regional Development National Water Agency SDG National Commission Instituto Chico Mendes de proteção a biodiversidade EMBRAPA	1988 Brazilian Federal Constitution 1997 Water Resources Policy 1981 Environment Policy 2019 Water Security National Plan
8	Support and strengthen the participation of local communities in improving water and sanitation management.	Ministry of Environment Ministry of Regional Development National Water Agency SDG National Commission	1988 Brazilian Federal Constitution 1997 Water Resources Policy 1981 Environment Policy

Source: Own elaboration based on data published in UN-WATER (2016; 2018).

Regarding the management of water resources, the Office of Water Resources and Environmental Quality of the Ministry of Environment formulates and subsidizes the 1997 PNRH. While ANA has amongst its tasks the implementation of the 1997 Act, the National System of Water Resources Management (SINGREH) allows the construction of a governance structure to water resources where the Watersheds Committees are part of the system. Those are important spaces for the internalization and implementation of the 2030 Agenda and its SDGs (BRASIL, 2018). The 1997 PNRH aims to be more inclusive and formalize more integrated management, which is consonant with the SDG6 sub-goal 6.5: promote articulate management at every level. It, however, places water as a public good endowed with economic value, which offends not only with the SDGs but also with the international tendency itself to approach this issue through human rights.

The 1981 Act, the 1988 Brazilian Federal Constitution, and the 1997 PNRH can help in the implementation of the SDG6 sub-goal 6.4: "*substantially increase the efficiency of water use in every area and assure sustainable withdraws and the freshwater supply to face the shortage of water*" (ONU BRASIL, 2018). As it is a multi-annual measure, it is urgent that the next planning covers in its scope actions that aim to implement SDG6. The National Sanitation Policy (Law n. 11.445/2007) was created to conceptualize and define the services of basic sanitation, guidelines, and rules that are adequate to the multiple social, environmental, and economic realities of the country. This regulatory mark makes it clear to be complementation to the management of water assets in Brazil. The use of water resources in public services for sanitation is subordinated to the grant of usage rights, being, therefore, paid (BRASIL, 2007).

In the scope of the Union, it was established the definition of minimal parameters of water portability for public supply, being under responsibility of the Ministry of Health. Furthermore, it creates specific conditions for the environmental license of unities of sewage treatment and residues from the processes of water treatment and water contingency mechanisms for cases of water streamlining (BRASIL, 2007). This law is related to the SDG6 sub-goal 6.2: achieve adequate and equal access to sanitation and hygiene for all, besides ending the defecation outdoors (ONU BRASIL, 2018), although issues of gender are not observed, which urges taking into consideration women and girls in vulnerable situations. The law for sanitation is also related to the SDG6 sub-goal 6.3: improve water quality, pollution reduction and elimination of wastes and reduce the release of chemical products and dangerous substances, besides lowering the proportion of non-treated residual waters and increasing the recycling and safe reuse (ONU BRASIL, 2018).

Finally, concerning the goals 6.5 -implement the integrated management of water resources in all levels, including transboundary cooperation-- and 6.a --widen international cooperation and support to the qualification of developing countries for activities and programs related to water and sanitation-- consider that Brazil owns 83 contiguous. Its successive rivers and transboundary watersheds occupy 60% of the territory. Concerning that, Brazil promotes initiatives to strengthen the cooperation in the management of water resources and to guarantee full access to water for the regional population, e.g., The Organization of the Amazon Cooperation Agreement (OTCA). In the bilateral cooperation plan, there is a cooperation between Brazil and its neighbors concerning

the integrated management of border and transboundary water resources, e.g., the Agreement with Paraguay for the Apa watershed (2006), and the Agreement with Uruguay for the Quaraí watershed (1991).

It is worth noticing how the Brazilian document deals with the National environmental indicators, absent in the UN SDGs, which blurs the perception of the achievement of SDG6. One understands that water in Brazil is considered a public good, but its exploitation is dependent on the finality and the specific state model management; this aspect is related to the sub-goal 6.1: universal and equal water access for all (ONU BRASIL, 2018). The 1977 PNRH establishes the protection of water for animal and human consumption and the access to drinkable water for subsistence, crucial parameters to discuss water management.

According to Aith and Rothbarth (2015), the legislation concerning the ownership of essential sanitation services is not clear, and there is the possibility of competencies overlapping between states and cities. The execution of services is also problematic because the holder of each service tends to be responsible for both the formulation of its corresponding basic sanitation public policy and the regulation and execution of the services directly or through delegation. Given that grey area of between competences, obstacles are likely to disturb the implementation and achievement of SDG6, which is set to guarantee the human rights to water and the implementation of a universal system of basic sanitation.

The water and sanitation access data in Brazil are alarming. According to Trata Brazil Institute (2018), 83,3% of the population has treated water supply, yet 35 million Brazilians are deprived of that service. Furthermore, only 51,92% of the population has access to sewage collection, which means that 100 million people are also deprived of that service. It is estimated that there are 13 million children and teenagers with no access to basic sanitation, and only 45% of the sewage generated in Brazil goes under treatment. Thus 55% is wasted straight in nature, which means 5,2 billion cubic meters per year or almost 6 thousand Olympic pools of sewage a day (INSTITUTO TRATA BRASIL, 2018). According to the Brazilian Institute of Geography and Statistics research, less than 40% of the Brazilian cities have basic sanitation policies (BRASIL, 2017).

The document 'SDG 6 in Brazil – ANA`s view on indicators' (AGENCIA NACIONAL DAS AGUAS, 2019) describe the calculus of the SDG6 indicators, including the historical series of results, the different levels of spatial disaggregation, critiques, and suggestions for methodological improvements and the comparison of Brazil with other countries and regions of the world. According to the data, the water supply deficit decreased from 8.1% to 4.2% of the population from 2007 to 2015.

Conclusion

There are numerous challenges and opportunities for the implementation of the 2030 Agenda and its SDGs. The 2030 Agenda represents an opportunity of alignment of federal, state, and municipal programs and the actions of entities of promotion of the SDGs. Considering the spatial dimension

of Brazil's territory, the effective implementation of the 2030 Agenda urges the establishment of cooperation, articulation and mobilization networks, in the many spheres of government and civil society. The 2030 Agenda also provides convenient means to increase the implementation of integrated actions for water and sanitation management. Such articulation may boost the monitoring of quantity and quality of water, sector consumption, easing the planning and inspection. For this purpose, the technical and operational strengthening of the roles of individual states and cities is essential, especially regarding the governance of water and sanitation.

Regarding SDG6, among its challenges is the implementation of integrated management of water and environment, the expansion of coordination and intersectional, interinstitutional, and intergovernmental integration, the dissemination of means of shared management of water and sanitation, increasing the investment in technologies, and the regulation directed to efficient management. The statistical figures and challenges presented in this paper show that water and sanitation issues in Brazil have to get over considerable hurdles, despite its legal progress, especially if compared to its South America's regional neighbors. Thus the implementation of SDG6 in the country demands great efforts and may be a great opportunity, if well executed, to start a venture that changes, somehow, the precarious situation of water and sanitation access in the country. The challenges to coordinate actions might be demonstrated due to the recent changes in the organizational structures of water governance and management. Atomized institutions will have difficulties in implementing integrated management of water and the environment. Moreover, technocratic structures of governance can demobilize social participation initiatives, which are incredibly relevant to implement SDG goals.

Concerning the water management and its relation to the sub-goals of SDG6, it is essential to point out that, besides the conflicts between multiple uses and techno-operational and institutional difficulties, the climate changes factor must be considered. Climate alterations have been worsening the situation and increasing management challenges. The challenges related to the state acting and the mediation of conflicts among uses in agriculture, industry, tourism, energy, transportation, and sanitation/health persist. Articulating governmental and non-governmental actors is another greatest hydropolitical challenge at stake to take Brazil to the route of achieving the SDG6 sub-goals.

Brazil has pursued leadership in the construction of indicators and implementation of the 2030 Agenda's SDGs and has approved an action plan to implement those goals. Nonetheless, regarding SDG6, its feasibility is at stake due to the current government elect, clearly resistant to comply with the international environmental agenda and its regulatory marks. Without a doubt, there is a considerable setback in the country's plan regarding SDG and other integrated and participative management. Brazilian water policies and management model changed with the current administration. From a model that sought integrated and participative management, Brazil turned to a management model based on command and control, fragmented and sectorized. It is still necessary to verify the degree of interference that these changes have concerning political participation and the incorporation of the social dimension in the management of water resources.

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