
THE LEGAL TREATMENT OF FRESH WATER RESOURCES IN BRAZIL AND IN THE UNITED STATES OF AMERICA ¹

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ABSTRACT

The article aims to verify whether the Brazilian and the North American water policies have been efficient in the face of complex and recent environmental problems. The approach methods used were the qualitative and the critical ones, whereas the procedure method was the comparison. The technique used was the bibliographical research. The United States adopts a pure system of federalism, each state has great legislative autonomy, so there is more than one legal system for the allocation of the right to water: the riparian right and the prior appropriation. Although the law in both Brazil and the US has incorporated the concept of water as a public asset, the American regime allows for the exercise of the right of ownership, the so-called water rights. Despite denying the existence of property rights on water in a macro-environmental sense, water rights permit this exercise to a portion of it. The Brazilian and the North American water systems have strengths and weaknesses that complement each other. While Brazil's bureaucratic apparatus is not yet in accordance with its legal system, the North American water legislation needs to be improved in order to allow for more equitable access.

KEYWORDS: Fresh water resources; Public domain; Regulation; Comparative law.

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*O TRATAMENTO JURÍDICO DOS RECURSOS HÍDRICOS
NO BRAZIL E NOS ESTADOS UNIDOS DA AMÉRICA*

RESUMO

O artigo tem como objetivo verificar se as políticas de recursos hídricos do Brasil e dos Estados Unidos têm sido eficientes frente aos complexos e recentes problemas ambientais. O método de abordagem utilizado foi o qualitativo e o crítico, ao passo que o de procedimento foi o comparativo. A técnica utilizada foi a pesquisa bibliográfica. Os Estados Unidos adotam um system puro de federalismo, segundo o qual cada Estado possui grande autonomia legislativa. Por isso existem mais de um system jurídico para a atribuição do direito às águas: riparian right e prior appropriation. Apesar de tanto o direito brasileiro quanto o estadunidense incorporarem o conceito de água como um bem público, o regime americano permite o exercício do direito de propriedade sobre ela, os denominados water rights. Apesar de negar a existência de um direito real sobre as águas no sentido macroambiental, os water rights autorizam este exercício sobre uma parcela dela. Os sistemas hídricos do Brasil e dos Estados Unidos possuem pontos fortes e fracos que se complementam. Se o aparato burocrático do Brasil ainda não está de acordo com o seu sistema legal, a legislação hídrica estadunidense precisa ser aperfeiçoada a fim de permitir um acesso mais equitativo.

Palavras-Chave: *Recursos hídricos; Domínio público; Regulação; Direito comparado.*

INTRODUCTION

The need to protect water resources has been one of the main concerns of the present days one the future of the human race itself is being discussed. The ecologically balanced environment is framed by specialists as a third-generation human right that has recently been called Solidarity Right.

What happens is that the development of the countries has mostly been supported by the unmeasured appropriation of vital natural resources, generating demonstrably severe environmental impacts besides the exclusion of access to less privileged ones.

This article aims at checking whether water resource policies in Brazil and the United States have been efficient in the face of the complex and recent environmental issues. The approach methods used were the qualitative and the critical ones, and the procedure was the comparative one. The technique used was bibliographic survey.

After explaining the legal models used by both countries to deal with water resources, a critical assessment of those models if going to be carried out, trying to find out what legal asset is being protected and to identify the differences and the common points, with the positive and the negative aspects of each system, so that one may contribute for the improvement of the other.

1 THE NORTH AMERICAN LAW AND THE WATER RIGHTS

In the United States, there are several complex legal systems to assign rights to the waters, the so-called *water rights*. Those systems vary from region to region both for historic and geographical reasons. Differently from what it may seem, water rights are not, as in Brazil, the right that any people has to water for survival.

In that country, waters and areas covered by it belong to federate States and, thus, are part of its domain. Thus, that is federative entity that has legitimacy to create and execute laws regarding water policies, since they do not conflict with the general laws issued by the Congress, at the limit of its constitutional competence.

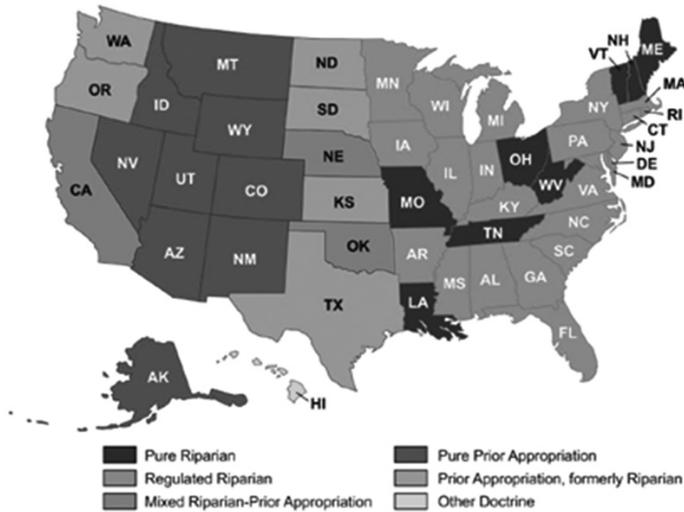
In the United States, there are two basic methods to attribute

a water resource to someone. The resource can be allocated through the marketplace or by government regulation (TARLOCK, 2014, p. 12). The North-American Water Law does not treat water resources as real estate in the same sense land is considered. The country grants the right to someone to use the water on a particular purpose. (JOHNSON, 2009, p. 29). Water is considered a public asset. Public assets in the United States are indivisible, collective and free assets, similarly to diffuse assets for the Brazilian law. That means that water cannot be divided or sold and that all people have the right to access it free of charges except for collection, transportation, treatment and destination (CASSUTO; SAMPAIO, 2011, p. 376).

For Cassuto and Sampaio, *water rights* grant use rights but do not transmit a title of current right regarding water. For the authors, nobody can prevent any people to access and enjoy water, regardless how ancient a *water right* may be. The reasons for that are mostly biological. Once water is essential for the survival of all human beings, the State has the obligation to provide all citizens with access to it (2011, p. 375).

The *water rights* are defined in the United States by means of two main methods. The first one is called *riparian rights*, which was firstly predominant in western United States. The other one is better known as *prior appropriation* and it has different shapes along the western area of the United States. *Water rights* are “*riparian*” if they result in land ownership or they are “*appropriation*” if the rights exist regardless any riparian land owner (JOHNSON, 2009, p. 35).

Figure 1 – “water right” systems



Source: U.S. Department of Energy. 2014 (John A. Dutton e-Education Institute)

Both in jurisdictions under the *riparian rights* doctrine and under *prior appropriation*, people that hold the *water rights* are just usufructuaries and the uses are subject to some limitations², as for the ESA (*Endangered Species Act*) that protects endangered species and their habitats. (CASSUTO; REED, 2010, p. 1-27).

The North American Law was mainly concerned about superficial waters. Underground waters are treated separately. The law has not been responsive enough to appropriately treat underground waters, since it would until recently regard as uncertain the dynamics of the underground waters cycle integrated to superficial waters in order to regulate it. State failure to legislate on the subject freed owners to extract underground water as they wished within the limits of their properties (GETCHES, 1997, p. 8-9).

Some theories to assign rights to underground waters are similar to *riparian rights* (land owner has absolute ownership over the water) and *prior appropriation* (underground water is subject to appropriation, thus protecting older wells). However, some states do not recognize the private property right over underground Waters, but they consider it public property. The Supreme Court of Colorado decided, for example, to free

² Those limitations are subject to compensations.

the Legislative Power to decide how to manage that resource (GETCHES, 1997, p. 8-9).

Exercising the right to eminent domain, the government of the United States cannot frustrate a *water right* for public use without fair compensation, which shall mandatorily be cash (GOLD, 1891, p. 481).

After those initial explanations, the operation of the traditional North American systems that regulate the use of water are going to be better detailed. Nowadays, few federate states adopt any of the systems in their pure form. Many of them use a hybrid and regulated system.

1.1 Riparian rights

The *riparian rights* had their origin in the English common law in the middle of the 18th century and they responded to Roman Institutes of Justinian for which water, as well as air, was *res communes*, that is, belonging to all and to nobody at the same time.

In the states where the *common law* has not been changed, especially in western United States, the owners of land adjacent to water bodies are granted certain rights due to that. Those rights are different from those that people in general have (FARNHAM, 1904, p. 278).

The Supreme Court of the United States explained the historic evolution of the *riparian rights* in *The United States v. Gerlach Livestock*.

In the middle of the Eighteenth Century, English common law included a body of water doctrine known as riparian rights. That also was the general Mexican law [...] As long ago as the Institutes of Justinian, running waters, like the air and the sea, were *res communes* -- things common to all and property of none. Such was the doctrine spread by civil law commentators and embodied in the Napoleonic Code and in Spanish law. This conception passed into the common law (1950, p. 339).

The *riparian rights* were traditionally ruled by the *natural flow* doctrine according to which each owner of land bathed by waters, had the right to them in its natural condition and the other users could not slow or decrease their flow neither pollute them (AUSNESS, 1986).

However, with population, industry and agriculture growth, the

natural flow doctrine became impracticable. In addition to that, territorial, geographic and population differences between the United States and the United Kingdom had the doctrine adapt to the needs of the United States. The paradigmatic case that reflected that progress was *Tyler v. Wilkinson*, whose decision introduced the notion of rational use into the system (CASSUTO; SAMPAIO, 2011, p. 379).

Riparians can use the water as they wish on domestic purposes or for irrigation, since that use is reasonable, which implies in saying that it cannot decrease the volume of water available neither compromise its quality. Moreover, they also have the right to all water products since the other owners are not harmed (FARNHAM, 1904, p. 1578).

Rational use of water by riparian owners is solved case by case by a jury. However, some assumptions are previously set by the Courts, such as the above mentioned rational use (FARNHAM, 1904, p. 1578-1579). Another requirement has also to be mentioned: priority uses. In case of shortage, the primary use shall be the domestic one so that all land owners along the water course can use it for their primary needs (FARNHAM, 1904, p. 1580).

According to Dellapenna (2004, p. 559), some factors define priority use: (a) use purpose; (b) sustainability of the use for water courses; (c) economic value of the use; (d) quantification and extension of the damages; (e) practical possibility to avoid the damage when adjusting the use or the use method for one of the litigants or the other; (f) practical possibility to adjust the amount of water used by litigants; (g) protection of involved amount of water, land, investment and the project; (h) justice when requiring that the user who caused the damage bears the loss.

The principle over which those rights are based is equally applicable to all water bodies, indistinctly. American Courts disagree in what regards listing those rights. Some of them grant more rights than the others (FARNHAM, 1904, p. 278).

No right that is equally shared by an indefinite number of people can be absolute, so that, although there is water in the property (and maintaining its purity is one of the *riparian rights*), that right can only exist by respecting some level of reasonability, considering all the uses to which water is subject, as well as the right of other owners of land adjacent above or below the water course (FARNHAM, 1904, p.278 e 1565).

According to Farham (1904, p. 295, 297-298), the riparian

owner has the right to access the water and not even the State, building up provisions to ease navigation, can prevent him to exercise it, unless there is a compensation. Some courts, however, refused to recognize that right or declare the right was subordinated to public law so they could have access hindered without due compensation.

Those *riparian rights* are not considered real property rights, but just the right to use Waters on domestic purposes and other legal purposes³. Thus, property referred to in the North American legal system consists not in the right to water *per se*, but in the value it adds to land. Not even the Legislative Power can, by way of protecting public interests, arbitrarily interfere in *riparian rights* (FARNHAM, 1904, p. 1565-1566).

The right to water is not gained or lost from use or its lack. The *riparian rights* are understood as natural rights⁴ belonging to land. Those who do not own adjacent land do not have the right to use it as private individuals. They can only claim the right to navigation or to share public rights such as the right to fishing, to ice and others. However, as already mentioned, those rights may be relativized for public use due to the power of an eminent domain (FARNHAM, 1904, p. 1569-1601) since duly compensated.

The increase of water demand and drought intensification, summed to other factors, contributed for the appearance of a system popularly known as *riparianism regulated*, based on a permitting system (CASSUTO, SAMPAIO, 2011, p. 380). That system has been used by 18 states⁵. However, state regulation, as it has been exercised, has not been enough to insure equalitarian access.

1.2 Prior appropriation

After the Civil War, North American politics started to worry about a solution for issues regarding water in the western part of the country, where the climate was more and more arid before getting to a narrow wet zone along the Pacific Coast. Initially, there was an attempt to adapt the

³ As set forth in case *Warder v. Springfield*.

⁴ The sense of natural right in this sentence is the right of nature. It does not refer to the natural law theory current.

⁵ Maryland, Arkansas, Iowa, Wisconsin, Delaware, New Jersey, Kentucky, North Carolina, Florida, Minnesota, Georgia, New York, Connecticut, Massachusetts, Mississippi, Hawaii, Virginia, and Alabama.

riparian rights doctrine to the western territory. Nonetheless, that was not enough once, in addition to shortage, there was considerable increase to the demand for mining and agriculture (CASSUTO; SAMPAIO, 2011, p. 382).

The federal government explicitly recognized the *prior appropriation* doctrine with the 1866 *Mining Act*, the 1877 *Desert Land Act* and by means of Jurisprudence in several cases.

The *prior appropriation* system started in western United States, where a lot of land was appropriated by the government. Due to that, few private owners had *riparian rights*. The fact that triggered that new system was mostly the search for water by the first miners for their work in federal ground⁶. They simply followed the same rules for the appropriation of the minerals for which they competed: *first in time, first in right*. That is, the first user could use and exclude the use of the other beneficiaries. The first courts recognized that custom and soon started using the same rules for farmers and other. While for the *riparian rights* doctrine the right to water depended on land ownership, for the *prior appropriation* one, it was defined by the first use (JOHNSON, 2009, p. 45).

To insure the right, the person has: 1) to meet all legal requirements; and 2) to use water on beneficial purposes. Those rights are valid while the person is enjoying them (JOHNSON, 2009, p. 45).

An important category in the *prior appropriation* doctrine is the “beneficial use”. The beneficial use is any productive use. The only remark is that the use cannot become waste. The definition of waste varies from region to region, but in general, the law assumes that appropriators shall not use the water so as to result in more losses than typical uses, which makes the concept extremely variable, depending on the wealth in the area and on the geography (CASSUTO, SAMPAIO, 2011, p. 383-384).

Appropriation rights may be transferred as they are not harmful to rights acquired by the others. Thus, the first user, who always keeps priority, is called senior and the following users, junior. From the states that adopt the pure appropriation doctrine, only Colorado does not require authorization for water appropriation. One of the disadvantages of appropriation is that it may result in collective action issues, avoiding the ideal use of the water (JOHNSON, 2009, p. 45).

Under the motto *use it or lose it*, in the *prior appropriation*

⁶ The first legal case took place in California, *Irwin v. Phillips*.

doctrine, not exercising the right can result in losing the right to use the water (ADLER, 2010, p. 22).

As already said, the arid climate in the western region was one of the reasons for this system to be adopted once water needs were not always located on the land bordering it. Moreover, that system would not allow few lucky owners to monopolize those rights. Although that system seems more equitable, it fails to allow for equalitarian use.

2 CRITICAL CONSIDERATIONS ON THE NORTH AMERICAN WATER SYSTEMS

In the beginning of the 80's, in some parts of the United States, especially in the western part, the focus of federate States on energy independence led to the increase and intensification of the competition for the scarce water resources. Power companies would buy the ancient rights over the waters from those who owned them once the marginalized rural population was unable to maintain intake systems and, due to that, they sold their rights and lost their ability to irrigate their land (STEADMAN; HECTOR, 1983, p. 1-3).

People living in the outskirts, outside legal municipal limits, were victims of the degradation of their waters by several pollution sources. Many people could not replace or deepen their wells, which made them unable to find water of appropriate quality once they were poor. For that reason, they were at a disadvantage in negotiation processes and they faced difficulties finding a source of supply at a reasonable cost (STEADMAN; HECTOR, 1983, p. 1-3).

After over 30 years, despite some progresses regarding the water policy in the country, those issues are far from a solution.

Besides the serious social problem, environmental conditions are also terribly bad. The temperature in the United States is increasing, especially in the west, worsening even more the problems in the arid region. North American scientific texts show that the increase comes from greenhouse effect gases and that phenomenon is likely to persist (MOTE et al., 2005, p. 48; CUBASCH et al., 2001).

The western snow mountains are a key component in the water cycle once they store water in the winter (when rainfall is more intense) to

release it during spring and in the beginning of summer, when economic, environmental and leisure demands in regards to water all over the western region are frequently higher. In most of the western water basins, especially in Washington, Oregon and California, snow (instead of artificial reservoirs) is the largest source of water storage, which leaves the west in a situation of vulnerability in the face of climate variation (MOTE et al., 2005, p. 39).

Warming rate estimates in the future for the western region are between 2° and 5° C in the next century. In some places, there was an increase to the rainfall, resulting in floods, in other places, there was a decrease. However, rainfall increases were generally insufficient to overcome the decreases due to the strong regional warming such as, for example, the Cascades area, where rainfall rates increased, but they were not proportional to the large temperature increase once there is an aggravating factor that this snow region is sensitive to high temperatures (MOTE et al., 2005, p. 46-48).

The North American system has progressed to state regulation (not market regulation that much) that provides for more efficient means to manage public assets. Nevertheless, that regulation is still poor.

The 1948 *Clean Water Act* was initially focusing on pollution reduction from punctual sources by means of a national permitting system – *National Pollutant Discharge Elimination System* (NPDES), which federate States could manage. The law would also require water quality to be monitored to identify and prioritize the quality of water bodies, the total amount of daily maximum loads regarding specific pollutants that those bodies could receive and translating those loads into permitting requirements and other measures. In 1972, the Act went through a series of changes that reflected a progressive understanding of water management challenges in the United States (BRUNCH; TROELL, 2011, p. 837).

Although the permitting system reduces the hegemony over the access to water, providing the Federate State with the responsibility to define the existence of water subject to appropriation and whether the proposed use is beneficial, the Byzantine complexity of the system still remains. More of a problem is the fact that the basis of the *first in time, first in right* doctrine allows for little flexibility in the face of the new water realities, and also the control over the water resource reaches relatively few people, which has been bad before environmental changes to the geography and

the climate that start to be seriously considered (CASSUTO; SAMPAIO, 2011, p. 386).

Those new measures, called Water Law adjustment, cannot respond to climate change. As Adler states, it is not possible anymore to wait for the humanity to raise awareness. Prevention and adjustment criteria shall be adopted simultaneously (ADLER, 2010, p. 10).

Several Federate States have issued laws for the decisions that grant permits are based on criteria that include public interest, but those laws do not apply to the already existing *water rights*, such as in the west where the water had already been appropriated a long time ago (CASSUTO; SAMPAIO, 2011, p. 385).

In the east, the *riparian rights* doctrine also fails to currently offer an adjustment to public interest. That doctrine was developed in an environment where water was abundant in a livelihood agricultural economy and its principles were designed to preserve domestic uses by individuals and it failed to foresee the economic importance of that environmental asset. The narrow approach adopted by the Judiciary Power to develop the doctrine imposes serious limitations to the capacity of local governments to meet the public consumption needs (BUTLER, 1985, p. 179).

The two legal water systems incorporate the concept of water as a public asset, but they allow for the right of property over it, the so-called *water rights*. Although they deny the existence of property right over waters, in the macro-environmental sense, the *water rights* authorize such a right over part of it. Both the West and the East are going through a slow transition period to a regulatory system, but they still have significant signs of previous regimes. Despite theoretical progresses, practice is very limited and incompatible with water changes related to the climate (CASSUTO; SAMPAIO, 2011, p. 374) pointed out above as examples.

Milaré wrote in his *Environmental Law* that the North American water law has one of the most advanced water policies in the world due to the promotion of the rational use.

The United States and Israel are among the most advanced countries in regards to the rational use of water policies. The largest world producer of grains is the western center of the US. It is an arid region where the good use allows from crops with surprising yields, thanks to the rational use of that resource (MILARÉ, 2011, p. 262).

It is necessary to disagree from that point of view.

Intakes in Center-Western and Western United States result in massive water appropriation, both superficial, underground and even rainwater, government subsidies and the desire to spend huge amounts of resources to promote cultures depending on water in the arid areas of the country. The *prior appropriation* doctrine privileges users based on priority instead of reasonability. The reasonable use requirement creates few significant restrictions once the term is an open clause that requires, in practice, that the use is productive, which allows for a highly consumerist use regardless the geographic and hydrological reality of the region.

What Milaré may have wished to highlight is the economic efficiency and the excellent development of strategic planning projects, but not in the sense of environmental protection efficiency by the legislation.

The only limitation of the *prior appropriation* regime is that, differently from jurisdictions that adopt the pure form of the riparian doctrine, the *water rights* are subject to expiration for lack of use, which is hard to apply in practice.

The *riparian rights* regime is even more of a problem. It exclusively attributes rights over the water to a few land owners. However, with the contemporary regulation of that system, in which permits are distributed based on the use reasonability criterion, there is at least one possibility that the legal regime is adapted to respond to emergency realities (CASSUTO; SAMPAIO, 2011, p. 408).

The *riparian rights* doctrine in its pure form fails to appropriately consider the needs of municipalities and small users who are less capable of litigating or organizing themselves against the irrational use of large water appropriators (DELLAPENNA, 2004, p. 560).

The benefits of the *riparianism* regulated system include efficiency in allocating resources and in conservation resources (resulting from public management), the stability of the water rights distribution and State capacity to take proactive measures before any forecasted drought once the North American management system allows to clearly see the amount of water available for users (CASSUTO; SAMPAIO, 2011, p. 380).

The disadvantages of the system are that the maintenance of the bureaucratic management apparatus is very expensive (CASSUTO,

SAMPAIO, 2011, p. 380) and it also fails to insure equitable compliance. There may be arbitrary and biased administrative judgments (ABRAMS, 1990, p. 264-265).

Another issue is the lack of regulation regarding the North American water legislation, especially the definition of reasonable use for the West and beneficial use for the East (CASSUTO, SAMPAIO, 2011, p. 408). The standard system based on the “reasonable use” offers little or no real guidance for administrative agents to decide about permit issuance in order to reach fair and efficient water distribution objectives (ABRAMS, 1990, p. 284).

The Water Law should also stop making a false difference between underground and superficial sources. It should recognize that they are interconnected and they are part in the same water cycle. It should avoid excessive extractions that incentive depletion of aquifers, seawater intrusion in coastal areas and ground collapse (HUNDLEY, 1992, p. 417-418).

The United States has a strong cultural resistance to regulation due to its economic regime. Butler states that one of the possible factors of modern North American court hesitation in recognizing public consumption rights may be the recent issue of relative water resource shortage. Despite the sudden and intense changes to water supply conditions in many eastern areas of the United States, the principles of the riparian doctrine became too rooted into many courts (1985, p. 180).

As judicial activism is a strong characteristic of *common law*, the author states that the solution should come from courts in the sense that they should accept responsibility over that task and develop a more reasonable accommodation of public and private interests or, in a less likely situation, that state legislative powers are willing to respond with encompassing reforms (BUTLER, 1985, p. 180).

For Cassuto and Sampaio, the solution for the United States involves the adjustment of existing standards to the new methodologies required by a Nation before a modified environment. Firstly, it is important to adopt methodologies that include precaution, intergenerational equity, the valuation of ecosystem services and the promotion of water conservation policies. All those principles and methodologies have already been foreseen in the Brazilian environmental legal microsystem. Secondly, a definition

of the terms “reasonable” and “beneficial”. Thirdly, the execution model shall adapt to the emerging political and ecological realities so as to ensure regulatory supervision and bear public pressures similar to the ones faced by the regulatory agencies in Brazil, which should be technical and not political agencies (2011, p. 409).

For a long time, the United States led the world in environmental and execution regulation and that is why Law n. 6.938/1981, which sets forth the National Environmental Policy, was inspired by the *National Environmental Policy Act* (NEPA) issued in 1970. Nowadays, despite its regulatory apparatus, it failed to maintain the same rhythm in the face of the new environmental challenges. The suggestion is that by interspersing the most important principles incorporated to the Brazilian legal order and the North American application and inspection methods, it is possible to create a sustainable water system post climate change (CASSUTO; SAMPAIO, 2011, p. 409).

The democratic process has already accommodated progresses in water management and environmental protection during the last decades and it is still promoting fights in courts and legislative assemblies to support and increase those gains. At the end of the day, gains have mostly been fragmented and often harmed by the lack of inspection and frequently more symbolic than real, especially when people designated for regulatory agencies are not committed or have no resources to efficiently carry out their duties. A great leadership has not yet come up to design and gain public support for a practical and intelligent water policy (HUNDLEY, 1992, p. 414).

Hundley says that it is no news that the United States has been abusing land and water resources and they have not been able to develop a coherent water policy for a population that has had an exploratory tradition for centuries. He believes that there are still signs of hope in some environmental legislation in the country. However, he believes that due to registers of abuse, population increases and the particular tolerance of the humanity to pollute their habitat, the task to be faced by those who try to inform and raise awareness of the public is gigantic (HUNDLEY, 1992, p. 417-418).

The water crisis in the United States has led authors to envisage greater interference from the Federal Government into the states and even

the creation of a water resource national policy. That is also because it is necessary to recognize water as a vital resource that has economic value. It seems that those changes, according to the current systems, would not be possible in the face of the economic regime adopted by the country once, in order to save the environment, it is necessary to slow economic growth down.

Some federate States were pioneers when regulating the uses of rain water. First of all because they considered them public and subject to regulation and, second, for admitting that the use of rain waters may influence the water regime.

Unfortunately, the reasons that led states to promote that regulation might not be the result of a distributive ideology, but the preservation and maintenance of some privileges, may they belong to land owners or to water rights owners once intake limitations do not affect all, only non-possessors/owners of *water rights*.

3 THE ACCESS TO WATER IN THE BRAZILIAN LAW

The Water Law, due to the new concerns and because society became more complex, progressed so as to overcome a system that tolerated private ownership over the water and to reinforce the prevalence of the public interest in what regards water resources, as we are going to detail below.

Until the promulgation of the 1988 Federal Constitution, the waters were classified according to their ownership as public Waters, which could be common use, belonging to domestic public legal entities, common waters and private waters.

From the discovery of Brazil in 1500 to its independence in 1822, the laws that ruled the country were the Portuguese ordinances. The 1916 Civil Code maintained the Portuguese legacy by stating government interest in the waters, but only in regards to navigable bodies. Even after the independence of Brazil and under the 1924 Brazilian constitutional regime, the rights over the waters were defined by some kind of previous appropriation regime that allowed those rights to be assured as private property rights.

The Brazilian water legislation had to adjust itself from a moment when waters were abundant to the current period of periodical shortages,

economic and political use pressures and also the fight for the implementation of the laws and regulations in force. The increasing water shortage resulting from poor environmental management, from natural disasters (including climate changes), from the emerging population issues and from water treatment has to make the effectiveness of the water legislation a priority at all government levels (CASSUTO; SAMPAIO, 2011, p. 387).

The perception of the legal world that water is a limited natural resource meant to exhaustion led to several changes to the legal order, especially after the promulgation of the 1988 Federal Constitution and with Law n. 9.433/97, which revoked a great part of Decree n. 24.643/34, better known as the Code of Waters.

One of the main changes brought by the Constitution was the extinction of municipal and private waters. Thus, all water bodies became public domain, that is, they were not subject to free seizure⁷.

There is a mistaken trend that sees the environmental assets as belonging to one of the Internal Public Law legal entities. The environmental asset is public not due to its subjective characteristic, but because the holder of the environment is the entire collectivity. The use is public because all have the right to use it, once the application of the non-exclusion of beneficiaries' principle is mandatory (objective characteristic) (BENJAMIN, 1993, p. 71).

The constitutional determination of a public legal entity ownership for some elements that form the environment does not affect the reasoning once the environmental asset – as an environmental quality and a macro-asset – does not mix with its material support, may it be the ocean, a lake, a river, a historic site etc. Saying that the environment is a common use public asset does not imply in ignoring that when the elements that form it are isolatedly investigated, they join multiple legal regimes, sometimes as public property assets – pursuant to the Civil Code (public assets in a subjective sense such as, for example, the ones listed in art. 20 of the Federal Constitution), sometimes as private assets of public interest, sometimes as mere private assets (BENJAMIN, 1993, p. 77).

The elements that form the environment, while related to it, keep the same diffuse or common use nature that characterizes it. Thus, a

⁷ The majority doctrine endorses that understanding, for example, Luís Roberto Barroso, José Ribeiro, Maria Luiza Machado Granziera, Virginia Amaral da Cunha Scheibe, Aldo da Cunha Rebouças and Vladimir Passos de Freitas. A minority, administrativists such as Maria Sylvia Zanella Di Pietro and Hely Lopes Meirelles believe that private property persists over common waters, as the Code of Waters sets forth.

heritage listed building or a preserved forest are common use public assets, even that they are ruled by the regime of private assets on other purposes (BENJAMIN, 1993, p. 70).

This means that the holder of an environmental asset, such as the waters, may it be public or private, cannot dispose of the quality of the environmental asset once it is not part of its availability since, even fragmented, the waters remain as the people's common use asset (SILVA, 2011, p. 86).

When we say that all have the right to an ecologically balanced environment, the word right is used in the sense of being its holder. It means that, even as a diffuse right, having a diffuse ownership, there is an individual holder who has particularities because it cannot be transferred, sold or integrate its individual property. Thus, the environmental asset as an individualized asset, integrates a public or private asset, but there is a diffuse ownership over it that changes its essence. (SOUZA FILHO, 2008, p. 177)

The State is responsible for controlling the use of that resource. That was made effective by means of the National Policy for Water Resources according to which water intake, in general, depends on the concession of a grant by the Federal Government or the member States.

Another innovative aspect of the National Policy is that the water started to have an economic value, which means that the user has to pay to use it. Nowadays, the price does not correspond to the water *per se*, but to sanitation services such as intake, treatment, drinkable water supply and distribution as well as sewage collection and treatment. Water charges are an instrument of the water resource policy, but it has not been fully regulated.

Making water public and charging for its use represented an impact in several situations, such as in regards to the poorer population. Low consumption, especially regarding the supply to the population in need, shall not be taxed under the penalty of offending the constitutional principle of the right to life. Article 12, paragraph 1 of Law n. 9.433/97 states that the use of water resources to meet the needs of small population groups in the rural area, the by-passes, intakes and discharges, as well as the accumulation of insignificant water volumes do not depend on grants and, consequently, on charges .

Those charges especially impact the economy, favoring the

principle of the free competition. The starting point is the statement that a preliminary condition to exercise freedom, including economic action freedom, is minimum equality. The positive externalities generated by water appropriation by a private individual are neutralized by the implementation of a billing system.

For example, a company that has the element water as the base of its production and the use of it is free of charges gains much more competitiveness in the marketplace than another one whose production costs are increased a lot due to the fact that it necessarily has to pay for that resource. Such a market failure shall be corrected by state intervention, through tax imposition, so as to force economic agents to consider the negative effects on the price of a certain product (MODÉ, 2006, p. 113).

Water pricing shall weigh several factors, such as the need to totally recover costs, water service sustainability, equality regarding access to water and so on. A method to balance those conflicting interests is the increasing use of block tariff systems in which water price increases according to the volume consumed. Thus, the more the user consumes, the higher the price, progressively. In some countries, such as South Africa, a “social tariff” is forecast. It guarantees a certain minimum amount of water per month (in South Africa, 6.000 liters) per family (BRUNCH; TROELL, 2011, p. 834).

Another important fundament of Law 9.433/97 is that water resource management shall be decentralized and count on the participation of the Public Power, users and communities, taking water basins as the territorial base for the implementation of public powers. Besides intending to be a democratic popular participation policy, the law gave priority to decentralization so that the characteristics of each region are respected.

Law 9.433, pervaded by social issues, established that every grant shall be conditioned to use priorities set forth in the Water Resource Plans and it shall respect the class in which the water body is framed and the maintenance of suitable condition for waterway transportation, when applicable, respecting multiple uses. Therefore, the National Policy for Water Resources has the main objective to guarantee equitable access to that vitally important resource.

4 COMPARATIVE ANALYSIS BETWEEN THE BRAZILIAN AND THE NORTH AMERICAN LEGAL WATER SYSTEMS

The legal water systems in Brazil and in the United States are similar in some aspects. Both are based on the principle that water is a public resource managed by the State in favor of the entire population. That doctrine originated in the Roman Law and it is known in the United States as *Public Trust Doctrine*, and it fits to article 225 of the 1988 Brazilian Federal Constitution. (CASSUTO; SAMPAIO, 2011, p. 387)

Another part of the North American doctrine interprets the principle that water is a public resource differently from the Brazilian doctrine. In the United States, water belongs to the States' citizens until someone purchases the use right, that is, the *water right*. Citizens can use rainwater since the use does not compromise the amount or the quality of the water used by appropriators (CUMMINGS, 2012, p. 553).

In the geographic aspect, the countries are also similar in some points: both have abundant water, although it is irregularly distributed. Their water reserves have considerably decreased due to climate changes. Because of those environmental problems, legal water regimes in both countries are also undergoing changes. Brazil promoted significant legislative changes in the last decades, coming from a water private property system to another one where waters are exclusively considered diffuse assets of public domain. The North American law has also progressed, coming from a strict *riparian rights* and *prior appropriation* system to a permitting system. The United States are more and more aware of water shortages and of the need for regulatory supervision and, on that purpose, each State has developed its strategic government plans (CASSUTO; SAMPAIO, 2011, p. 373).

Nevertheless, huge challenges still remain. The Brazilian administrative system is poorly equipped to enforce the rights, in addition to the difficulty to provide the principles of precaution, equity and multiple uses with efficacy in the face of the dependence of the country on hydroelectric power. In the United States, despite increased regulation by the states by means of permitting, rights on water remain privately insured, even if water *per se* is a public asset before the legislation. That allows private rights to overcome collective ones (CASSUTO; SAMPAIO, 2011, p. 374).

Although those two countries adopt different legal systems - Brazil, *civil law*; the United States, *common law* – there are several common points. As it would be good for the United States to study the adaptability and flexibility of the modern Brazilian water law, Brazil could benefit from assessing how the US has been able to plan and efficiently comply with its law, in spite of its territorial dimension and variable geography (CASSUTO; SAMPAIO, 2011, p. 374).

Even though the two countries are affected by climate changes, none of them has presented efficient solutions for those environmental issues.

On December 29, 2009, Brazil issued Law n. 12.187, which addresses the National Policy for Climate Changes, recognizing that diagnosed climate changes are also a result of the anthropic action. It also takes over the voluntary national commitment to reduce greenhouse effect gas emissions between 36.1% (thirty-six point one per cent) and 38.9% (thirty-eight point nine per cent) by 2020. However, the implementation of that public policy is still inadequate.

In the United States, the situation is chaotic. There is no consensus at the government level on the existence of climate changes and that they are caused by anthropic actions. There is also no consensus on the need for an encompassing national policy. For example, the EPA – *United States Environmental Protection Agency* firmly states that climate changes are taking place. However, the United States signed the Kyoto Protocol under strong opposition from the Congress and the Senate, have never confirmed to neither adhered to it prorogation in 2012. They have recently ratified the Paris Agreement, but the election of Donald Trump puts the respect for the agreement at risk.

Some federate States took individual or joint measures, but that fragmented response cannot replace a wide federal action. Although the Supreme Court's decision in *Massachusetts v. EPA* in 2008 authorized the EPA to start regulating carbon emissions in the light of the *Clean Air Act*, the agency has taken some hesitant steps when it aimed at reducing carbon emissions instead of adjusting to climate changes (CASSUTO; SAMPAIO, 2011, p. 406).

Due to the challenges from climate changes, both the United States and Brazil have to evaluate whether their respective legal water

regimes are enough to minimize the dramatic effects of environmental changes, which they do not seem to be (CASSUTO; SAMPAIO, 2011, p. 407).

The Brazilian problems are not related to the legislative aspect, but the political-administrative one, such as infrastructure and execution. Brazil depends over 75% on power from hydropower plants (WALZER, 2009).

That commitment to infrastructure requires huge amounts of water. With temperature increases and recent water shortages, Brazil has not adopted efficient action strategies to solve the energy issue, as we have seen in the State of São Paulo.

The country's dependency on hydropower brought up another serious problem. In order to create alternatives for power generation, Brazil started to build additional coal-burning plants. For that reason, it now faces the same problem as the United States and several other countries: coal-burning plants discharge huge amounts of carbon gas, which aggravates climate issues. That is, instead of meeting the emission reduction objectives, it generates even more emissions. It is noticeable that there is no government plan with strategic environmental actions, just isolated actions to "put out the fires". The greatest challenge for public policy makers in the country is how to implement the paradigmatic environmental changes introduced by the 1988 Constitution (CASSUTO; SAMPAIO, 2011, p. 410).

Besides climate changes, there is also the population growth issue and the competition for water due to scarcity, according to the information presented above, which puts vital uses at risk, including domestic consumption.

In short, water policies in Brazil and in the United States are going to face a frightening future. The two countries are, respectively, strong where the other is weak. Brazil's bureaucratic apparatus is not yet according to its legal system. The environmental laws, including the National Policy for Climate Changes and the National Policy for Water Resources, provide for a solid structure on which a regulator State shall be erected. The task to be faced involves the creation of a strong and independent regulator mechanism that can bear political pressure and the campaigns to manipulate public opinion in order to undermine the formulation of environmental policies.

In Brazil, the Public Administration fails to efficiently execute the National Policy for Water Resources. By assessing the map (Figure 6), it is possible to notice the concentration of grants issued in the Eastern Atlantic, Southeastern Atlantic and Paraná regions, which resulted in an overloaded water system. The consequences of that imbalance can already be seen, such as the water shortage in the State of São Paulo in 2015.

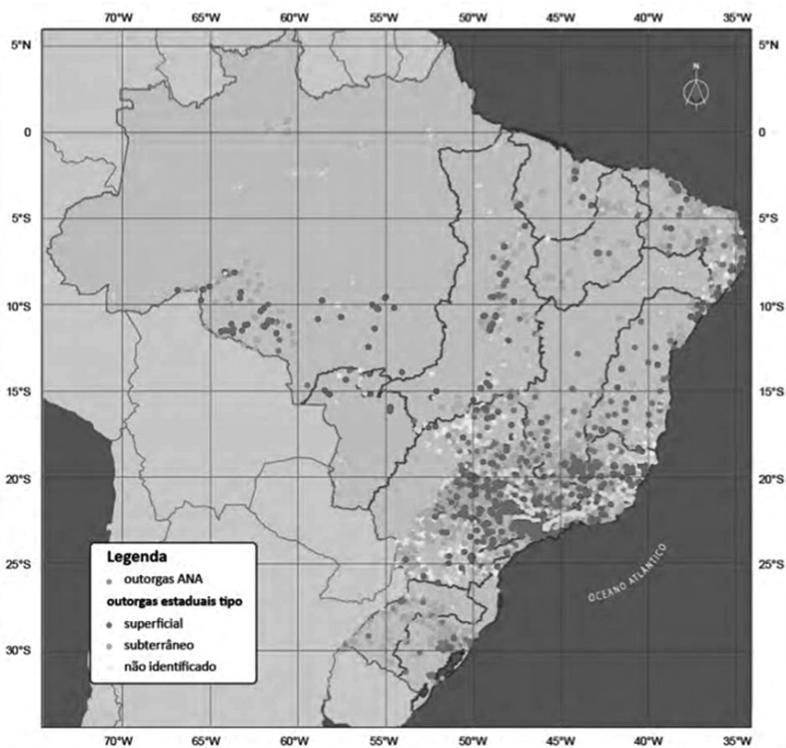


Figure 2 – Distribution of grants issued by ANA and by the water resource state management agencies for industrial supply by December 2012. Source: ANA, 2013, p. 118

Neither multiple and priority uses of water resources are being given a priority. Irrigation consumes a great part of the water that is caught. According to the graph below (Figure 7), it was responsible for 72% of the total flow rate consumed in 2010.

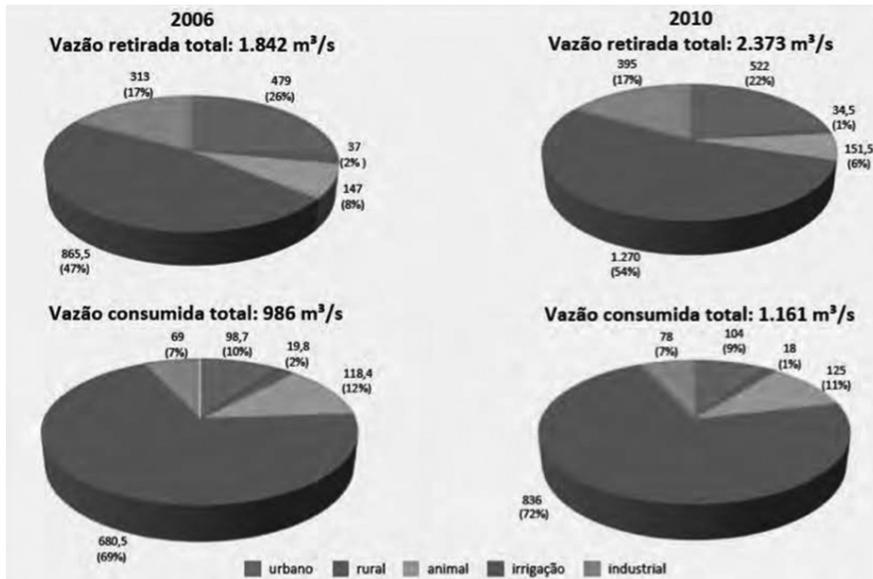


Figure 3 – Distribution of collection and consumption flow rates for different uses: 2006 versus 2010 Source: ANA, 2013, p. 89

Those figures indicate that, in practice, the National Policy for Water Resources has not been appropriately implemented. They warn us that pain and even the death of human beings due to the lack of water, in Brazil, is not a consequence of scarcity, but the failure of the Public Power in making the right of all to the use of public waters effective.

If Brazil’s challenge concerns the implementation and efficiency of its water public policy, the United States’ one regards the legislation and the legal theory.

CONCLUSION

Intakes in central-western and western United States result from massive superficial, underground and even rain water appropriation, government subsidies and the desire to spend huge amounts of resources to promote cultures depending on water in the arid areas of the country. The *prior appropriation* doctrine privileges users based on priority instead of on a reasonability criterion. The reasonable use requirement creates few

significant restrictions once the term is an open clause that demands, in practice, the use to be productive, which allows for a highly consumerist use, regardless the geographic and hydrologic reality of the area.

Even though the United States implemented legislative changes in regards to water resources, the so-called adjustment of the Water Law measures are not enough to respond to climate changes. Both the East and the West are going through a slow transition period to a regulatory system, but signs of previous regimes are still visible. Despite theoretical progresses, practice is quite limited and incompatible with water changes related to the climate.

If the Brazilian legislation is theoretically more suitable to environmental preservation and equitable access, the North American efficiency is renowned.

Both the Brazilian and the North American systems are based on the principle that water is a public resource managed by the State in favor of the entire population. But part of the North American doctrine interprets it differently from the Brazilian doctrine. In the United States, water belongs to citizens until someone acquires the right to use it, that is, the *water right*.

The water systems in Brazil and the United States have strong and weak points that complement each other. The Brazilian bureaucratic apparatus is not yet according to its legal system, while the North American water legislation needs to be improved to level with the quality of its managerial system.

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