



# Governance, water security and citizenship in Brazil, 2019

## *Governança, segurança hídrica e cidadania no Brasil, 2019*

Estela Maria Souza Costa Neves\*

### Abstract

Even though benefitting from over 12% of the world's surface freshwater, Brazil nevertheless has undergone increasingly frequent water scarcity crises in both rural and urban areas. This paper presents the results of an exploratory research on water security issues in Brazil, developed according to a three-step methodology. The concept of water security is discussed based on a review of the literature, taking into account the sustainability criterion. An institutional analysis of water governance in Brazil, summarized from the perspective of water security, based on Brazilian constitutional mentions related to water, followed by the identification of policy initiatives at national and subnational level.

**Keywords:** water governance; water security; sustainability; Brazil; federalism.

### Resumo

*Apesar de ser o detentor de cerca de 12% da disponibilidade de água doce do planeta, o Brasil tem vivenciado crises hídricas cada vez mais frequentes, tanto em áreas rurais quanto nas aglomerações urbanas. Este artigo apresenta os resultados de uma pesquisa exploratória sobre a segurança hídrica como objeto de política no Brasil, desenvolvida em três passos: revisão do conceito de segurança hídrica à luz do critério de sustentabilidade, análise institucional da governança da água no Brasil desde a perspectiva da segurança hídrica, baseada nas disposições constitucionais relacionadas à água, e identificação de iniciativas de política nas esferas nacional e subnacional.*

**Palavras-chave:** governança da água, segurança hídrica, sustentabilidade, Brasil, federalismo.

\* Federal University of Rio de Janeiro. Postgraduate Program on Public Policies, Strategies and Development – PPEd. Email: estela.neves@terra.com.br

## INTRODUCTION

Even though benefitting from over 10% of the world's surface freshwater, Brazil nevertheless has undergone increasingly frequent water scarcity crises in both rural and urban areas. In 2014 a huge water crisis impacted the city of São Paulo (12,2 million inhabitants) and threatened Rio de Janeiro (6,6 million inhabitants). Three years later, water rationing regimes were adopted for more 850 cities, including the federal capital of Brasília (2.5 million inhabitants), and for the first time for crops irrigated by the São Francisco River.

Scarcity in the midst of abundance: what are the interconnections among water security policy, environmental protection, and sustainable development? This paper's objective is to contribute to the debate on water security policies in the context of water governance in Brazil. For this purpose, an assessment is made of federal policy responses to water security issues in light of the institutional framework related to water, highlighting citizen and civil society participation.

The work is presented in four sections: first, the literature review on the concept and definitions of water security is presented; then the results of an institutional analysis of water governance in Brazil are summarized from the perspective of water security, based on Brazilian water regulations; third, the recently launched National Water Safety Plan is discussed, in the context of on-going policy processes. The conclusion lists additional questions to explore further the role of subnational levels of government and civil society actors in water security policy, leading to innovative approaches for water security policies.

## WHAT IS WATER SECURITY?

Essentially, *water security* is the capability to ensure to humans and the environment clean and available water supply (Strickert et al., 2016). The term emerged in academic circles in the 1990s and was incorporated into the political sphere in the early 2000s. This expression is nowadays widely used in official documents and statements by government authorities and is an object of academic research and news in the media. It has become a key point on the agenda of social movements and civil society organizations: in domestic freshwater management programs, the theme is currently considered a key goal comprising all levels of governance (Jansky et al. 2008).

Several issues require addressing by government agents, citizens, researchers and water managers. How useful and applicable is the concept of water security? How does this concept contribute to the challenges in water governance? To what extent does it overlap with the concept of integrated water resources management? How does the concept of water security correlate with the human right to water and sanitation?

The first challenge is to define what does *water security* exactly mean. In both academic and public policy usage, there are numerous definitions which differ not

only according to the fields and disciplines within which they were formulated but also according to their conceptual framework, scale, and methods. There is a wide variety in scope, from 'strict' concepts pertaining no more than the quantity and availability of water, to broad concepts comprising also water quality, access, equity in distribution, environmental aspects, resilience and sustainability issues. According to a comprehensive review of the academic production on the subject by Cook and Bakker (2016), until 1990 the definition of water security was conjoined with issues of military and food security, and used mainly by engineers and specialists in the natural sciences. The framework changed after 2000 and the Second World Water Forum, in which a new definition of water security was introduced associated with the aspects of ecological health, human needs, and physical and financial accessibility: "Water security, at any level from the household to the global, means that every person has access to enough safe water at affordable cost to lead a clean, healthy and productive life, while ensuring that the natural environment is protected and enhanced." (GLOBAL WATER PARTNERSHIP, 2000)

According to Cook and Bakker's broad review, for purposes of a first approximation, most of the available definitions can be organized in four perspectives: water quantity and availability, vulnerability to hazards, human development needs, and sustainability. In addition, several definitions applied to specific sector profiles (e.g., water security as a function of food safety or energy safety in hydro-power based matrices) should be taken into account, as well as the debate on the securitization of water.

In the approach pertaining water quantity and availability, water security refers to water scarcity approached from the perspectives of physical scarcity, demand management, increase of supply and adequate governance. The availability of water is a key parameter (FALKENMARK et al., 2007), supplemented by assessment indicators such as 'water stress' (annual availability below 1.700 m<sup>3</sup> per capita) and 'water shortage' (annual availability below 1.000 m<sup>3</sup> per capita).

The second approach is based on the concepts of risk and vulnerability and has been adopted by government agencies and global governance organizations such as OECD and Unesco:

"A risk-based approach addresses water security first and foremost by determining acceptable levels of different risks in terms of the likelihood that they will occur and the potential economic or other impacts if they do, and balancing this against the expected benefits of improving water security." (OECD, 2013).

The US Environmental Protection Agency (EPA) attributes a crucial role to water security planning associated with intentional threats, "(...) because of the increased threat of terrorism and other intentional attacks since 9/11. There are many ways in which water systems can be threatened by contamination or be intentionally contaminated." (ENVIRONMENTAL PROTECTION AGENCY, 2006). UNESCO adopted in 2013 a definition which gives importance to the watershed approach, based on this conceptual framework:

(...) water security is defined as the capacity of a population to safeguard access to adequate quantities of water of acceptable quality for sustaining human and ecosystem health on a watershed basis, and to ensure efficient protection of life and property against water related hazards - floods, landslides, land subsidence and droughts (UNESCO/IHP, 2008) .

This definition has been reaffirmed in Unesco some years later, then emphasizing social equity criteria: "To achieve water security, we must protect vulnerable water systems, mitigate the impacts of water-related hazards such as floods and droughts, safeguard access to water functions and services and manage water resources in an integrated and equitable manner."<sup>1</sup>

The third approach to water security pertains human needs, including food security and human development issues. The concept of 'human needs' allows bridging water security and human rights, providing juridical-institutional force to the term and some legal basis for ensuring access to water as a basic right ALLOUCHE at al., 2016). A definition arrived at by Witter and Whiteford (1999) is representative of this perspective:

(...) water security is a condition where there is sufficient quantity of water at quality necessary, at an affordable price, to meet both the short-term and long-term needs to protect the health, safety, welfare and productive capacity of position (households, communities, neighborhoods or nation.

The concepts focusing on sustainability have as their milestone the definition adopted by Global Water Partnership (GWP) in the Second World Water Forum in 2000: the declaration signed by ministers and heads of delegations on 22 March 2000, known as the Ministerial Declaration of The Hague on Water Security in the 21<sup>st</sup> Century, which promoted the inclusion of water security issues in the global agenda. In 2007, Gray and Sadoff (2007) formulated a succinct and widely quoted definition in this perspective: "We define water security to be 'the availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks to people, environments and economies."

The UN-Water definition for water security (UN et al., 2013), a good example for the sustainability approach, is the most frequently adopted by national governments and by UN organizations:

The capacity of a population to safeguard sustainable access to adequate quantities of and acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.

In addition, there are a few more approaches that contribute to the debate: the aspects related to interdependence, distribution, dimension and the process called 'the securitization of water'. Zeitoun (2009) explores the concept of a "web of sustainable water security" to emphasize the interdependencies between sociopolitical and



biophysical processes, and between the demand for water security and basic social necessities such as food and energy. Calling attention to the distributive dimension of the debate on water security, this author proposes the concept of “sustainable water security” as a policy objective, taking into account the interdependencies between the biological, physical and socioeconomic means, as well as a sense of justice to distribute the benefits and costs of water security policies.

The opposition between the viewpoints of developed and developing countries is highlighted by Gray and Connors (2009) which analyze the relationship between the lack of water security and development, drawing attention to its socially regressive effects: the poor suffer far worse impact from shortages and other extreme circumstances; thus, social equity must be ensured in decision-making processes regarding the provision of water security. At this point theoretical discussions meet water justice debate (Rusca et al., 2018).

Finally, bridging the gap between theory and politics, analyses are found on the reasons why academicians and policymakers have chosen to reference the problems related to water scarcity within a conceptual framework of ‘security’. Authors define this process by the expression *securitization* of the water discourse. ‘Securitization’ originates from distinct viewpoints highlighting in particular the two approaches focused respectively on the State and on human needs. Bogardi, Spring and Brauch (2016, p.38) hold that in structuring a narrative on water problems in terms of threats and needs for protection, the ‘securitization’ of water helps raise the issue to the level of high government priorities. Water securitization would be a collective construction that could help put water scarcity issues on the government agenda, justifying claims for priority given the potential conflicts that could lead a community to extreme situations involving violence (FISCHENDLER, NATHAN, 2016). Under the aegis of securitization, threats and the need of protection of vulnerable groups and sectors are focused through a perspective of an “emergency”, to the detriment of the more strategic and long-term issues connected to sustainability. This argument is corroborated by Loftus (2015), who reminds us that the securitizing discourse would not exist without the insecurities that create them. Securitization opens the way for treating the issue as an “extraordinary” event where “exceptional” measures are taken, implying in breaking the distribution of socially agreed responsibilities and norms, and in scant transparency (TARLOCK, WOUTERS, 2013). According to its critics, the language of securitization should give way to an approach guided by governance, management and cooperation to tackle problems of scarcity.

In summary, it is not so easy to grasp the exact content of the term: the definitions of water security differ according to numerous variables, amongst them the object of security, the criteria, the scale, the stakeholders considered, and to whom is given authority to exercise applicable security measures. As for the time horizon, it can be seen that water security comprises both a long-term strategic vision, the resolution of risk and vulnerability issues on a short- and medium-term horizons, and emergency

situations. Regarding the angle of water availability, it is indeed a crucial factor. However, except in extreme situations, water security deals less with the physical availability of water and more with decisions in situations of scarcity regarding access and distribution to different users. Thus, water security involves agreement and negotiation processes, revealing the importance of the political dimension in the decision-making process.

It is worthy of note that, based on diverse rationales and frameworks, the various concepts of water security often compete or are even incompatible among themselves, as stressed by Pahl-Wostl, Gupta, and Bhaduri (2016). Some definitions are problematic from the perspective of environmental stewardship and sustainability, such as definitions that emphasize immediate action rather than strategic intergenerational perspectives, which necessarily contemplate the sustainable use of water systems; or definitions that entail restricted public access to information on water resources and contingency plans, in detriment of the principle of publicity of government actions. The notable theoretical advances made on the subject are, by themselves, insufficient to support collective action in public policy - but the exuberant array of definitions attests to the degree of concern and importance afforded the subject by various sectors of academia, government, and society. It is necessary to overcome the dilemmas comprised in those concepts - which are either excessively comprehensive (which reveal the multidimensionality of the theme, but are too dispersed and vague) or excessively narrow (which forsake crucial variables, but can support operational initiatives) or which downplay environmental and sustainability issues - to thus enable addressing water security demands in a consistent manner, within a framework of environmental stewardship and sustainability.

## **WATER SECURITY IN BRAZIL, 2019**

Brazil is a privileged country: estimates of the total surface water available in Brazil are of approximately 78.5 thousand  $\text{m}^3/\text{s}$ , approximately one third of the total average flow of 260 thousand  $\text{m}^3/\text{s}$ . This availability varies enormously in the national territory: both precipitation and river flows are extremely unequal in the 12 hydrographic regions<sup>2</sup> in the national territory, in terms of volume and regularity, as well as throughout the year. The average national rainfall is of 1,760 mm, varying from 500 mm in the semi-arid region of the Northeast to 3,000 mm in the Amazon region, which concentrates 80% of the total surface water. Brazil has 172,837 artificial reservoirs (overwhelmingly, hydroelectric dams) which occupy a surface area of almost 45 thousand  $\text{km}^2$ . Of this total, the storage capacity in 1959 summed 620.4 billion  $\text{m}^3$  of water, most of which stored in three basins - Paraná, Tocantins-Araguaia, and São Francisco. In addition to surface water and reservoirs, Brazil also has an estimated groundwater with flow of 14,650  $\text{m}^3/\text{s}$  tapped by circa 1.2 million tubular wells.

The demand for water is expanding: the estimated increase over the last two decades is of 80%, and an increase of 24% is projected until 2030. It is estimated that the demand for freshwater supply will reach about 2,600m<sup>3</sup>/s in 2030 (PNSH, 2019, p.16). The water is disputed by several uses: irrigation (the largest water consumer sector, both in Brazil and in the world), human supply, husbandry, mining and processing industry, thermoelectric power generation and the net evaporation of manmade reservoirs, comprise the main consumptive uses.

In the present decade, significant variations were observed in average flows: the rainfall volumes over the 2012-2017 period were much lower than the average, influencing in addition the storage level of artificial reservoirs. Notwithstanding the effective capacity, water shortages have proliferated, whereas until recently they had been restricted to the semiarid region in the Northeast. Between 2013 and 2017, of the 5,570 Brazilian municipalities no less than 48% decreed state of emergency or even of public calamity, due to water shortages or flood-related disasters. In 2014 the South-East region began to suffer a severe water crisis, especially in São Paulo (20 million inhabitants), revealing a structural crisis in the water resources governance. In December 2016, no less than 132 north-eastern cities faced a collapse in supply, affecting 1.5 million people. By 2017, about 3 million people were affected by floods in Brazil, while 38 million people were affected by droughts or dry spells, 80% of which in the northeast. In the national capital Brasília, the entire population was affected by water rationing for over a year (2017-2018).

In April of 2018, 34 cities in the states of Bahia, Ceará and Paraíba, summing 323,000 inhabitants, were still under supply collapse, due to the exhaustion of springs. Under these circumstances, an emergency supply of water rations by water tanker trucks is provided by the federal government. The metropolitan areas of São Paulo, Rio de Janeiro and Belo Horizonte also experienced crises in their supply sources. The reduction in the reservoir levels also put into alert the country's energy security protocols, booting the generation by thermoelectric plants to preserve the reserves stored in hydroelectric dam reservoirs. Water security definitely has become a key strategic item on the government agenda.

## **WATER SECURITY AND WATER GOVERNANCE IN BRAZIL: INSTITUTIONAL FRAMEWORK**

It is not surprising to find several mentions to water issues in the Brazilian Federal Constitution of 1988 (CF88), once water is a crucial element to several domains of human life. The constitutional mentions draw a complex institutional order that goes well beyond environmental stewardship and water resources management. Based on CF88, this section summarizes the institutional framework of water governance in Brazil, in order to highlight issues of interest for water security strategies.



Several water-related constitutional rights and duties are dispersed along the various sections of the Federal Constitution along with instruments for the defence of such rights: fundamental rights and guarantees, organization of the State, defence of the State and of democratic institutions, taxation and budget, economic and financial organization, and social ordering. There are seven different dimensions or approaches to water according to the CF88: water as a public good; water as an object of explicit competence of the three governmental spheres; water as an environmental asset; water as an input for economic activities and services; water supply in sanitation; and water as an object of individual and collective rights. In addition to these, the constitutional text also allows another approach, which is water security in connection with natural disasters. Thus, the constitutional provisions fundament the existing sectoral regulations on the environment, watermanagement, sanitation, public health, civil defence and disaster response. With the exception of the latter, a relatively recent institution, the others rely on solidly established institutional and political arrangements which design a complex arrangement that merits being better known, involving society, the private sector, the Public Ministry, and the three governmental spheres.

Within this ample framework, however, the subject of water security itself has very little visibility. The topic of water security is not explicitly addressed: it is treated in an unsystematic way in the national legal and institutional framework - its contours are imprecise and fragmented. However, the references that are already available in the Brazilian institutional order sufficiently robust to guide the discussion on the theme, its institutionalization and the formulation of public policies, as follows.

There is no formal conceptualization of water security, or provisions explicitly referring to water security, in the federal legal norm. Nevertheless, the CF88 mentions several issues currently identified as belonging to water security. Among these, provisions for protection against water-related public calamities (droughts and floods) through civil defence are mentioned among the Federal Government's competences; the Federal Government's coordinated action to promote development in regions subject to periodic droughts, including the rehabilitation of degraded drylands; attribution to firefighter and civil defence departments in the context of public security at the state level and defining the Unified Health System, SUS (*Sistema Único de Saúde*) as responsible for the monitoring and vigilance over drinking water conditions for human consumption.

At the infra-constitutional level, five policy areas are identifiable as normative references which act directly upon what may be properly called water security: these are civil defence (disaster protection and risk management, including water-related risks and disasters such as floods), water resource management, the supply of water for consumption, as a component of basic sanitation, the health sector (in conjunction with the environmental sector responsible for monitoring and ensuring the quality of drinking water) and environmental stewardship, where water security is addressed in

the context of protecting ecosystems, forests, water bodies, watersheds and areas of hydric concern, and more recently climate changeresponses.

**Civil defence and disasters.** Among the types of recorded disasters that are identified as natural disasters, water-related events include droughts, floods, downpours, flash floods, riverbank erosion, riverbank collapse and mudslides, river surges, and torrential storms (GANEM, 2012). The National Policy for Protection and Civil Defence (PNPDEC, *Política Nacional de Proteção e Defesa Civil*) and the National Civil Defence System (SINDPEC, *Sistema Nacional de Defesa Civil*) regulate the constitutional provisions against disasters. The federal government is responsible for coordinating SINDPEC, issuing standards, promoting studies on causes and probabilities of disasters, supporting subnational governments in the mapping of risk areas, commissioning disaster risk identification studies, and pursuing other measures for the prevention, mitigation, preparation, response and recovery of disasters; organizing and maintaining a register of municipalities with areas susceptible to the occurrence of disasters; instructing and maintaining a system for the declaration and recognition of emergency situation and/or state of public calamity; instituting National Plan for the Protection and Civil Defence; and supporting the school-teaching community in the development of material for a disaster prevention culture.

**Water resources management.** The National Water Agency (ANA, *Agência Nacional de Águas*) is responsible for preventive functions regarding droughts and floods, in cooperation with the national civil defence system, and for strategic action on water allocation including planning and promoting action to prevent or minimize the effects of droughts and floods within the scope of the National System for Water Resources Management (SINGREH, *Sistema Nacional de Gerenciamento de Recursos Hídricos*) in tandem with the central organ of the National System for Civil Defence, in support of the states and municipalities. With regard to reservoirs, the ANA is tasked with defining and supervising the operational condition of reservoirs managed by both public and private agents, and also defining the operational condition of hydroelectric dam reservoirs in articulation with the National Electric System Operator (ONS, *Operador Nacional do Sistema Elétrico*). In addition to these, ANA has the following attributions of direct interest to water security: issuing the Waterworks Sustainability Assessment Certificate (CERTOH, *Certificado de Avaliação de Sustentabilidade de Obra Hídrica*), whose sustainability criteria specify attention to risks the water infrastructure project might pose to the population, surroundings, or the environment; planning and promoting preventive rationing actions, to prevent or minimize the effects of droughts and floods, in partnership with the National Civil Defence System and in support of States and Municipalities – provided that preventive rationing actions observe criteria to be defined by decree by the President of the Republic; and declaring bodies of water to be under preventive rationing, applying measures as necessary to ensure their priority uses in accordance with the criteria established by decree after consulting their respective river basin committees, if any. Water resource usage grants may be partially

or totally suspended, either permanently or for a specified period in cases of urgent need of water to attend to calamities, including those arising from adverse climatic conditions, the need to prevent or reverse grave environmental degradation, or the need to attend to priority uses of collective interest for which alternative sources are not available.

**Basic Sanitation: drinking water supply, wastewater collection, solid waste and drainage services<sup>3</sup>.** The normative provisions on basic sanitation, which are of most interest to water security, involve municipalities (responsible for providing water supply and other basic sanitation services<sup>4</sup>) public regulators, and mechanisms for social control. The responsibilities of the municipalities include: adopting minimum standards for the supply of drinking water to ensure essential public health standards; establishing mechanisms for social control, an integral part of the basic sanitation policy; and defining contingency and emergency actions, which comprise the minimum content in basic sanitation plans. The standards to be issued by the public regulators shall address contingency and emergency measures to be defined in the sanitation plan, including rationing. In critical situations, with scarcity or contamination of water resources, the regulatory body may adopt contingency tariff mechanisms. Water potability parameters are defined at the federal level. Social control organizations monitor and assess the performance of all players - state agents, regulators and operators.

**Public Health.** The performance of the federal public health sector as regards of water security occurs through regulatory standards on drinking water quality. All rationing measures require that sanitation companies adopt contingency measures according to established criteria, with the participation of sanitary vigilance by the Health Ministry /HM. The HM determines that the party responsible for operating the water supply system for human consumption shall maintain systematic evaluation of such waters from the perspective of health risks, in accordance with the Water Safety Plans principles as recommended by the World Health Organization (WHO).

According to the work developed by WHO (2009), the Water Safety Plans shall cover the evaluation of the system (system description, flow diagram, hazard identification and risk assessment, establishment of control measures at the critical points); operational monitoring (in order to control risks and ensure that health goals are met); management plans (to ensure constant verification of the PSA, containing documentation on system evaluation, routine and emergency procedures, risk communications, periodic validation and evaluation); PSA review (considering the collected data, changes in the watersheds, basins and systems, and emerging hazards and risks), and PSA validation and verification.

**Environmental Stewardship.** In Brazil, there are no explicit federal environmental standards addressing water security. However, the environmental agencies play a crucial role in this domain: exercising the power of environmental police in the protection of water bodies and water systems; control of water pollution; strategies

and public policy initiatives relevant for the production of water, on several fronts (such as in the management of water resources, protection, restoration and recovery of ecosystems and areas of interest for water systems and watersheds); through deforestation prevention and control, zoning regulations, and development of sustainable rural development strategies. Environmental agencies also contribute to the improved management of water by conserving or rehabilitating natural and modified ecosystems through nature-based solutions (United Nations World Water Development Report, 2018). Regarding climate change issues, the relationship between temperature increase and an increase in water vulnerability has been emphasized in the regions currently classified as semi-arid, which are under desertification processes yet subject to sporadic floods; in the so-called areas critical for water supply and watersheds, and areas critical for flood controls –affording central importance to mitigation and adaptation initiatives addressing the climate changes that may impact water security. The current federal government adopted numerous measures to weaken the environmental governance rules.

**Citizen participation: water and rights.** The participation of civil society on water governance and water security issues stems from the rules that treat water as an object of rights. Constitutional references to rights include the right to water as part of the rights to the environment, for whose protection the collectivity is entitled by the provisions that refer to the defence of diffuse interests. The right to access to safe drinking water, which is recognized as a human right by the United Nations plenary since 2010, is still not explicitly named as such among the rights and guarantees in CF88 - nevertheless it may be considered as an integral part of the rights to health services, and connected to the right to water supply and basic sanitation, in particular the adequate provision of drinking water supply services. The right to information on water is outlined in three constitutional provisions, regulated by the Law on Access to Environmental Information / LAI, with instruments provided for in various public policies related to environmental matters. The institutes that enable the participation of society are found within environmental regulation standards, health and sanitation, transparency and access to information. Citizens are co-responsible for the defence of water quality as an integral part of the environment. To this end, various social control policy instruments are available, such as participation in public hearings, in consultative and deliberative committees; as a legitimate stakeholder to propose popular action. Associations that have been constituted for at least one year under the civil law, and which include among their institutional purposes the protection of consumers and the environment, among others, also have the legitimacy to move class action suits (both remedial and preventive).

The titleholder of the rights regarding drinking water services is the consumer, whose rights are regulated by the Consumer Protection Code. It should be noted that both CF88 and PNRH (Law 9433 of 1997) and the national basic sanitation guidelines (Law 11445 of 2007) are still silent on any guarantees for the enjoyment of the universal

right of access to water, as advocated in the international agreements the country is a party to.

As regards basic sanitation services, the national guidelines also include as an obligation of the regulating authority the establishment of user rights, among which the law specifies access to drinking water sanitation services and the regularity of such services. The social control of public sanitation services is one of the basic principles in the national guidelines: a set of mechanisms and procedures that assure civil society access to information, technical representation, and participation in the processes of policy design, planning and evaluation. The participation of civil society in water resources management policies occurred until the present administration through the Hydrographic Basin Committees, which foresees the participation of public powers, users and civil society, limiting to 50% of the total representation of public power. Nevertheless, the participation rights are threatened by measures recently taken by the federal government, such as a provisional measure that extinguishes participative committees and councils.

### **From theory to policy: national and subnational initiatives on water security, 2019**

Water security still remains at an incipient stage in the Brazilian federal institutional framework, although recently the concept of water security has been increasingly disseminated, owing to the crises previously mentioned. Nevertheless, ongoing processes reveal that several social and governmental sectors are interested in formalizing the integration of water security into the legal and institutional framework in Brazil. The initiatives, originated in the three tiers of government, as well as in civil society organizations, are here shortly presented.

At local level, an innovative initiative was launched in 2016, promoted by civil society organizations, local councillors and municipalities - it is worthy of note, even if it may be considered in a very early stage: the proposal of local water security plans. The Alliance for Water (*Aliança pela Água*), a civil society coalition that unites more than 60 civil society organizations and movements created in October 2014 (in response to São Paulo crisis), promoted a campaign to include water and hydric security issues in the October 2016 municipal elections, grounded on analyses on water governance in Brazil (NEVES, 2016) and on the role of local governments in water supply and governance (NEVES, 2016a). The campaign presented an innovative municipal water agenda for mayor and alderman candidates, proposing in addition a term of commitment whereby, if elected, mayors and aldermen would include the water issues on the agenda and present a municipal bill on municipal water security policy<sup>5</sup>, based on the engagement of civil society and the commitment of legislative representatives and heads of the executive with the water security agenda. Among the principles underlying this proposal are the recognition that all levels of

government have responsibilities and must be at the service of the population and must consider the recovery of existing water source; and that local government has a central role in providing sanitation services, in monitoring the quality of drinking water, in establishing local interest priorities and in the articulation of federal and state government policies. As a result, about 100 candidates committed to the Alliance's water security bill. To date, there is evidence that the campaign was able to bring about desired outcomes in at least two major cities: in the municipality of Ribeirão Preto (SP), the first municipal water safety law was approved at the end of 2017. In the city of São Paulo (SP), the water security bill was presented to the City Council, which was processed in several Commissions, and was the subject of a public hearing in November 2017 - and was finally approved in 2019 by the City Council and sanctioned by the Mayor of São Paulo.

At state government level there are a few initiatives among the 26 Brazilian states that are beginning to discuss strategies to increase their capacity of water infrastructure, under pressure from the recent crises. According to Souza Filho et al. (2018), the state of Ceará developed a robust strategy combining several measures such as a water security plan for the state metropolitan area, negotiated water allocation system, a state water security working group, an integrated committee for drought adaptation, a state plan to cope with drought, and emergency measures (among others, quick-build pipelines, wells, desalination plants, mobile water treatment stations, reuse of backwash water in water treatment stations, extracting groundwater from dunes).

At federal level, there are three government initiatives for water security under the National Water Agency (ANA), which already carried out for years activities related to water security, such as mathematical simulations to assist in preventing extreme events and the Situation Room (Sala de Situação) created to monitor hydrological events across the country (SOUZA FILHO et al., 2018). The first of these is the definition for water security in the Brazil Water Resources Status Report 2017. The second initiative is the recent creation of the National Secretary for Water Security (2018-2019), under the Ministry for National Integration, to support the construction, operation and maintenance of water infrastructure works for water supply, such as dams and canals, responsible for the national water security policy. The third federal executive initiative was the elaboration of the National Water Security Plan (PNSH) under responsibility of ANA and the Ministry of National Integration, from 2014 on and publicly presented in April 2019, discussed further on, as the focus of the present work is the federal-level governance.

**The National Water Safety Plan, 2019.** After five years under elaboration, the National Water Safety Plan (PNSH) was released to the public in April 2019. According to its authors, they adopt the UN Water concept of water security (PNSH, 2019, p.15). Key factors are highlighted, responsible for the recent water crises: an increase of population, the disorderly use and occupation of the land, economic growth, climate



changes, a deficiency in investments in water infrastructure, and an absence of institutional planning for water infrastructure and sanitation.

The PNSH's policy response to the crises involves planning "in an integrated and consistent manner" and a water management infrastructure that is established "(...) strategically and with regional relevance by 2035, to reduce the impact of droughts and floods, [through] works, additional studies and projects, as well as filling the knowledge gaps on areas with low water security" (p.19). It refrains from addressing issues of a "specific nature, local scope, or isolated solutions".

The Plan presents an assessment of the national territory identifies "water safety levels" through the creation of a "water safety index", result of the combination of indicators on four dimensions - human (assurance of water for human use), economic (assurance of water for irrigation, animal husbandry, and industrial activity), ecosystem (water for natural resources in adequate quantity and quality, and keeping the safety of mining tailings dams and bunds), and water resilience (artificial reservoirs, natural reservoirs, underground storage potential, and rainfall variability). Areas called Territorial Units of Analysis (UTA, *Unidades Territoriais de Análise*) were selected for spatial analysis and for which risk values were calculated. An integrated assessment was performed based on a comparison between the water safety problems characterized by the ISH and the provision of inventoried water supplies in order to identify those that were configured available strategic reserves and met PNSH requirements, in addition to highlighting a few predefined critical UTAs. The result of these procedures was the identification of the situations most eligible for risk minimization and flood control to be object of studies and projects, works and institutional support.

The PNSH proposals for spatial intervention comprise three components: studies and projects (to a value of USD 48 billion), works (99 interventions to a value of USD 7 billion) and an institutional component. The proposed interventions observe the following general guidelines: assistance to territorial units concentrating most problems, measured by the beneficiary population and the value of agricultural and industrial production; focus on supplying existent and projected deficits based on effective demand, estimated from current results and water usage trends; use of local water resources, based on existing water infrastructure and projected availability from ongoing works; and human supply assurance through sources with guaranteed quantity and quality of water, preferably by direct adduction of reservoirs and avoiding dependence on stretches of perennial rivers. No steps were taken up for the PNSH implementation up to now.

## **FINAL REMARKS: IN SEARCH OF A SUSTAINABLE STRATEGY FOR WATER SECURITY**

Analysing the numerous definitions of the term "water security" discloses that their conceptual frameworks are often incompatible among themselves and that very

feware in line with the principles of environmental law, the fundamental human right to drinking water and the principles of sustainability.

The review of the juridical-institutional framework reveals that there are already important references in place to guide the forthcoming steps, found in current regulations protecting the environment, water resource management, sanitation, and health. Taken as a whole, the responsibilities and rights pertaining water security involve civil society, the private sector, the Federal Public Prosecutor's Office, and the three spheres of government - federal, state, and municipal.

With respect to the initiative by the federal government to present a national plan for water security, the integration of the subject in the national agenda is undoubtedly positive, advancing toward institutionalization of the topic as a new policy area. However, the public version of the National Water Safety Plan shows that the proposal has in many respects fallen short of what was proposed. According to the released text, in practice the federal government adopted a narrow definition of the concept of water security even while claiming to have adopted the UN definition. The PNSH only considers the aspect of physical availability, while the aspects of risk are mentioned only in summary form. The environmental dimension of the strategy is not detailed, nor does it mention the importance of the solutions based on nature, nor the role of water remediation through the treatment of sanitary sewage, a historical social debt in the country. The PNSH does not specify the architecture of the governance system underlying the implementation and operation of its decisions - which significantly weakens the plan's contribution, as it does not clarify any commitment to coordination by the federal government, nor the forms of integration and joint decision with states and municipalities. Civil society actors are the great absentee in the PNSH. None of the participation mechanisms included in sectoral regulations is considered in the Plan, ignoring that much of the governance of water safety concerns negotiation processes. Regarding crisis demands, there is no word on building response capabilities to deal with emergencies and collapses, nor on the participation of civil society in strategic planning and decision-making processes. Federative arrangements and interdependency among national and subnational governments are barely considered in practice ignored, leaving out the metropolitan region challenges. Water quality, a crucial issue dependent on two sectoral policy areas, environment and sanitation, is not addressed in the Plan. In sum, the approach undertaken by the federal government is undoubtedly identified most closely with mere water infrastructure provision.

Nevertheless, important steps were taken, such as the recognition of the importance of water security in the government agenda and acknowledging that it is incumbent upon the federal government to perform structural water infrastructure works and estimate the order of magnitude of the requisite resources. But the federal government still does not have a water security policy: the above considerations point out challenges that must be faced, to be subsequently transformed into a consistent, sustainable and democratic strategy.

The ongoing initiatives at state and municipal level reveal that there are manifold visions of water security in Brazilian society, corresponding to distinct interests and approaches, grounded on lessons learnt - and these are still scantily known and disseminated and should be more closely analysed by all stakeholders, specially the compatibility of the proposals with environmental stewardship, democratic regime and sustainability. Promoting the debate on water security presupposes overcoming several challenges - amongst which the ignorance and disinformation of the population about the water governance system and the responsible parties and, even, the difficulties in mobilizing the population and raising awareness after emergency peaks subside, as the water crises are experienced across several regions.

### Notes

<sup>1</sup> Available at: <https://en.unesco.org/themes/water-security>. Accessed: 1 March 2018.

<sup>2</sup> National Council for Water Resources, Resolution #32 of 2003, identifies the following hydrographic regions: Amazon, Tocantins-Araguaia, Paraguay, Paraná, Uruguay, Northeast Atlantic, Eastern Northeast Atlantic, Parnaíba, São Francisco, East Atlantic, Southeast Atlantic, and South Atlantic.

<sup>3</sup> Basic sanitation responsibilities comprise drinking water supply; wastewater collection and treatment; solid waste collection, management and treatment, and rain water drainage, all of interest to water issues

<sup>4</sup> They are in charge of municipal planning, service provision, organization, regulation and controls, as well as of defining tariffs. In metropolitan areas, the exercise of municipal ownership must be exercised jointly by all stakeholder municipalities together with the state government, and these activities are carried out under intergovernmental cooperation.

<sup>5</sup> "Vote for Water" Campaign, 2018. Available at: <https://bit.ly/3apCHYV>. Accessed: 1 March 2018.

### References

- ALLOUCHE, J.; NICOL, MEHTA, L.; SRIVASTAVA, S.** Water securities and the individual: challenges from human security to consumerism. In: PAHL-WOSTL, C.; BHADURI, A.; GUPTA, J. (eds.) *Handbook on water security*. Cheltenham, UK: Edward Elgar, 2016, p. 59-75.
- BOGARDI, J.; SPRING, U. O.; BRAUCH, H.G.** Water security: past, present and future of a controversial Project. In: PAHL-WOSTL, C.; BHADURI, A.; GUPTA, J. (eds.) *Handbook on water security*. Cheltenham, UK: Edward Elgar, 2016, p. 38-58.
- BRASIL.** Ministério do Desenvolvimento Regional. Agência Nacional de Aguas. Plano Nacional de Segurança Hídrica. Brasília, DF: ANA, 2019
- COOK, C.; BAKKER, K.** Debating the concept of water security. In: LANKFORD, B.; BAKKER, K.; ZEITOUN, M.; CONWAY, D. (eds.). *Water security – principles, perspectives and practices*. New York: Routledge, 2013, p. 49-63
- COOK, C.; BAKKER, K.** Water security: critical analysis of emerging trends and definitions. In: PAHL-WOSTL, C.; BHADURI, A.; GUPTA, J. (eds.). *Handbook on water security*. Cheltenham, UK: Edward Elgar, 2016, p. 19-37.
- ENVIRONMENTAL PROTECTION AGENCY/ EPA.** *A water security handbook: planning for and responding to drinking water contamination threats and incidents*. Washington: EPA Publications, 2006
- FALKENMARK, M.; BERNTSELL, A.; JAGERKOG, A; LUNDQVIST, J.; MATZ, M.; TROPP, H.** On the verge of a new water scarcity; a call for good governance and human ingenuity. Brief, Stockholm: Stockholm Water International Institute, 2007.

**FISCHHENDLER, I.; NATHAN, D.** The social construction of water security discourses: preliminary evidence and policy implications from the Middle East. In: PAHL-WOSTL, C.; BHADURI, A.; GUPTA, J. (eds.) *Handbook on water security*. Cheltenham, UK: Edward Elgar, 2016, p. 76-90.

**GREY, D.; CONNORS, G.** The *Water security imperative: we must and can do more*. 5th World Water Forum, Istanbul, 2009

**JANSKY, L.; NAKAYMAMA, M.; PACHOVA, N.** From domestic to international water security. In: PACHOVA, N.; NAKAYMAMA, M.; JANSKY, L. *International water security*. Washington: United Nations University Press: March 2008.

**LANKFORD, B.; BAKKER, K.; ZEITOUN, M.; CONWAY, D. (eds.)**. *Water security – principles, perspectives and practices*. New York: Routledge, 2013, p. 49-63

**LOFTUS, A.** Water (in) security: securing the right to water. *The Geographical Journal*, v. 181, n. 4, December 2015, p. 350-256.

**NEVES, E. M. S. C.** *Quem cuida da água?* Governança da água doce, moldura jurídico-institucional, 2016. / [org M. Whately]. Rio de Janeiro: Aliança pela Água, 2018.

**NEVES, E. M. S. C.** *O município e a governança da água: subsídios para a agenda municipal de cuidado com a água*. [org M. Whately]. Rio de Janeiro: Aliança pela Água, 2018. Accessed: 01 March. 2018

**NEVES, E. M. S. C.** Segurança hídrica, governança das águas e sustentabilidade. *Revista de Direito Ambiental*, v. 23, n. 91, p. 225-250.

**PAHL-WOSTL, C.; GUPTA, J.; BHADURI, A.** Water security: a popular but contested project. In: PAHL-WOSTL, C.; BHADURI, A.; GUPTA, J. (eds.) *Handbook on water security*. Cheltenham, UK: Edward Elgar, 2016, p. 1-18.

**RUSCA, M.; ALDA-VIDAL, C.; KOOY, M.** Sanitation Justice? The multiple dimensions of urban sanitation inequalities, In: Boelens, R.; Perreault, T.; Vos, J. *Water Justice*. New York: Cambridge University Press, 2018

**SOUZA FILHO, F.A.; FORMIGA-JOHNSON, R.M.; STUDART, T.M.C.; ABICALIL, M. T.** From drought to water security: Brazilian experiences and challenges. In: WORLD WATER COUNCIL (Ed.). *Global water security- lessons learnt and long-term implications*. Marseille, Springer, 2019, p. 233-265.

**STRICKERT, G. et al.** Unpacking viewpoints on water security: lessons from the South Saskatchewan River Basin. *Water Policy*, v. 18, p. 50-72, 2016

**TARLOCK, D.; WOUTERS, P.** Reframing the water security dialogue. *The Journal of Water Law*, v. 20, p. 53-60, 2013

**UNITED NATIONS UNIVERSITY/UNU; INSTITUTE FOR WATER, ENVIRONMENT AND HEALTH/ INWEH; UNITED NATIONS ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC/ UN-ESCAP.** *Water security and the global agenda*. A UN-Water analytical brief. Ontario: UN-INWEH, 2013

**UNITED NATIONS EDUCATION, SCIENTIFIC AND CULTURAL ORGANIZATION UNESCO; INTERNATIONAL HYDROLOGICAL PROGRAMME / IHP.** *Strategic Plan for the 8th phase*. Paris: UNESCO, IHP, 2013

**WITTER, S.G.; WHITEFORD, S.** Water security: the issues and policy challenges. *International Review of Comparative Public Policy*, v. 11, 1999, p. 1-25.

**WORLD HEALTH ORGANIZATION/WHO.** *Water security plans*. Geneva: WHO, 2009

**ZEITOUN, M.** The web of sustainable water security. In: LANKFORD, B.; BAKKER, K.; ZEITOUN, M.; CONWAY, D. (eds.). *Water security – principles, perspectives and practices*. New York: Routledge, 2013, p. 11-25.