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Instruments of administrative concessions of water use rights in Spain

Instrumentos de concesión administrativa de derechos de uso del agua en España

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ABSTRACT

Most of the Spanish territory is marked by Mediterranean climatic characteristics, in which rain irregularity and droughts present continuous challenges to water resource managers. Since the end of the 19th century, the country has adopted a management logic based on flow regularization from dam construction and basin water transfers. However, from the Water Framework Directive adopted in 2000, European Union member states are forced to undertake more environmentally oriented management processes, with a focus on improving the ecological status of water bodies. In this sense, economic management tools have been highlighted in the national strategies for compliance with the Water Framework Directive requirements. One of those instruments is the public water use rights permit. This paper aims to present the Spanish panorama of this instrument and contribute to those interested in water management. The work shows that there are several challenges and problems faced by the Spanish management apparatus, particularly regarding continuity of private management of groundwater and insufficient knowledge of numerous wells and volumes of water used. For various reasons, the concessions system faces criticism as to defending the interests of traditional economic sectors.

Keywords: Water use rights concession; Water resources management; Spain water management.

RESUMEN

Gran parte del territorio español es marcado por características climáticas mediterráneas, en que la irregularidad pluviométrica y los estiajes se constituyen en retos continuados a los gestores de recursos hídricos. Desde el final del siglo XIX, España ha adoptado una lógica de gestión basada en la regularización de caudales a partir de la construcción de presas y de transferencias hídricas entre cuencas. Sin embargo, a partir de la Directiva Marco del Agua los países miembros de la Unión Europea han sido forzados a buscaren objetivos más ambientales, centrados en la mejora del estado ecológico de las masas de agua. En ese sentido, los instrumentos económicos tienen destaque en las estrategias nacionales de adecuación a las exigencias de la Directiva. Este artículo intenta presentar el panorama español de aplicación de la concesión de derechos de usos del agua. Hay una serie de retos y problemas confrontados por el aparato gestor español, particularmente la continuidad de la gestión privada de aguas subterráneas y el desconocimiento de gran parte de los pozos y de los volúmenes utilizados. Por este y otros motivos, el sistema de concesiones enfrenta críticas cuanto a la defensa de los intereses de sectores económicos tradicionales en el país.

Palabras clave: Concesiones de derecho de uso del agua; Gestión de recursos hídricos; Gestión del agua en España.

INTRODUCTION

The Mediterranean conditions that affect two thirds of the Spanish territory make the country the most arid of Europe (LLAMAS et al., 2015) and shape different management challenges for neighboring countries. Rainfall irregularity and frequent droughts aggravate the connection between water availability and demands. This framework was traditionally taken as a cause of "hydrological and socio-economic imbalances" between the North Atlantic "wet Spain" and the Mediterranean "dry Spain" (GARCÍA FERNÁNDEZ, 2004). Hydraulic policies to increase supply and the disorderly processes of land occupation and water use have led to severe degradation and artificialization of aquatic systems. In fact, water management is one of the most important challenges for Spanish society in the 21st century.

Spain is one of the precursor countries for water management institutionalization. The Cortes de Cádiz, which approved the Constitution of 1812, established the public character of hydraulic use and intensified political concerns regarding water planning (SÁNCHEZ-MARTÍNEZ et al., 2011). The Water Law of 1866 was the first water regulation code in the world, but it had a short duration of only two years. The Centenary Law of Water was in force between 1879 and 1985. In 1985 the Water Law was passed, regulating the general framework of the terrestrial waters domain ever since.

From the 1990s, a more intense polarization of positions concerning the traditional water management models based on increased water supply was noted. Pressures were driven by social movements and by the Water Framework Directive (WFD - Directive 60/2000, October 23), which established a community management framework (EU, 2000). Environmental sustainability, subsidiarity, the search for efficiency, and social participation in management processes are transversal principles of the WFD (GRAY et al., 2016). The WFD considers that water is not a commercial good but rather a heritage that must be protected. The central objective of water policies should be to restore the "[…] good ecological and chemical status of surface water bodies and the good quantitative and chemical status of groundwater, with a more environmental perspective than that of water traditional approaches" (EU, 2000).

By seeking system modernization and WFD fulfillment, the management system has been proposing and applying instruments that bring advances as well as criticisms. This article presents the Spanish implementation framework for one of the main instruments: the administrative concessions of water use rights, since water is a public resource. From a traditional experience, we hope to contribute to reflections in Brazil and other countries. In addition to the extensive bibliographic review, other sources of information were used through informal conversations with specialists and participation in events.

GEOGRAPHICAL FRAMEWORK AND WATER USES

Spain has an area of 504,645 km^2 and one of the largest populations in Europe: 46,438,000 inhabitants (INE, 2016). In addition to the mainland, the country covers the Balearic and Canary Islands and the autonomous cities of Ceuta and Melilla in North Africa. Much of the territory is typically Mediterranean in its variations of aridity and semi-aridity. The southeastern part of the country is the driest region of the Iberian Peninsula, with average precipitation that often does not exceed 300 mm of annual rainfall (GIL OLCINA, 2002, 2008). In recent decades, climatic variables have been changed that may aggravate the water availability framework, as there are several records of rainfall reduction and rising temperatures in the country's basins (ESPAÑA, 2007; OLCINA CANTOS et al., 2016). Among the largest and most important river basins in the country are those of the Ebro, Guadalquivir, Júcar, and Segura rivers, but more than half of the territory is inserted in five other international basins shared with Portugal: Miño, Limia, Duero, Tajo, and Guadiana. Frequently, the fluvial regime is expressed in a hybrid behavior of the dynamics of the temporary *ramblas* and the perennial Mediterranean rivers.

Spain has undergone significant changes following the country's entry into the European Union in 1986. Industrialization, expansion of irrigated agriculture, and the explosion of "sun and beach" tourism have been the most prominent causes of these changes. In the Mediterranean zone, the tourism industry is responsible for completely transforming many territories and contributing to urban expansion. This tourism is strongly concentrated in the summer, intensifying the water demands between July and August and strongly pressing the aquifers.

With such changes, demands for water have increased dramatically from the beginning of the 20th century. Spain is the European Union country with the highest demand for water for irrigation (RODRÍGUEZ CASADO et al., 2008). About 68% of the water goes to the agricultural sector, 18% to the industrial sector, and 14% for domestic uses (FAO, 2016). However, in recent years, there has been a decline in domestic, industrial, and agricultural demands, thanks to higher tariffs and modernization of the urban supply and irrigation systems. Irrigated areas cover a third of the country's cultivated land but produce more than 55% of the country's agricultural products (HERNÁNDEZ-MORA et al., 2014). Further, 15-20% of the water used comes from aquifers, but Spain is one of the European countries that uses the least groundwater (HERNÁNDEZ-MORA et al., 2007). Meanwhile, the percentage increases to almost 35% of the total water used for domestic uses, which can reach 100% in the Balearic and Canary Islands (MOLINERO et al., 2011).

Modern irrigated agriculture is subsidized by the State and European Union, and it is mainly based on the production of cereals, forage plants, and industrial crops. At the same time, extensive areas produce rainfed crops, especially olive groves and vineyards. On the other hand, practically without State and European support, small family production is responsible for fruit and vegetable crops irrigated with groundwater. Production is destined for export and presents better results of profitability.

ADMINISTRATIVE CONCESSIONS OF WATER USE RIGHTS IN SPAIN

The WFD represents a fundamental change in the prospects for water management in European Union member countries. However, it does not prejudge with good understanding or affect the regime of water ownership (CAPONERA, 2003; BOISSON

DE CHAZOURNES; TIGNINO, 2016). The WFD simply establishes requirements to obtain results about the ecological and chemical status of river and aquifer ecosystems, whether publicly or privately owned. However, these requirements represent important frameworks for changes in management logic regarding concessional water systems, which is a dimension of the private use of public goods.

As a public good and as defined by the Spanish Constitution of 1978, water must be used only with the authorization of the State. There are three types of water use rights authorizations in the Spanish legal system, which can be reviewed under exceptional conditions (HERNÁNDEZ-MORA et al., 2014; HERNÁNDEZ-MORA; DEL MORAL, 2015). One of them refers to the administrative concessions granted by the State for different uses for a maximum period of 75 years; these are renewable. This category includes the historical licenses granted by the State to associations of irrigators, created mainly between 1940 and 1980, and which are maintained over time, although with the legal incorporation of the public hydraulic domain. Thus, water use and management are carried out by user associations (irrigation communities), and much of the irrigation water (about 80%) falls into this category. Finally, there are groundwater use rights that remains private, requiring approval based on the Water Law of 1985; almost all uses of groundwater follow this private system. Under certain conditions and requirements, the law also allows use rights contracts between private users and user associations in a "water markets" judgement.

The Water Law has established that all Spanish waters, surface or underground, are in the public domain of the State, with the need for administrative concessions for their use, except for the previous regime of private underground waters. Therefore, a concession is an instrument that allows the private use of the public hydraulic domain under certain legal conditions, such as maximum permitted flows, ecological flows (which must be kept in the streams) and validity terms. The Water Law of 1985 (ESPAÑA, 1985) and the Revised Text of the Water Law – RTWL (ESPAÑA, 2001) specifies that the authority to grant concessions for water use rests with the basin organizations. The Public Hydraulic Domain Regulation also determines that the basin organizations are responsible for discharge authorizations into the water systems in the case of direct (not treated) effluents in surface waters and direct and indirect effluents in groundwater.

According to the legislation, the basin plans must establish that the domestic supply is the priority for water use, followed by irrigation and other agricultural uses, industrial uses, aquaculture, recreational uses, and navigation (ESPAÑA, 2001). Any concession may be revoked and expropriated in favor of another previous use. The RTWA also establishes that the concession duration cannot exceed 75 years, except for specific cases with extension possibilities.

In this sense, Brufao (2008, p. 60) warns that power decisions to grant an individual a public good during this maximum period of 75 years is based, in practice, on the mere will or intentions of the managers at the given time. With the many possibilities for exceptions and extensions given by legislation, the maximum period can be converted into situations of perpetual use, forming a picture of "patrimonialization" of a good that "naively was thought to be public".

Legislation allows the review of concessions in exceptional situations, such as prolonged droughts or excessive pressures on available water resources, but the State commonly views the revision as a politically and economically draining process (HERNÁNDEZ-MORA; DEL MORAL, 2015). As a result, many users consider that State concessions represent perpetual rights to private water ownership. In this sense, Arrojo (2006) affirms that this rigidity of the concession system creates a panorama of solidified private property rights of entire rivers, mainly by irrigators and the electric sector. This means that, in Spain, the water as a public good is hardly an administrative formality. The almost inexistence of inspection and control in riparian public domain areas aggravates management in favor of the private perspective.

In practice, however, basin organizations usually set concession deadlines that are less than the 75 years as the maximum allowable period. As an example, the Catalan Water Agency (Agencia Catalana del Agua) defines, in the decree approving the Catalan River Basin District management plan for the 2016-2021 period (ACA, 2016), that the maximum term in its management area is 50 years for the municipal supply and 25 years for other uses. In the case of the urban supply sector, investments in infrastructure and management devices to be implemented by concession agencies certainly contribute to this longer term perspective, which is also the context in Brazil. Without guarantees of these longer periods, mixed or private companies would not feel motivated to assume the risks associated with services and recovery of invested costs.

The fact that water in Spain is legally public and its use must be controlled by State concessions has similarities to the Brazilian experience. In Brazil, the public concession of water use rights (*outorga*) is one of the management tools proposed by the National Water Resources Policy of 1997. However, there is an important difference. In Brazil, there are no acquired rights with respect to the private waters that existed prior to the Federal Constitution of 1988, when the public waters domain was defined.

In Spain, on the contrary, the Water Law of 1985 maintained certain aspects of the previous private property system, as mentioned above (ESPAÑA, 1985). Since then, two options have been offered to water owners. One is the permanence of private ownership for an indefinite period from approval granted via the Water Act and inscription in a Private Water Catalog. This process could enable the State to draw up a water use inventory to assist in planning and management. The other option refers to cases in which the user would agree, from then on, to convert its waters to public use. In such situations, they should be registered in the Water Register, maintaining the same use rights and conditions for 50 years, from which they have priority in the regime of concessions in force. To facilitate and motivate the transition of the private water owner's system to the concession regime, the Water Law opened the possibility that any use foreseen in the Registry or in the Catalog can be transformed into an administrative concession at any time.

The State defined a period of three years (until 1988) for all users to define their legal status. However, 80-90% of the country's wells were not yet declared or registered; thus, private ownership was maintained (LLAMAS et al., 2015). Additionally, thousands of

wells were opened without State control, forming a true picture of "hydrological insubordination" (LLAMAS, 2004). The significant lack of data and updating of the Water Register and the Water Catalog have created a framework of delays in the groundwater management apparatus. Most of the wells are unknown, and there is a lack of data on catchments and users. Another problem involves the deficiencies in experience and a cultural understanding of basin organizations in managing groundwater, since they had always been more accustomed to applying waterworks policies in surface waterbodies (MOLINERO et al., 2011).

In this way, the current scenario is reflected in a peculiar management model. The Water Law of 1985 defines that all waters are in the public domain, but the reality is different. Surface water management is carried out by public power through the concession system, but groundwater continues to be privately owned because of previously recognized rights. Therefore, contrary to the Water Law, practically all groundwater remains under private ownership according to the transitional provisions of the Water Law and social inertia (ARROJO, 2006).

Deficiencies of groundwater inventory and registration aggravate this situation, with a significant lack of knowledge and control of the wells (many of them illegal). According to this argument, Sahuquillo et al. (2008) stated that, after more than 20 years of the Water Law, and despite the granting of moratoria, the situation of groundwater in Spain is "chaotic":

> It is not well known how many uses there are, and thousands of drillings have been made (perhaps most of them) without permission or concession from the basin organizations, which are the ones that must approve them. These agencies are unable to control them and do not have the means, support, or appropriate guidelines to do so. It also seems that a very important part of private water owners has not accepted the offer to enroll in the Registry and were not registered in the Catalog. (SAHUQUILLO et al., 2008, p. 10).

Water concession regimes can also be used in the management of demand, either by normative or economic instruments. In the first case, managers can adopt strategies to modify concessions granted with the objective of releasing water resources for new concessions or environmental purposes (improving the ecological status of water bodies). Possibilities include the revision of concessions when previously granted rights can be reduced or canceled, the forced expropriation of concession rights in cases of public utility, or the expiration of non-renewable use rights concession periods (HERNÁNDEZ-MORA; DEL MORAL, 2016). These strategies are not easy to apply in Spain, depending on political, economic, administrative, and judicial complications. Thus, they are effectively restricted to the theoretical perspective. This situation has inspired the employment of economic instruments aimed at reducing demands, such as hydraulic systems modernization and application of tariffs and fees. Most water resources not used according to these measures are affiliated with the agricultural sector and are used to address new uses with more social impact, mainly urban uses, environmental protection, and recovery of water bodies. However, agricultural practices modernization has been used basically to increase the irrigable area.

WATER USE RIGHTS NEGOTIATIONS

Another option for water management economic instruments in Spain involves water markets. They are decentralized mechanisms that allow users to transfer voluntary use rights in exchange for an economic counterpart (HERNÁNDEZ-MORA; DEL MORAL, 2016). For centuries, informal water exchanges have been implemented in Spain, mainly in the Mediterranean region because of the importance of its water availability and overexploitation problems. However, they are small-scale initiatives involving relatively low water volumes. Purchase and sales agreements or informal water markets are noted mainly among irrigators, or between irrigators and urban users, during scarcity or periods of rising water prices. Those who sell or donate water can receive different forms of compensation, such as a financial value agreed to for each cubic meter, infrastructure investments, or even a change to water of a different origin or quality (DE STEFANO; HERNÁNDEZ-MORA, 2016).

However, Act 46/1999, dated December 13 (ESPAÑA, 1999), amended the Water Law so that water markets were officially approved in the Spanish legal system, resulting in flexibility of the concessions regime. The model adopted was based on the California water markets created in 1991 (SAURÍ; DEL MORAL, 2001). Embid Irujo (2016) warns that, under a rigorous conception of the terms, and considering that in Spain the waters are public and inalienable property, Law 46/1999 does not refer to water markets, but to "water use rights negotiation markets." This means that it is not water that is subject to change, purchase, or sale, but the rights to use it. However, the literature has consolidated the generalization of the water market term for any type of water negotiation in Spain.

Therefore, from Law 46/1999, the State adopted the argument that the concessions regime did not adequately deal with the lawsuits system, which was intensified by the heavy drought of the early 1990s. This context has fomented the water use rights market so that underutilized resources could be ceded to other users and meet more active, urgent, or priority demands (PÉREZ GONZÁLEZ, 2006). According to the Law, negotiations must be carried out with users who are already holders of concessions, and whose uses are considered priorities. In that sense, public institutions have preference in the use rights acquisition, and basin organizations can prohibit negotiations if they are contrary to the general interest. Another principle to be addressed is that basin organizations should promote water markets in periods of drought or extreme events. When negotiations take place between right holders from different basins, State authorization (General Direction for Water, part of the Ministry of Agriculture, Food and Environment) is required for the use of channels that connect watersheds.

With the mentioned Law, the possibility of use rights negotiations arose through two legal entities: the "Exchange Centers" and the "Contracts for the Water Rights Assignment" (ARROJO; LA-ROCA, 2015). The latter are held between users holding concessions or rights to private use of water. A user may transfer to another all or part of the use rights during a certain time, with corresponding compensation and previous State administrative authorization. This mechanism was activated by the Royal Decree

Law 15/2005 of December 16 to deal with urgent measures for the regulation of water use rights negotiations (ESPAÑA, 2005).

The first formal negotiations for water use rights in Spain occurred in 2001 (PALOMO-HIERRO, GÓMEZ-LIMÓN, 2016). In a historical and dominant panorama of the hydraulic paradigm aimed at increasing the water supply continually, the State conceived the exchanges as an alternative to interbasin water transfers, avoiding the high political, socioeconomic, and environmental costs of these infrastructure works (HERNÁNDEZ- MORA; DEL MORAL, 2015). The costs became clear in the proposals for the Ebro River transfer in the National Hydrological Plan of 2000, leading later governments to abandon the idea under the strong social pressures coordinated by the "New Water Culture" movement (MARTÍNEZ GIL, 1997). In addition, exchanges would have the advantages of being able to reinforce the water economic dimension for users, motivate rational water use because it is a scarce resource, and prevent situations of use restriction in scarcity periods in urban areas close to irrigated zones.

The urgency resulted from the severe 2005-2010 drought that affected almost all of Spain. The contracts allowed a water market between users of the Guadalquivir and Tagus river basins and the Mediterranean basins of the Almanzora and Segura rivers, respectively. For Gil Olcina and Rico Amorós (2015), these experiences involved relatively low water volumes, but, nevertheless, they provided undeniable benefits to the basins. In the case of the donor basins, part of the resources was invested in the modernization of irrigation systems.

Hernández-Mora and Del Moral (2016) have different opinions; the water market developed between users of the Tajo and Segura basins during the 2005–2010 drought; as the main Spanish experience with concession contracts, it has only served to intensify the pressures on local ecosystems. The sale of water from the headwaters of the Tagus River would have benefited the users, but at the expense of a worsening of the basin's water situation, which already suffered from drought effects. Therefore, profits would have been accrued at the expense of the general interest of society, which subsidizes the negotiations. For the authors, this experience shows that, in cases of unequal access to power and information, markets reinforce the lack of transparency and intensify inequalities in power relations. In previous work (HERNÁNDEZ-MORA; DEL MORAL, 2015), the authors have criticized the process of "water mercantilization" in Spain in recent years. This process would intensify from the gradual replacement of water allocation techniques, based on public concession policies by market instruments.

For Gil Olcina and Rico Amorós (2015), one of the main compromising factors of the Assignment Contracts expansion was the absence of connecting infrastructures between watersheds in regions most vulnerable to droughts and watersheds in regions with higher water availability. Without a spatially well-distributed network, water use rights negotiations could not occur in several situations. The market for water use rights, in this case, was limited precisely by the lack of hydraulic structures. Complementing this underutilization context of the Assignment Contracts, the severe 2005–2010 drought limited the offer of rights sales and increased the values demanded by the yielding basins in proportion to the urgent needs of the more disadvantaged basins-a typical reflection of market laws.

In turn, the Water Rights Exchange Centers are created by the basin organizations and allow the State to make public offers to obtain use rights in exchange for financial compensation to users, as well as rights offers acquired in exchange for a price (ARROJO; LA-ROCA, 2015). The Centers have the function, therefore, to make it possible to hold public offers for the temporary or definitive acquisition of water use rights from public concessionaires or private owners. In this way, they transform private water ownership into public property (EMBID IRUJO, 2016). Negotiations occur from offer disclosures by the Centers.

The Water Exchange Centers were activated by a Royal Decree-Law of 2006, which dealt with urgent measures to minimize the drought effects. They were operated in the Guadiana, Júcar and Segura river basins between 2006 and 2007 (GIL OLCINA; RICO AMORÓS, 2015). In these watersheds, the State (water management) acquired irrigation use rights and at the same time urged the recovery of overexploited aquifers and the guarantee of maintenance of environmental flows, but few negotiations were put in practice and involved relatively small water volumes. Arrojo and La-Roca (2015) consider that, of the three experiences mentioned, the most significant were those of the Alto Guadiana, to permanent rights, and the Alto Júcar, to temporary rights.

Thus, the creation of the Exchange Centers is generally limited to special water conditions/periods–when there is a critical reduction of water availability. Mainly in prolonged drought periods, the Centers are considered good alternatives for negotiations between the countryside and the city in the sense of seeking to guarantee urban supply in exchange for obtaining water surpluses from irrigation. The agricultural sector, which accounts for about 80% of consultative water uses in Spain, plays a decisive role in the use rights markets, since it is the main source of surplus resources in times of the greatest urban and hydroelectric use needs (NAREDO, 2008). Therefore, it is necessary for public authorities to guarantee investment in infrastructure, implement instruments to facilitate exchanges, media, and connections between users and water users, as well as "[…] stable frameworks of reference, and not [...] last minute reactions in scarcity moments" (ESPAÑA, 2009, p. 57).

With the legal possibility of maintaining groundwater private use rights, negotiations in real markets were developed in certain regions. As an example, at the beginning of the 2000s, almost all groundwater of Tenerife Island was private and subject to a purchase and sale market (AGUILERA KLINK; SÁNCHEZ PADRÓN, 2002). Motivated by the lack of public investments, several private initiatives agglutinated in users' associations achieved prospecting of underground springs by means of wells and galleries. When resources were found, they were distributed in proportion to individual investments. Among the conclusions, the authors emphasize that the prices of this market do not generally reflect water scarcity and quality, but rather agreements between brokers. It must be said that in the Canary Islands, another Water Law applies because of historical issues related to its model of conquest and population since the 15th century; hence, the water ownership regime is being deprived.

The subject of water use rights market is subject to controversy and hot debates, not only in Spain. The market idea provokes distrust regarding any proposal of openness in the water resources management sector, with frequent criticism about water mercantilization and public services privatization. In this sense, Hernández-Mora and Del Moral (2016, p. 451) affirm that "[…] the introduction of water markets in Spain has not faced a solid ideological opposition". The authors argue that the practical application of market instruments requires a considerable institutional effort in the application of regulatory-deregulation processes, which is only possible from the effective intervention of the public power. They also state that, in this context, the institutional development of water rights markets in Spain has always been strongly influenced by pressures from power groups in the country's southeastern part–that is, Spain's driest region. These groups–mainly the tourist-residential and export agricultural sectors–compromise the developing of general interest in efficient markets.

For Naredo (2008, p. 14), the idea of an "[…] absolutely free or decontextualized market does not exist […]", since its existence depends on a solid institutional framework and defined property rights to enable its operation. As much of the Public Water Domain remains private and the concession system is inefficient and "paternalistic", the author reinforces that the main problem in Spain is not the existence of water markets, but rather their absence, which prevents implementation of a flexible users' negotiations system.

However, assuring smooth functioning of the Exchange Centers is not easy. Challenges include defining the available renewable river flows in relation to property rights and the concessions and water use context, attributing security to the negotiations. Another issue is compatibility between the concession flexibility criterion and regulation of the concessions regime and water use rights, including the revision of the administrative concessions instrument, as well as the Centers' operation regulations, based on well-established and audited standards (NAREDO, 2008).

As claimed by several authors, the water use rights market in Spain has had a rather limited development, not fulfilling its potential because of the near trade limitation in the most critical periods of drought, almost disappearing during higher water availability periods. Except for the most critical phases, such as the 2005-2010 drought, the market has been virtually inactive. Other reasons include the mentioned need for waste transfer infrastructures negotiated between basins, as well as the irrigators' cultural resistance to carry out the negotiations. For many users, negotiating use rights represents assuming conditions of water excess in their concessions, taking risks to attract State attention for rights revision and for possible granted volumes reduction. There is also the vision that the agricultural sector would be assuming a certain fragility in relation to the other water users' sectors, weakening their traditional power in public policies (HERNÁNDEZ-MORA; DEL MORAL, 2015).

Therefore, water management public institutions have been criticized for not creating alternatives to motivate and make possible a well-structured water market system. The lack of information regarding data basis generation and organization and the lack of transparency in their disclosure are also criticized. As Hernández-Mora and Del Moral (2016, p. 23) affirm, "[…] there are currently no official figures on the negotiations number, negotiated volumes, prices paid or agents acting in these markets".

The apparent brightness that the water use rights market brings to the eyes of many does not seduce some of the water management specialists in Spain. According to Arrojo and La-Roca (2015), the opening to the market brought by Water Law reform was made by arguments about the need for alternatives to an "intense drought" of the early 1990s, as established by the Royal Decree 46/1999 of December 13. The water concession regimes' flexibility was defended without giving possibilities to more than known alternatives, such as the reuse of gray water and treated effluents, as well as desalination. In any case, the water market development in Spain is not yet a reality, being restricted to theoretical debates and few practical initiatives.

For some authors, rights of use negotiations through the Exchange Centers or Assignment Contracts eventually become instruments of exception to the general rule established by the Water Law. Therefore, "[…] the water that is granted will be attached to the uses indicated in the concession title, without it being possible to apply them to different ones, or to different lands in the case of irrigation" (ESPAÑA, 1999, p. 43104). The advocates of the use rights negotiations argued that the water market can avoid many hydraulic works. The "invisible hand" of the market would lead the water grant process to more economically important activities, freeing the State from worrying about new works to guarantee the water supply increase required to meet the increasing demands (GOMES, 2015).

However, among the proponents of the New Water Culture, opinions differ on water markets. Authors such as Estevan and Naredo (2004) reinforce the importance of water use rights negotiations as instruments to make State concessions and water supply systems more flexible. For them, the State must install banks and water markets, breaking with the rigidity of the concessions in long periods of time, which foments inefficiency of use. This traditional model does not combat unused water losses or promote economic initiatives, especially in terms of irrigation, with frequent payments based on cultivated and irrigated areas rather than by volumes of used water. The authors have expressed their views as follows:

> When the irregularity is characteristic of our hydrology, the possibility of transferring water between concessionaires and nearby users is a first-rate instrument to ensure the supply of priority uses. A reasonable water management requires that the Administration favours voluntary water exchanges between nearby users, in the face of forced transfers between distant territories. (ESTEVAN; NAREDO, 2004, p. 39).

Naredo (2008) warns, paradoxically, that dominant private interests do not want water markets to develop in Spain. The generalization of water markets or free exchange centers between users would require more transparency and more ordering of the "obscure" picture of water availability, rights, concessions, and real uses of water in the country, exposing many unfair but favorable scenarios to these strong private interests. The solutions include the revision of unfounded projections of increasing demands and the fight against water waste that benefits the corporate sector

associated with the hydraulic works industry. They also cover the revision of concession systems marked by oversized uses for long-term irrigation. An updated and detailed environmental information system is, therefore, essential to expose the reality of water availability, demands and uses, and contribute to the search for efficiency and fidelity of the concession apparatus to the hydric situation of each territory.

CHALLENGES AND PERSPECTIVES

Market regulation is a water management priority demanded by various civil society entities in Spain (FNCA, 2016). These organizations criticize the possibilities of buying and selling water from the Tajo River basin by irrigators in the Segura basin through the Tajo-Segura transfer, since these processes establish scenarios that are not in accordance with the legal limits imposed to protect the yielding watersheds. Another example is the water purchase from the Guadiana's public water bank (Banco Público de Aguas del Guadiana), since the Hydrographic Confederation of Guadiana (Confederación Hidrográfica del Guadiana) purchased, in accordance with the Special Plan of Alto Guadiana, usage rights in the amount of 66 million euros, although a percentage of these rights had not been respected for several years. In this sense, the letter delivered at the Congress of Deputies in April 2016 proposes, among others, to repeal the legal norm that allows the purchase and sale of concession rights among users of different hydrographic regions. These are the European Union territorial water management unities proposed in the WFD (called Demarcaciones Hidrográficas in Spain).

In addition to the instrument for granting long-term water use rights, Spain also applies time-limited administrative authorizations for the Public Hydraulic Domain use, as in the cases of navigation and sediment extraction from river beds. The RTWA also determines that the discharge of contaminating effluents into the environment is subject to the need for administrative authorization from the competent authority under the "polluter pays" principle.

Brufao (2008) takes a rather critical view of the water concessions system in Spain. The lack of State policies will would block any attempt to reform the legal apparatus, so that a concession can be extended in time, even by more than a century, according to the transitional provisions of each legal reform. Its content would be blocked by their consideration as *benes patrimoniales irreformables salvo expropriación,* that is "[…] irreplaceable patrimonial assets except expropriation" (BRUFAO, 2008, p. 54), *although t*he jurisprudence is modifying these budgets to correspond to the application of environmental and protected areas laws.

Despite advances in the implementation of the concessions of the water use rights instrument, in several Spanish regions there remain important imbalances between granted and used volumes, thanks to concessions that are not respectful of the water and ecosystems reality. It is common for basin cases with water volumes to exceed the existing water availability. In part, this problem results from the widespread scenario of conscious available flows oversizing, an issue related to the adoption of hydrological data from a long historical series for average annual flow calculations and the lack of river systems studies. Many basin plans have adopted data series initiated in the 1940-1941 hydrological year. However, in the last 25 years, significant reductions in rainfall and river flows have been observed in much of the country, and this picture tends to worsen in the coming years (ESPAÑA, 2007). This reduction was even foreseen in the 2008 Hydrological Planning Instruction (Instrucción de Planificación Hidrológica) regarding the guidelines for the river basin plans revision in 2027, with an estimated rainfall reduction of 2-3% in the country's northern area and 11% in the south (OLCINA CANTOS et al., 2016). Several studies estimate reductions in river flows to reflect these changes, mainly in the Mediterranean Arc (AYALA-CARCEDO, 1996; SÁNCHEZ NAVARRO; MARTÍNEZ FERNÁNDEZ, 2008; DEL MORAL; OLCINA CANTOS, 2015). Therefore, the means resulting from a long hydrological data series may distort the reality.

Changes in climate variables in recent decades and the future scenarios of maintenance and aggravation of these trends have been profusely mentioned in studies and debates on water management in Spain. Therefore, water irrigation concessions often refer to much higher flows than the existing ones and the effective water needs for crops. As an aggravating factor, concessions contemplate water volumes much higher than those granted for water losses in distribution systems and deficiencies in irrigation systems, although modernization has been verified in recent years (NAREDO, 2008).

The need for revision of the concession system, based on data banks and safe and up-to-date information covering water availability and real water demands and uses, is a matter on which most specialists agrees. These banks should operate with more transparency and ensure society's access to data. Information is an essential condition for adequate water management, and progress in this regard depends on political will. An efficient and honest information system that subsidizes water management is, therefore, dependent on the willingness of the management apparatus to counter decisions based on hydrological subjectivity and combat existing technical corruption in the "[…] uncritical use of data without a valid statistical birth certificate, as a common basis for projections and models" (NAREDO, 2008, p. 21).

The widespread illegal use of water resources, whether from surface springs or aquifers, also compromises the demands scenarios foreseen in basin plans, mainly in the most problematic basins, such as those of the Júcar, Segura or Guadiana rivers. According to OPPA (2015), management plans for hydrographic regions do not include strong measures for the control of illegal extractions, or in protected and internationally recognized spaces such as Doñana National Park in the Guadalquivir Basin. In certain basins, such as in the Segura River area, a stated concern follows:

> Pernicious policy of consummated facts and amnesty to illegal irrigators "of past times," also allowing the expansion of illegal irrigated areas and the existence of illegal water abstractions. (OPPA, 2015, p. 7).

In several irrigated areas, such as in the Tajo River Basin, 20% of the water is extracted above the granted volumes (ESPAÑA, 2009). The unregistered and unofficially authorized irrigated areas create imbalances in projections and water balances in terms of availabilities and demands, reducing the potential of plans to contribute to land use planning. In this way, Spain offers worrisome cases of "[…] rights without flow and flow extractions without rights" (NAREDO, 2008, p. 15).

CONCLUSIONS

An erroneous but widespread belief is that the WFD affects ownership regimes or water ownership in European Union countries. The directive has simply established performance requirements regarding the status of water bodies in terms of quality and quantity. In Spain, almost all surface waters are public, whereas about 80% of the underground waters are private. This picture has not been changed by the WFD.

On the other hand, WFD objectives influence the logic as water managers apply concessional systems, one aspect of the use of public goods. The Spanish water concessions system is a strategic instrument for implementation of the WFD´s principles. Proper functioning of the legal and institutional concession apparatus is essential for water/land-use control, but there are several challenges to achieving this standard.

For many civil society entities, the current concessions system, particularly as it relates to the hydroelectric and agricultural sectors, represents an obstacle for reaching and maintaining the good ecological status of water bodies, considering the high abstraction pressure in several hydrographic regions (FNCA, 2016). These entities also criticize that part of the concessions is oversized or does not fit the reality of basins' water availability, or, as already mentioned, does not consider the climate change variables in the last decades. Thus, a reform of the concession system is required, including the revision of terms and granted water volumes. Criticism also extends to mineral water regulation and seaside resort concessions, which have a different legal regime inspired by mining legislation.

The Spanish water concessions framework receives much criticism from social sectors concerned about the lack of adequate water use control. There is disapproval for the long terms of concessions and the lack of a data and information efficient system to support decision-making. Many uses remain completely hidden from the officials. To a large extent, these situations result from private uses of groundwater and the control of thousands of wells outside administrative action. Many wells are illegal and the used volumes are not registered, thus compromising current and estimated flows that can be granted. For several specialists, maintenance of this situation addresses the interests of the dominant economic sectors of the water system: agricultural and hydroelectric. Without adequate strategies for water concessions, other management instruments are also committed, such as the definition of ecological flows.

In parallel to the concessions system, water markets can contribute to minimizing problems in certain basins during critical drought periods. Negotiations for water use rights between concessionaires is a valued perspective in the country, but more incentives from the State are needed.

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Authors contributions

Antônio Pereira Magalhães Junior: The author participated in the entire process of the article design and development during postdoctoral studies in Spain. His collaborations resulted, therefore, from a vast bibliographical review, participation in events and interviews with specialists.

Pedro Brufao Curiel: The author collaborated as a water management specialist in Spain, particularly regarding the legal aspects of the administrative concessions of water use rights.