

# Developing markets for water reallocation: Revisiting the experience of Spanish water *mercantilización*



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## ABSTRACT

Economic instruments are being promoted as a desirable alternative to public sector action in the allocation and management of natural resources. A wide body of literature has developed that critically analyzes this phenomenon as part of a wider project of 'neoliberalization of nature', trying to uncover the underlying rationale and commonalities of geographically specific phenomena. The case of water is at the vanguard of these processes and is proving to be particularly contentious. In the European Union water policies are increasingly emphasizing the application of economic instruments to improve the allocative equity and economic efficiency in the use of scarce resources. However, there are few analyses of how these instruments are really working on the ground and whether they are meeting their objectives. This paper aims to contribute to this debate by critically analyzing the experience with water markets in Spain, the only country in the European Union where they are operative. It looks at water permit sales during the 2005–2008 drought period using the Tajo–Segura transfer infrastructure. The paper describes how the institutional process of *mercantilización* of water works in practice in Spain. It shows that the use of markets requires an intense process of institutional development to facilitate and encourage their operation. These institutions tend to favor the interests of clearly identifiable elites, instead of the public interest they supposedly promote.

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## 1. Introduction

Nature is undergoing an intense process of neoliberalization, enhanced by profound institutional reforms aimed at reinforcing the role of economic instruments and market mechanisms in detriment of political or public sector action (Castree, 2008a, 2008b; Heynen et al., 2007). Whether the goal is to find alternative sources of financing for public sector activities, guarantee a secure investment environment for global financial capital, or achieve sustainable natural resource management goals, governments throughout the world have undertaken profound legal reforms in order to create institutional frameworks that give economic instruments and the private sector an increasing role in the management of public services in general, and natural resources in particular (Raco, 2013).

The case of water merits particular attention. As Swyngedow states, "water has become one of the central testing grounds for the implementation of global and national neoliberal policies" (2007, p. 53). One may argue that the process started with the

declaration of water as an economic good by the Dublin Statement on Water and Sustainable Development (Dublin Principles) at the 1992 International Conference on Water and Environment. The four Dublin Principles, of which the economic consideration of water is the fourth and most contested, became the basis for the Integrated Water Resources Management (IWRM) approach that has dominated water management over the past thirty years. IWRM promotes the "coordinated development of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems" (GWP, 2000). Nevertheless, as Bauer (2004) points out, there has been an intense debate on what the consideration of water as an economic good actually means, and whether "an economic approach is the same as a free-market approach". Should water, as a basic human right, be managed on the basis of access and equity, or rather as a tradable commodity?

The European Union has not been immune to this conceptual debate. While the Water Framework Directive (WFD), approved in 2000, affirms in its opening statement that "Water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such" (WFD, Preamble 1), it also "asserts the economic value of water" (Kaika, 2003) and

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promotes the use of “water-pricing policies to provide adequate incentives for users to use water resources efficiently” (art. 9.1, DMA). In more recent years, European environmental policy in general, and water policy in particular, are placing increasing emphasis on economic instruments to achieve its goals. Clear illustrations of this trend include the consideration of water trading as an instrument that “could help to improve water efficiency and overcome water stress” by the Blueprint to Safeguard Europe’s Water Resources (p. 12, COM 2012/673) and the increasing emphasis of payment for ecosystem services as a means to achieve ecological conservation goals. Additionally some recently EU-funded research projects, such as EPI-Water (Delacamara et al., 2013) or Cap & Trade (Rinaudo, 2014), have looked at the potential role of market mechanisms and other economic instruments to manage water resources and achieve EU policy goals.

The process, however, is not proceeding uncontested. Understood as a common heritage, water policies are of particular concern to citizens. The recognition by the UN General Assembly in 2010 of the access to water supply and sanitation as a basic human right has further assisted the cause of those who feel that water cannot be managed primarily in response to economic criteria. In 2013, the European Citizen’s Initiative of the Human Right to Water gathered over 1.8 million signatures to put the demand for water as a human right in the European political agenda and keep water out of the Single Market rules.

In the midst of this tension it becomes relevant to critically analyze existing experiences of the use of economic policy instruments for water management and assess whether they deliver the benefits their proponents argue they provide. This paper hopes to contribute to this task by focusing on the development of water markets in Spain, the only country in the European Union with operating water markets. It will analyze the evolution of water policy with respect to the regulation of water markets, highlighting the process of institutional build up that has been necessary to facilitate them. It will then focus on the water trades that took place between users in the Tajo and Segura river basins during the 2005–2008 drought using the Tajo–Segura transfer infrastructure. These trades are the most significant in terms of volume of water sold and have driven further institutional reforms at the national level, creating an opportunity for more extensive water trading. They also illustrate the dysfunctionalities that result from institutional reforms which are uncritically presented as solutions to water resources management challenges but in essence serve the interests of particularly powerful groups. In Spain, these powerful lobbies are identified with the irrigation-based agro-export sector and the expanding tourist industry in the southeastern Mediterranean coast. The political-economic power associated with these sectors derives from their importance for the position of the Spanish economy in the larger European and global economic system (Swyngedouw, 2013, 262).

The authors conducted research between 2012 and 2014 using different sources of information: extensive literature, legislative and document review; participation in stakeholder meetings and public conferences of European research projects that used the Tajo–Segura as a case study for the analysis of the potential of water markets to achieve EU water policy goals (EPI Water in Alcalá de Henares, Spain, in November 2012 and February 2013; and Cap & Trade in Madrid, November 2012 and Paris, February 2014); analysis of water sales data; and phone and online open interviews with members of the Spanish water administration (2), environmental attorneys specializing in water law (3), and members of Tajo citizen and environmental organizations.

The paper is structured in five sections. Following this introduction, Section 2 reviews some of the most significant literature that looks at the use of economic instruments to achieve environmental goals as part of a wider process of neoliberalization of nature.

Section 3 presents the evolution of the institutional framework for water markets in Spain, discussing the influential role played by the southeastern agro-tourism lobby. Section 4 presents three case studies of water trading agreements between users in the Tajo and Segura river basins in Spain during the 2005–2008 drought period, and ties this experience to the broader framework of water neoliberalization. The final section presents some concluding remarks.

## 2. Neoliberal approaches to natural resources management: Water mercantilización in Spain

The emphasis on the use of economic instruments to achieve environmental objectives is part of a wider context of ecological modernization that emerged in the 1970s (March, 2013; Bakker, 2003; Hajer, 1995). It assumes that environmental protection and economic growth are not incompatible objectives and therefore does not seek to undermine or transform existing patterns of production. Rather, it posits that solutions to the environmental degradation that results from the capitalist process of production and accumulation can be resolved within the existing institutional framework through technical and apolitical solutions. Technological innovation, efficiency gains, management based on scientific knowledge and expertise and, most significantly, the use of economic instruments (economic assessment, cost recovery, payment for ecosystem services, or market mechanisms) thus become tools for attaining environmental goals. This philosophy permeates the IWRM conceptual framework and is gaining traction as part of the European Union’s approach to environmental governance (Delacamara et al., 2013; EC, 2011, or Bailey and Maresh, 2009, to cite just a few recent examples).

Ecological modernization can be understood as the application of neoliberal approaches to the resolution of environmental challenges (Castree, 2010; Furlong, 2010). Starting in the 1990s, a growing body of literature has critically studied examples of the wider process of neoliberalization of nature (March, 2013; Edwards, 2013; Furlong, 2010; Castree, 2010, 2008a, 2008b; Heynen et al., 2007; Mansfield, 2007; Bakker, 2005, 2002), a set of diverse and geographically-contextual processes by which human interactions with the biophysical world are increasingly being governed by market-based approaches and norms. The variegated forms of neoliberalization differ from one another in that they are “defined according to the specific policy measures enacted, the pre-existing moral economy and the physical characteristics of the resource in question” (Castree, 2010, p. 13). However, they also share commonalities and draw on one (or several) of various possible policy prescriptions (Castree, 2008a): privatization of environmental (and natural) goods and services; corporatization of the public sector, emphasizing efficiency and competitiveness over social equity goals (Bakker, 2003); commodification or *mercantilización* (Bakker, 2002) of natural resources by assigning prices and using market mechanisms for allocation and management; deregulation aimed at removing the state from previous areas of social or environmental intervention; reregulation that implies the setup of institutional structures to favor the neoliberal project; and the requirement for civil society to fill the gaps left by the roll-back of the state.

Castree (2010, and previously 2008a and 2008b) has reviewed research that analyzes examples of nature’s neoliberalization in different socio-geographical contexts—what Brenner and Theodore (2007) and Peck et al. (2009) call ‘actually existing neoliberalisms’—in an attempt to identify the main components and draw some conclusions on its environmental and social implications. This paper aims to contribute to this effort by revisiting and expanding on the analysis of the process of water

*mercantilización* in Spain. *Mercantilización*, applied to the specific hydro-political context of Spain, was first described by Bakker as the “introduction of markets or market simulating techniques” to water resources management, and “the participation of private companies and private capital in resource development, water supply and wastewater treatment” (2002, p. 767). Throughout the twentieth century Spain was dominated by the hydraulic paradigm (Sauri and Del Moral, 2001), an approach to water management characterized by public control of resource development and allocation of public water resources to strategic sectors at highly subsidized rates. Bakker argued that Spain’s specificities (the preexisting moral economy, in Castree’s terms) resulted in what might be called an incomplete process of neoliberalization, since the state continued to have a preeminent role in water resources administration and provision. In Bakker’s terms, “*mercantilización*, in the Spanish case is not necessarily synonymous with liberalization or commodification of water” (Sauri and Del Moral, 2001, p. 787) but, rather, a “technical facilitator of the continuation of the traditional hydraulic paradigm” (Sauri and Del Moral, 2001, p. 781). However, we will argue in this paper that the process of neoliberalization of water in Spain has continued and intensified over the past decade through a series of regulatory reforms that have progressively shifted the management and allocation of water resources away from state control and political<sup>1</sup> deliberation and toward a growing role of the market.

The paper will address three questions posed by Castree (2008a, 2008b) in his analysis of the existing literature. How does the institutional process of *mercantilización* of water work in practice? What are the effects of the use of market instruments for water allocation? How can they be evaluated in terms of the achievement of WFD goals and contribution to the resolution of water governance conflicts? In the context of the growing emphasis on the use of economic instruments for resource management these are essential questions.

### 3. Institutional reform to develop water markets in Spain

The origins of the current institutional context for water resources management in Spain date back to the 1985 Water Act. In line with the prevailing hydraulic paradigm the Act was based on a supply-side approach, low water use fees associated with heavily subsidized water infrastructures, and water allocation through 75 year-long administrative concessions following a priority order for water use rights—with urban uses and irrigation in first and second position respectively, and other uses (energy production, industrial uses or navigation) below (Varela and Hernández-Mora, 2010; Del Moral, 1996).

Starting in the early 1990s, the emergence of three new and competing discourses began to undermine the hegemony of the traditional hydraulic paradigm (Swyngedouw, 2013, p. 264): the reassessment of nature’s meaning and purpose; the accentuation of the commodification and privatization of bio-political life through the pursuit of *mercantilización* (Bakker, 2002, 2010); and the scalar transformation of the geo-political relations around water supply, propelled mainly through the European Union’s environmental governance legislation on the one hand and the devolution of state power in Spain on the other, which augmented the hydro-social powers of local and regional governments in a

context of intensifying inter-regional conflict (Del Moral et al., 2003). These parallel processes help explain the regulatory development of water markets and their role in Spanish hydro-politics.

#### 3.1. Dominating discourses in Spanish water governance: Balancing nature’s imbalances through interbasin water transfers

The Spanish hydraulic paradigm has continuously aspired to ‘balance’ the unequal distribution of water resources between the humid north and the arid southeast, where a productive agriculture has existed for centuries and water scarcity is seen as the limiting factor for agricultural and economic development. Successive hydraulic plans, going as far back as the early twentieth century, have proposed different interbasin transfer alternatives (Hernández-Mora et al., 2014). This dominating discourse of public provision of subsidized water has helped in the consolidation of a powerful lobby made up of irrigators, tourism-related developers, and regional governments of the autonomous regions of Murcia and Valencia in southeastern Spain.

The Tajo–Segura transfer project (ATS or *Acueducto Tajo–Segura*) was the first proposal to be approved in 1971. It was designed to transfer 1000 Mm<sup>3</sup> (million cubic meters)—600 in a first phase, and 400 in a second phase that was never realized—from the Entrepeñas and Buendía (E&B) reservoirs in the headwaters of the Tajo basin to the southeast (Fig. 1). The infrastructure would transfer ‘surplus’ Tajo water, that is, resources in excess of existing needs for urban water supply, irrigation and hydroelectric production. At the time, environmental requirements and impacts were neither legally contemplated nor part of water policy debates.

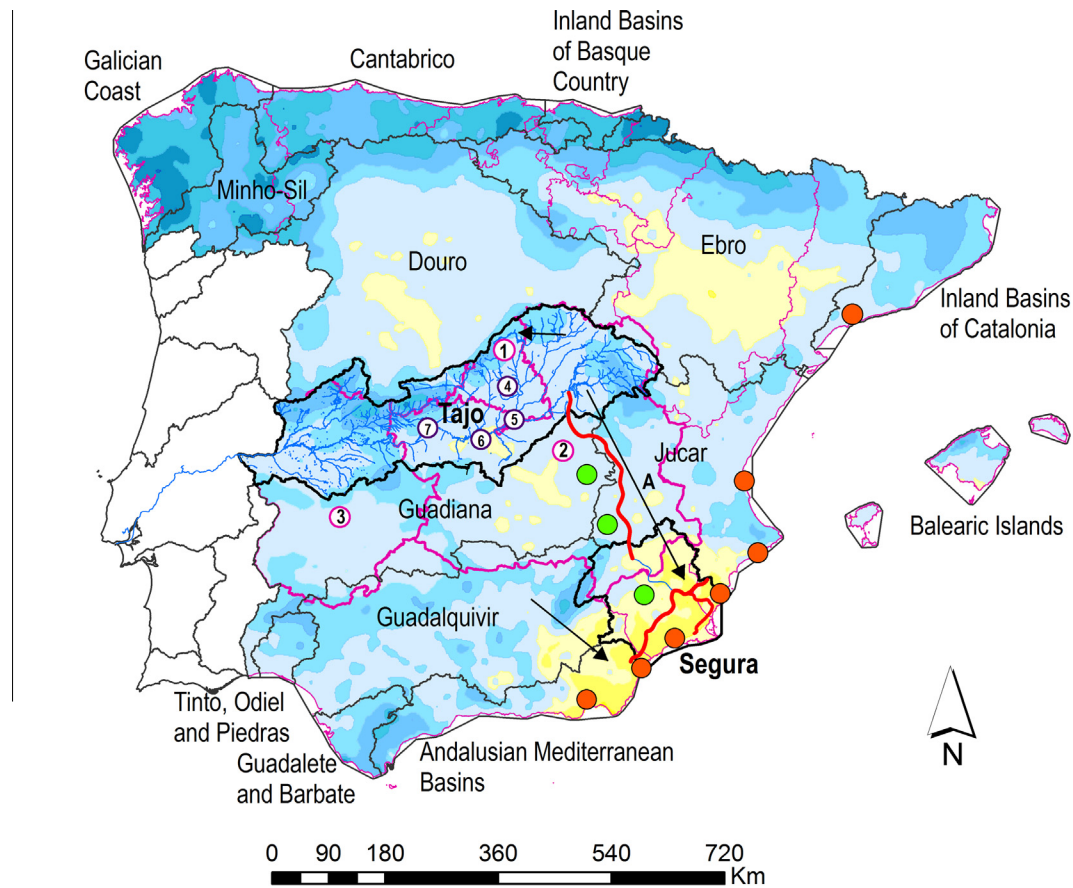
The ATS was presented as the first large hydraulic infrastructure in Spain that did not require significant public subsidies (Melgarejo Moreno, 2000, 2009). The transfer’s specific legislation requires users of transferred waters to pay a volumetric tariff with variable and fixed components. The law allocated transferred water (discounting evaporation losses) to irrigation (up to 400 Mm<sup>3</sup>) and urban water supply (up to 110 Mm<sup>3</sup>) in the recipient regions. It also required that a river basin plan determine ‘surplus’ volumes and that discharges from E&B guarantee a minimum flow of 6 m<sup>3</sup>/s in Aranjuez to cover the needs of the Tajo basin (Fig. 1). Construction started in 1971 and the infrastructure became operational in 1981.

Transfer volumes are determined by the Central Commission for the Management of the Tajo–Segura Transfer (*Comisión Central de Explotación del Trasvase Tajo–Segura*), made up of representatives of the Central government, regional governments of donor and recipient Autonomous regions, donor and recipient River Basin Authorities (RBAs),<sup>2</sup> and ATS users—organized in the *Mancomunidad de Canales del Taibilla* (MCT, urban users) and the *Sindicato Central de Regantes del Acueducto Tajo Segura*<sup>3</sup> (SCRATS, irrigators). No private users or stakeholders from the Tajo river basin have a seat in the Commission. Decisions are made within the parameters of the ATS operational rules that establish transfer volumes for different storage levels in E&B (Table 1). The operational rules were approved in 1998 in an attempt to minimize political

<sup>1</sup> The term “political” in this paper, following Swyngedouw (2011), refers to “the political”, the space where the status quo can and is questioned, “an inherently public affair (...) that reconfigures socio-spatial relations” (p. 377). In contrast, the term “politics” refers to the process that is shaped by “private interactions between elected governments and elites that overwhelmingly represent business interests” (Crouch, 2004, p. 4, as cited by Swyngedouw, 2011), or as in the case study presented in this paper, represent the interests of powerful elites.

<sup>2</sup> As Fig. 1 shows, the Spanish part of the Tajo river basin encompasses the autonomous regions of Madrid, Castilla-La Mancha and Extremadura. The ATS affects primarily water quality and environmental conditions in the riparian cities of Aranjuez (Madrid), Toledo and Talavera de la Reina (Castilla-La Mancha). Recipient regions include Murcia (Segura river basin), Alicante (Júcar River basin) and the province of Almería in Andalucía. An additional 50 Mm<sup>3</sup> are transferred to the Guadiana basin.

<sup>3</sup> Using water from various sources, MCT supplies up to 90% of the Segura river basin population. SCRATS is a major player in Spanish hydro-politics, both at the regional and at the national level. It encompasses over 80,000 irrigators in the Segura and Andalusian Mediterranean River Basins that receive transfer waters from the Tajo or use the transfer infrastructure to move and use water.



## Legend

River Basin Districts	Tajo-Segura transfer and post-transfer	<b>Annual average precipitation</b>
Autonomous Regions	Water permit trading agreements	Less than 400 mm
1. Madrid	A. Estremera - SCRATS	400 - 800 mm
2. Castilla-La Mancha	Canal Aves - MC Taibilla	800 - 1600 mm
3. Extremadura	Illana-Leganiel - SCRATS	More than 1600 mm
<b>Riparian cities</b>	Public Water Banks	
4. Madrid	Informal Water Markets	
5. Aranjuez		
6. Toledo		
7. Talavera de la Reina		

**Fig. 1.** Spanish river basin districts, existing water markets and the Tajo-Segura transfer. Source: Own elaboration. Rainfall data from the Spanish Ministry of Agriculture, Food and the Environment. Database available at: <http://www.magrama.gob.es/ide/metadatos/srv/es/metadata.show?uuid=10696290-e0e5-4486-bf1f-e4ad370ce5d5>.

conflicts surrounding transfer decisions. Before that time, transfer volumes were determined by the Commission without specific guidelines. When storage levels fall below level 3, transfer decisions have to be made on a national governmental level by the Council of Ministers. No transfers are allowed when combined storage falls below level 4 (240 Mm<sup>3</sup> in the 1998 rules). As we will discuss in Section 3.4, these rules were revised in 2013.

Conflicts surrounding the desire to transfer large volumes of water to the southeast have consistently been at the center of Spanish water policies (Hernández-Mora et al., 2014; Lopez-Gunn, 2009). For instance, the socio-political conflicts surrounding the failed attempt to build a second water transfer from

the Ebro basin in the 2001 National Hydrologic Plan (Bukowski, 2007; Font and Subirats, 2010) dominated Spanish water management debates in the late 1990s and early 2000s. In the case of the ATS, the conflict has often reached the courts, with the Government of Castilla-La Mancha systematically contesting transfer decisions, and ATS users trying to obtain more secure water rights (FNCA, 2013a). These conflicts derive from several factors:

- Overestimation of water availability in the headwaters of the Tajo and decrease in available resources (Fig. 2). Annual transferred volumes have averaged 348 Mm<sup>3</sup> instead of the projected 600 Mm<sup>3</sup>.



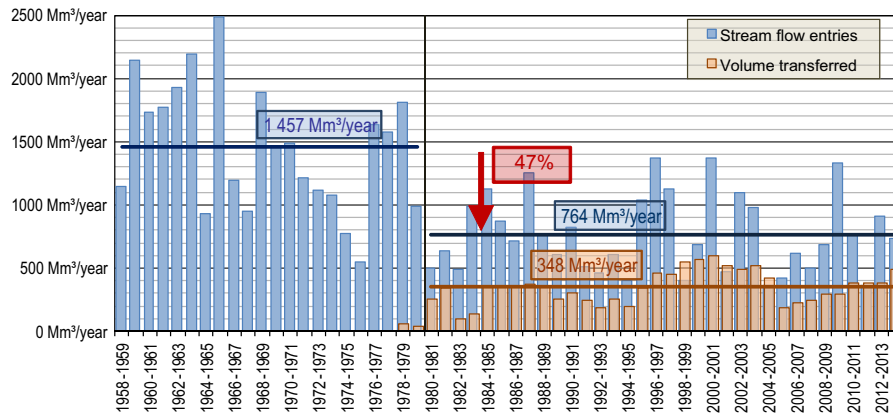
**Table 1**

Operational rules of the Tajo–Segura transfer (1998 and 2013). Source: Own elaboration with data from CHT (2012 and 2014).

Levels	1998 Rules		2013 Rules	
	Thresholds	Monthly transfer volumes (Mm <sup>3</sup> /month)	Thresholds	Monthly transfer volumes (Mm <sup>3</sup> /month)
1	$V > 1500 \text{ Mm}^3$ or $\text{In12 m} > 1000 \text{ Mm}^3$	68	$V > 1500$ or $\text{In12 m} > 1000 \text{ Mm}^3$	60
2	$1500 \text{ Mm}^3 > V > \text{Curve N3}_1$ and $\text{In12 m} < 1000 \text{ Mm}^3$	38	$1500 \text{ Mm}^3 > V > \text{Curve N3}_2$ and $\text{In12 m} < 1000 \text{ Mm}^3$	38
3	$\text{Curve N3}_1 > V > 240 \text{ Mm}^3$	23	$\text{Curve N3}_2 > V > 400 \text{ Mm}^3$	20
4	$240 \text{ Mm}^3$	0	$400 \text{ Mm}^3$	0

V: Combined storage in E&amp;B reservoirs.

In12 m: Total inflows to E&amp;B over the past 12 months.

Curve N3: Emergency curve determined by monthly storage levels in E&B below which transfer decisions cannot be made by the Transfer Commission. N3<sub>1</sub>: average monthly storage volume of 502 Mm<sup>3</sup>. N3<sub>2</sub>: average monthly storage volume of 662 Mm<sup>3</sup> (million cubic meters).**Fig. 2.** Water inflows into Tajo headwater reservoirs and transferred volumes (Mm<sup>3</sup>). Source: Adapted and updated from the first draft Tagus Basin Management Plan (CHT, 2011).

- Increased pressure on the Tajo basin to satisfy demands from ATS users. In some years, up to 80% of E&B resources have been transferred (Fig. 2), thus limiting outflows to the Tajo. This has accentuated the water quality problems that result from the inflow of Madrid's wastewater through the Jarama river near Aranjuez (see Fig. 3). The Tajo RBMP (CHT, 2014) acknowledges that the transfer of clean headwaters makes it difficult to achieve good status in the Tajo downstream from the Jarama.
- Failure to eliminate water scarcity in the Segura river basin, which has persisted over time because of uncontrolled expansion of irrigation and urban water demand (Gómez et al., 2013; IDR-UCLM, 2005; Martínez and Estévez, 2002; Melgarejo Moreno, 2000). Unregulated groundwater use makes up for existing water deficits.
- Failure to pay the full cost of water transfers, which continue to be subsidized. Users only pay ATS tariffs for volumes actually received in the Segura, in effect less than 30% of total infrastructure costs. They are also exempted from paying the tariffs in times of drought. Additionally, the tariffs have been periodically reviewed downward so that today they are almost 40% lower than when they were first established in 1981 (in the case of irrigation from 0.1539 €/m<sup>3</sup> in current 2014 prices in 1981 to 0.09731 €/m<sup>3</sup> in 2014). The gap between operating costs and tariffs is made up through budgetary transfers from the central government to the Tajo and Segura RBAs (Melgarejo Moreno, 2000).

Far from resolving water allocation problems, the ATS has exacerbated water-related political and social conflicts. Interregional disputes surrounding the ATS were at the core of the delay in the approval of the Tajo and Segura RBMPs in the current WFD planning process, which did not happen until 2014, five years after

the 2009 deadline. The failures of the ATS and of the institutional and political context in which it operates have played a significant role in the process of water *mercantilización*, as we will see below.

### 3.2. Introducing water trading in Spain

The first significant reform to the 1985 Water Act came in 1999 following a major drought (1990–1995) that resulted in significant economic losses and large-scale water supply restrictions throughout the country (Estrela and Rodríguez, 2008). In the context of widespread economic liberalization reforms, the conservative Popular Party government altered the rules for water allocation through the introduction of markets in order to provide the system with more flexibility<sup>4</sup> (Bakker, 2002; Del Moral et al., 2000). A previous law in 1996 had introduced the possibility of private sector involvement in service provision and infrastructure development.

Water allocation to individual users is the responsibility of RBAs within the parameters established by River Basin Management Plans (RBMPs). Until 1999 permit holders could not exchange, sell or otherwise trade water rights. However RBAs can, in times of drought and in consultation with users, reallocate water from lower to higher priority uses (for instance irrigation to domestic) or restrict allocated volumes in order to minimize drought impacts (Hernández-Mora et al., 2013). In Spanish water law, there are three types of water use permits (Hernández-Mora et al., 2014):

<sup>4</sup> The Canary Islands have a different legal framework for water resources management that accounts for their geographical and hydrologic specificities. Water markets play a significant role for water allocation in some of the Canary Islands (Tenerife primarily) and have been extensively studied by Aguilera Klink and others (Aguilera-Klink and Sánchez-García, 2002, 2005; Fernández-Bethancourt and Aguilera-Klink, 2000). They will not be the focus of discussion in this paper.

- Administrative concessions (*concesión administrativa*), granted by RBAs for irrigation, urban water supply, hydroelectric production or other industrial uses, for maximum 75 years renewable periods. Concessions are tied to the type of use (and plot of land in the case of irrigation) that is specified in the permit.
- Water use permits held by historical irrigator associations and irrigation districts of public initiative (developed primarily between the 1940s and 1980s). The rights are held by the irrigator association, not by individual farmers. About 80% of water used for irrigation in Spain falls under this typology.
- Private groundwater use rights that existed prior to the approval of the 1985 Water Act. In these permits the location and capacity of the well and the area and location of the land irrigated must remain unchanged (Martínez Cortina and Hernández-Mora, 2003). The attachment of the right to the land legally prevents water sales to other users.

Many water permits predate the introduction of environmental concerns in water management. Also, some Spanish river basins are overallocated and there are no resources available for new uses (Berbel et al., 2013). Although the law allows for the administrative review and modification of water permits (for environmental, socioeconomic, scarcity or efficiency reasons), these mechanisms are only used for temporary reallocation or restrictions in times of drought, and rarely for permanent modification of the permit conditions (Brufao, 2008). As a result, many users consider water permits as unalterable private property rights. Permit review processes are challenging politically, potentially expensive and seldom undertaken. Informal water markets also exist in Spain, particularly in areas of intense water scarcity and high economic value water uses. Through a variety of institutional arrangements that do not always clearly fit within the letter of the law, these transactions are mostly local in scale, help alleviate either temporal or long-term scarcity situations, and concentrate in the Mediterranean southeastern coast (Hernández-Mora and De Stefano, 2013).

The 1999 reform introduced limited and strongly regulated market instruments. Two types of water trading mechanisms were introduced: water use permit trading (*contratos de cesión*) and public water banks (*centros de intercambio*) (Table 2).

The proposal was intensely debated and received criticism from environmental interests, left-wing political groups (Socialist Party and post-communist *Izquierda Unida*), as well as associations of small and medium-sized farmers, who resisted the idea of treating water as a commodity (De Stefano, 2005; Del Moral et al., 2000). Their objections focused on the potential socioeconomic effects (concentration of resources in sectors and regions of highest productivity, squeezing out of smallest, poorest farmers) and

environmental impacts of water markets, and the moral argument that water, by virtue of being essential for life, should remain a public rather than a private good (Del Moral et al., 2000; Bakker, 2002).

Despite such objections, even these critical sectors acknowledged that introducing flexibility into the existing concession system “might be a good idea” because “it could help solve the concentration of water rights in unreasonable uses, minimizing the social rejection of the transition to a more sustainable management model” (*Izquierda Unida*, 1997). In a context of a dominating hydraulic paradigm (Del Moral, 1996; Swyngedouw, 1999), the rationale behind this unlikely consensus was based on the idea that water trading could have several benefits: encourage the revaluation of water as a scarce resource, introduce the economic dimension in the users’ minds, help prevent water restrictions in urban areas near irrigation districts in times of drought, and offer an alternative to water transfers between distant regions as a solution to local water shortage problems, thus avoiding the high political, socioeconomic and environmental costs of these transfers (Naredo, 2007; Del Moral and Silva Pérez, 2006; Del Moral et al., 2000; Naredo, 1998).

The 1999 changes were the first of several reforms over the next 15 years aiming at strengthening the role of economic instruments to improve what were perceived as inefficient public allocation mechanisms. The reforms were designed to facilitate water reallocation from purportedly lower to higher (social, economic or environmental) value uses, although, as we will see in the analysis of the Tajo–Segura case study, this has not always been the case. Table 3 presents a chronology of this regulatory evolution and the essential characteristics of each reform.

### 3.3. Promoting water trading: The 2005–2009 Legislative Drought Decrees

The water trading mechanisms introduced in 1999 were scarcely used until the 2005–2008 drought due to a variety of reasons. On one hand, between 1999 and 2005 no significant droughts occurred. On the other, trades in surface water rights can only occur where there are water transport infrastructures in place and significant profitability differentials between different users. More importantly, perhaps, studies have found that farmers, who represent about 75% of all consumptive water uses in Spain, are reticent to formally give up their rights (Giannocaro et al., 2013; Hernández-Mora et al., 2013; Del Moral and Silva Pérez, 2006). In their view, selling their permits can have several negative consequences: an implicit recognition of an excessive concession volume—thus opening the door to concession revisions and a limitation of volumes allocated—, a weakening of the socioeconomic fabric of the agricultural sector in

**Table 2**  
Characteristics of water trading mechanisms introduced by the 1999 reform. *Source:* Own elaboration.

Water permit trading
Water trading agreement between users with concessions (thus excluding 80% of water used for irrigation)
Buyer and seller must be within the same river basin district
Contracts are temporary (no permanent reallocation)
Trades are only allowed from lower to higher ranked uses within the order of priority allocation
Non-consumptive users cannot sell to consumptive users
Prices are negotiated between buyers and sellers
Traded amount cannot exceed volumes effectively used by the concessionary
Contracts require administrative approval of RBAs
Public water banks
Established by RBAs under exceptional circumstances (drought, environmental degradation, etc.)
RBAs publish an offer to purchase (temporarily or permanently) water use permit rights at a pre-established price
Concession holders can voluntarily sell their rights
The purchased rights can be allocated to other users or held by the RBA for environmental restoration (the latter became possible after a further reform in 2006)
Public water banks have only been used in 3 river basins (Guadiana, Júcar ad Segura)
Offered prices are set by the administration

**Table 3**Key regulatory reforms for water *mercantilización* in Spain. Source: Own elaboration.

	1985 Water Act	1996 Reform	1999 Reform	2005–2008 Drought decrees	2013 Environmental Impact Statement Act
<i>Mercantilización</i> process	Administrative reallocation from lower to higher priority water uses in times of drought	State Water Companies ( <i>Sociedades estatales de agua</i> )	1. Public Water Banks ( <i>Centros de intercambio</i> ) 2. Water Permit Trading ( <i>Contratos de cesión</i> )		
Characteristics	Reallocation decisions made by RBAs in participated water management boards	Introduces the possibility of private capital investment in hydraulic infrastructure development	Trading only allowed within same river basin and between users with administrative concessions (see characteristics in Table 2)	Exceptionally allows: trading between the Tajo–Segura and Negratín–Almanzora river basin districts; and trading of public irrigation districts permits	Allows water trading between different river basins permanently
Administrative requirements	Approval by RBA's Governing Boards	Consortium agreements between companies and RBAs require Council of Ministers approval	1. Set up by RBA 2. RBA approval required	Approval by the Water Directorate of the Ministry of the Environment	Approval by the Water Directorate
Price or economic compensation	Possible compensation by beneficiaries (not compulsory)	–	1. RBA establishes price 2. Price agreed by parties with RBA/Water Directorate approval		

the selling area, and a resulting loss of power vis-à-vis other water users in the basin. In order to overcome these limitations, several authors have argued for further institutional reforms to help encourage transactions (Garrido et al., 2013a, 2013b; Calatrava and Gómez Ramos, 2009).

When the next drought period started in 2005, the Socialist Party government in power introduced further flexibility to the water trading legislation using the drought as the rationale for reform. A Drought Decree introducing two major changes to the 1999 rules was approved in December 2005 for a one-year period. First it allowed trading between users located in different river basins. And second, it also allowed farmers in public irrigation districts to undertake water trading agreements, thus incorporating a large volume of irrigation water that was excluded under the 1999 reform (see Table 2). The 2005 Drought Decree was renewed annually until 2009, in spite of the fact that by early 2008 normal hydrologic conditions had returned to much of the country.

The 2005–2009 Drought Decrees therefore temporarily eliminated many of the restrictions and regulatory oversight established in the 1999 reform in a continued process of deregulation to facilitate market exchanges while at the same time expanding the reach of the market by incorporating waters not subject to trade. Although total volumes traded during the drought represented less than 1% of total annual national consumptive uses (Garrido et al., 2013a), these reforms were beneficial for ATS users, who bought almost 75% of the water traded,

which amounted to 17% of total transfers received from the Tajo (see Table 4). They were thus able to circumvent the limitations established in the ATS operational rules to protect the Tajo environmental and social water needs. The possibility of conducting interbasin water permit sales, regardless of drought conditions in the donor basins, already signaled an intent to rely on market mechanisms to deal with conditions of scarcity, and avoid the political cost of transfer decisions.

### 3.4. Further liberalization of water trading without public debate

The next step in the process of liberalizing water trading was taken by a conservative Popular Party government in 2013 in the context of sweeping economic and fiscal liberalization reforms to deal with a severe economic and budgetary crisis. In early 2013 the Tajo and Segura river basin plans (RBMP) had not yet been submitted to public consultation, primarily because of political discrepancies over the ATS. The government pledged to approve all pending plans by December 2013.

A first draft RBMP was briefly published by the Tajo RBA in November 2011. According to the document, given the decrease in available resources WFD environmental requirements in the Tajo basin could only be met through an increase in environmental flows from E&B, which questioned the viability of the ATS. In fact, the decrease in available resources (Fig. 2) had resulted in the elevation of transfer decisions to the Council of Ministers 21 times between 1998 and 2013 because reserves had fallen below the

**Table 4**

Annual storage in Entrepeñas and Buendía and volumes transferred and sold through the Tajo–Segura infrastructure (2005–2008) (Mm<sup>3</sup>/year). Source: Own elaboration using unpublished data from the Tajo RBA, SCRATS and Tajo RBA annual reports and the online hydrologic bulletins of the MAGRAMA (<http://www.magrama.gob.es/es/agua/temas/evaluacion-de-los-recursos-hidricos/boletin-hidrologico/>).

Hydrologic year	Storage in Entrepeñas & Buendía (Sept 30)	Outflows to Tajo	Ordinary transfers to SCRATS and urban uses			Water sold for irrigation	Water sold for urban supply	Total transferred (ordinary + sales)	Volumes sold/total transferred (%)
			Irrigation	Urban water	Total ordinary transfer				
2005/2006	329	250.9	38.0	148.50	186.50	31.05		217.55	14
2006/2007	241	242.1	31.0	147.00	188.00	31.05	8.5	227.55	17
2007/2008	357	253.6	60.4	118.26	178.66	31.05	36.9	246.65	28
2008/2009	312	292.1	128.5	116.60	265.00	31.05	–	296.05	10
Total	–	1038.7	257.9	530.36	818.16	124.20	45.4	987.80	17

N3 curve (see Table 1). Given climate predictions, the Tajo RBA estimated this would happen again 25% of the time under the 1998 ATS operational rules (CHT, 2012), with the resulting political conflict. The removal of the transfer decisions from the political arena was thus a major goal of ATS water users. Given the implications of the 2011 proposal for the ATS and in response to pressures from the ATS lobby, the Ministry of the Environment ordered the withdrawal of the proposed plan.

In order to approve the plan while protecting the interests of ATS users a political agreement was necessary. A working group made up of representatives of the recipient regions, the central government and SCRATS started meeting to work out a compromise. Neither the meetings, the make-up of the working group nor its deliberations were made public until an agreement was reached. In March 2013 the *Tajo Memorandum* was signed by the negotiating parties and, shortly thereafter, a revised version of both Tajo and Segura RBMPs were released for public consultation. The new Tajo draft RBMP had removed all references to environmental flow regimes downstream from the transfer diversion, and only included minimum flow requirements. In order to obtain support for the approval of the plans the government yielded to the demands of the ATS lobby and transformed the contents of the *Tajo Memorandum* into law, as last-minute amendments to the Environmental Impact Assessment Law approved in December 2013. The amendments stated that the new legal framework was needed to facilitate “water use concession trading that is more effective in the future” (Introduction, Law 21/2013). The reform liberalized water trading and at the same time avoided opening a politically and socially contentious debate, since the changes were introduced as last minute amendments, thus avoiding regular parliamentary procedures.

The 2013 law modified ATS operational rules along three main lines: increased the no-transfer storage level (level 4) to 400 Mm<sup>3</sup>; moved the responsibility for transfer decisions below the N3 curve from the Council of Ministers to the departmental Minister in charge of water affairs; and required all stored water above the no-transfer level to be transferred. The changes have limited the ability of the Tajo RBA to manage the basin according to technical, environmental and social considerations, and converted the transfer into a right for end users instead of an expectation (FNCA, 2013a). The amendments also allowed water trading contracts between different river basins with administrative approval from the General Water Director (a Directorate within the Ministry responsible for water affairs), whereas under the 1999 reform, inter-basin permit trading was exceptional and subject to legislative approval by Parliament (FNCA, 2013a). The 2013 reform therefore eliminated the discretionary nature of regular transfer decisions, circumventing costly political debates and minimizing opportunities for stakeholder input. Furthermore, by allowing private individuals to reach interbasin permit trading agreements outside of each transfers’ operational rules, it moved water management decisions away from the public sphere and into the realm of the market.

The resistance to this additional push for the *mercantilización* of water became quickly apparent. Environmental and citizen organizations in the Tajo basin and nationwide issued legal reports (FNCA, 2013a, 2013b) and promoted a grassroots campaign that resulted in a formal complaint before the European Commission and legal action before the Spanish courts. In spite of the resistance, consulting companies and other parties are positioning themselves to act as intermediaries in water trades in what is starting to be perceived as a potentially lucrative economic activity. Decisions over trading and allocation are becoming a matter of supposedly technical criteria and personal choice, determined by the mid-level Water Director and individual users who buy and sell, and devoid of larger political, planning or ecological considerations.

#### 4. The case of the Tajo Segura water markets: The experience of water sales during the 2005–2008 drought

The 2004–2005 hydrologic year registered the lowest accumulated precipitation on record in Spain (Estrela and Rodríguez, 2008). The Drought Decrees approved by the government between 2005 and 2009 aimed to mitigate the impacts of the drought. In the case of the Tajo and Segura basins, the successive legislative reforms created an institutional framework through a process of deregulation—through the elimination of the water use restrictions associated with the concession regime—and reregulation—designed to increase the reach of the market—in order to favor the powerful ATS lobbies. As discussed above, the Drought Decrees enabled ATS users to purchase Tajo water while circumventing the limitations imposed by the transfer’s operational rules to protect the needs of the Tajo basin.

In addition to the modification of the trading regime, the 2005 Drought Decree exempted SCRATS irrigators from paying part of the ATS tariff. The 2006 decree extended the exemption to MCT urban water users. The exemption was designed to compensate the MCT for the “unexpected expenses” incurred through the purchase of Tajo water (Introduction, 2006 drought decree). These exemptions subsidized the water purchases, thus reducing the potential gains in economic efficiency and open competition that water markets were supposed to introduce.

The impacts of the 2005–2008 drought in the Tajo basin were severe. Environmental flows decreased to the point that the river ceased to flow in Talavera de la Reina for the first time on record in the summer of 2006, an event that sparked social mobilizations basin-wide (Hernández-Mora, 2013). The Tajo RBA also recognized that “some regular demands in the basin (...) have been derived toward the ATS as a result of the permit trading” (Tajo RBA Technical Manager, Unpublished Minutes Dam Release Commission, December 2006). Between 2004 and 2006 inflows to the E&B combined reservoir system fell 50% below historical average (Estrela and Rodríguez, 2008). Storage fell close to the 240 Mm<sup>3</sup> line, and remained below Level 3 until the spring of 2009, so that transfer decisions were made by the Council of Ministers during this time (Level 3 in Table 1). Given the legal priority of urban uses over irrigation, transferred volumes were allocated to MCT, and SCRATS received less than 10% of their maximum allocation (Table 4). The approval of the drought decrees was designed, in part, to meet the demands of the SCRATS and minimize the political cost of contentious transfer decisions. In fact, between 2005 and 2008 SCRATS obtained 29% of their allotment of Tajo waters through water sales, and as much as 45% in 2005 and 2006 (Table 4). The Director of the Tajo RBA Technical Department explained that the transfers resulting from the sales “do not need the approval of the Council of Ministers” but, rather, “are contracted among individuals that freely agree to certain conditions” (Unpublished Minutes of the Tajo RBA Headwater Management Commission, February 2006). Table 4 presents data on storage in E&B at the end of each hydrologic year, annual volumes transferred and additional volumes sold.

The following three sections present the characteristics of the three permit trading agreements subscribed between Tajo and Segura water users during the 2005–2008 drought. Fig. 3 shows the location of the selling irrigator communities in the Tajo basin, all of them downstream from the ATS diversion point.

##### 4.1. Water permit sales from Estremera Water User Association (EWUA) to SCRATS

The Estremera Irrigation District is located upstream from the city of Aranjuez (Fig. 3). It is an irrigation district of public initiative



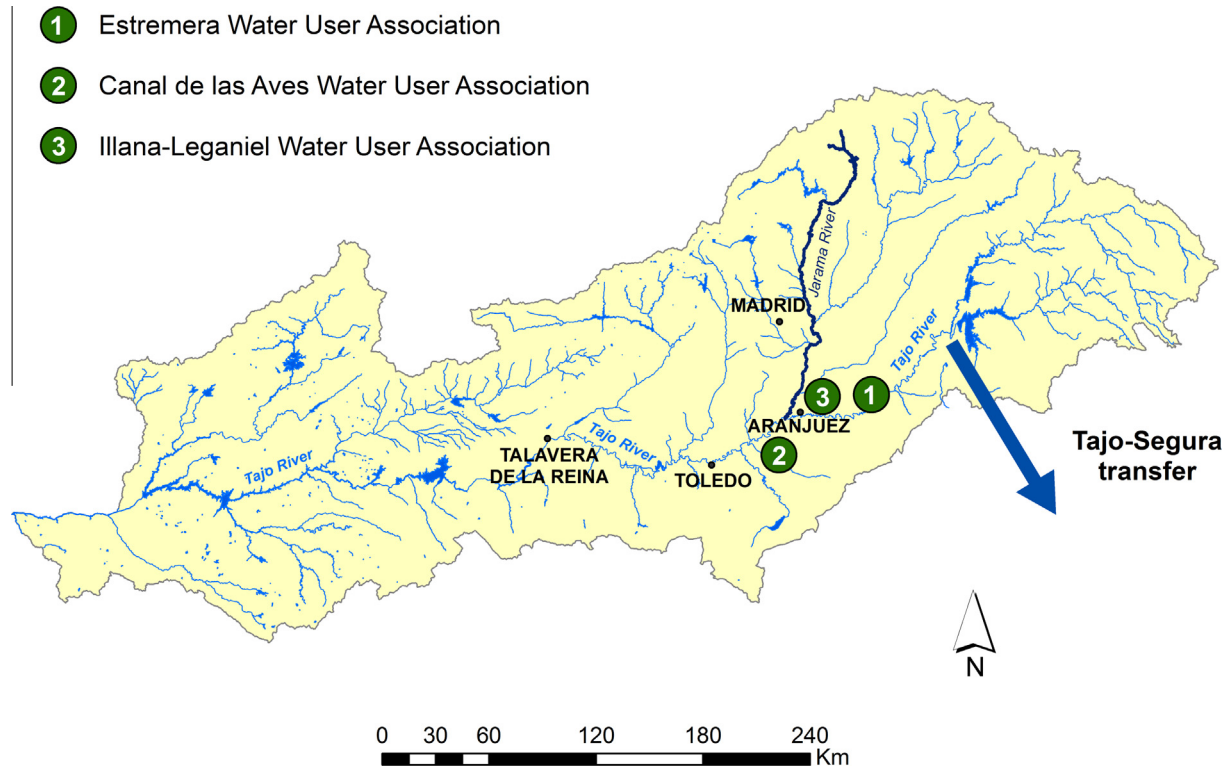


Fig. 3. Location of the Tajo basin irrigator communities that negotiated water sales. Source: Own elaboration.

created in the 1940s. In 2000 the District obtained a concession to derive 17.5 Mm<sup>3</sup> from the Estremera dam on the Tajo river to irrigate 2300 ha using flood irrigation with average estimated return flows of 20%. In February 2006 the Tajo RBA granted EWUA a 'provisional concession' for an additional 13.8 Mm<sup>3</sup>. This measure enabled EWUA to sell 31.05 Mm<sup>3</sup> to SCRATS, a volume that exceeded their original concession volume. The provisional concession title stated that it would only be valid as long as the 2005 Drought Decree was in force, essentially meaning, as long as inter-basin water sales were allowed. Spanish water law requires beneficial use of permitted waters but in this case, the temporary permit was granted to allow EWUA to increase the volumes sold to SCRATS. Furthermore, the regulatory development of the 1999 reforms (art. 345, 2003 amendment to Hydraulic Public Domain Bylaw) limited the volumes subject to trade to those effectively used for the previous five years and required return flows to be discounted from volumes sold to reduce environmental impacts. In the case of EWUA this would have implied the ability to sell only 14 Mm<sup>3</sup>, not the 31.05 Mm<sup>3</sup> that were actually sold annually.

The sale agreement was signed in February 2006 and renewed annually through 2009. Table 5 summarizes the basic elements of the contract and the subsidies received by SCRATS through ATS tariff exemptions. The agreement was clearly favorable to

the interests of both parties and detrimental to the public interest. At a time when the ATS operational rules limited transfers, SCRATS irrigators were able to significantly increase their allocation through purchase agreements and pay for the water through tariff exemptions, with a net gain of 10 million €.

Irrigators in Estremera also benefited from this process. They obtained 23.5 million € for the sale of 124.2 Mm<sup>3</sup> to SCRATS, well in excess of their original concession volumes. In 2007 the president of the EWUA declared: "the last two years have been the best ones for the farmers in the Estremera Irrigation District", due to the income from the sales of the water (Minutes of the Upper Tajo RBA Management District Meeting, July 25th 2007). A second benefit came from the inclusion of the district in the National Irrigation Modernization Action Plan aimed to improve efficiency in irrigated areas. The Estremera Modernization project was the first (and so far only) plan executed in the Tajo basin. It was designed to reduce water consumption by 12 Mm<sup>3</sup> that could be reassigned to Madrid's water supply (WWF-Spain, 2015). However, at the end of the project total concession volume expanded to 18.86 Mm<sup>3</sup>. The Tajo RBA argued that the project had achieved the projected 40% reduction by estimating savings over the 31.05 Mm<sup>3</sup> that were sold to SCRATS and not over the original concession (letter of Tajo RBA President to WWF, January 2013). Thus,

Table 5

Cost of water sales from Estremera Water User Association to SCRATS and ATS tariff exemptions (2005–2009). Source: Own elaboration with data from the purchase contracts and minutes of the Upper Tajo Management Commission meetings (2005–2009).

Hydrologic year	Volume (Mm <sup>3</sup> )	Price (€/m <sup>3</sup> )	Total paid (€)	Ordinary transfers for irrigation (Mm <sup>3</sup> )	Tariff exemption [parts (b) and (c)] (€/m <sup>3</sup> )	Total exemption (€)
2005/2006	31.05	0.186	5,761,700	38.00	0.0857	5,922,694.7
2006/2007	31.05	0.189	5,882,696	31.00		5,322,276.7
2007/2008	31.05	0.191	5,923,875	60.40		7,844,032.3
2008/2009	31.05	0.192	5,947,570	128.50		13,685,241.7
Total	124.20		23,515,841	257.90		32,774,245.4

the modernization project, largely funded with public money, only served to increase the concession. Furthermore, in the summer of 2014 and thanks to the 2013 reforms, SCRATS purchased 5.6 Mm<sup>3</sup> from EWUA to complement approved transfers (*La Verdad* newspaper, August 8, 2014).

#### 4.2. Water permit sales from Canal de las Aves Water User Association (CAWUA) to MCT

The CAWUA is an irrigation district of public initiative whose origins date back to the 1930s and is located on the left margin of the Tajo, upstream from the city of Aranjuez. It irrigates 3571 ha with a permit for 27.57 Mm<sup>3</sup> (CHT, 2014). Like Estremera, it is a traditional irrigation district that uses flood irrigation and is a candidate for agricultural modernization, although the project has not yet been approved. In 2008 CAWUA applied for a concession of 42.85 Mm<sup>3</sup>/year, which was approved by the Tajo RBA.

Between 2006 and 2009 the MCT signed annual contracts with the CAWUA to purchase between 26 and 40 Mm<sup>3</sup> to be transferred before November of each year. Payments had to be made within 20 days of Ministry of the Environment's approval of the transaction (usually in the spring), regardless of total volumes actually transferred throughout the summer. As Table 6 shows, contracts were made for a total of 108 Mm<sup>3</sup>, which were paid in full to the CAWUA and indirectly subsidized through the tariff exemption (MCT Annual Reports, 2007, 2008 and 2009). However, according to unpublished Tajo RBA data, only 45 Mm<sup>3</sup> were actually transferred.

Between 2004 and 2008 and in spite of drought conditions, MCT had received its full ATS allocation (110 Mm<sup>3</sup>/year). Therefore the emergency situation that the Drought Decrees alleged to allow the purchase and apply the tariff exemption did not exist. Furthermore, as the actual volumes transferred show, the purchase option was only partially executed. Between 2006 and 2009 E&B storage was very close to the no-transfer limit of 240 Mm<sup>3</sup> and transfer decisions had to be made by the Council of Ministers. It is plausible that the sale agreement was a publicly subsidized operation to reduce the risk of crossing the no-transfer line.

#### 4.3. Option contract between Illana-Leganiel Water User Association (ILWUA) and SCRATS

The ILWUA was created in 2003 through a declaration of public interest for the conversion of the agricultural district to irrigation. The project was approved in 2008 and is currently underway. In 2009 it received an administrative concession to irrigate 1575 ha with 10.19 Mm<sup>3</sup>/year, which is included in the 2014 Tajo RBMP. In 2011, when the irrigation district was not yet operational, the SCRATS signed a 10-year option contract with the ILWUA for the right to purchase the full concession volume at a price of 0.06 €/m<sup>3</sup>. The agreement would be put into effect in case of drought conditions and if legally allowed. In exchange, SCRATS pays the water tariffs to the Tajo RBA during the 10 years of the

agreement, which in 2012 amounted to 8.35 €/ha (SCRATS 2012 Annual Report). The Irrigation District is thus being created with public funds and beneficiaries have signed a potential water sale agreement, thus jeopardizing the legal requirement of beneficial use for permitted waters. Furthermore, this agreement exemplifies the process of water *mercantilización* given that public water rights are being granted with full knowledge of the explicit intention to sell them. Market instruments are being used for the reallocation of water resources outside a situation of drought, something the 2013 Tajo Memorandum legal reforms have made possible.

#### 4.4. Discussion

This study has emerged from a close and detailed knowledge of the origins, context and evolution of Spanish water markets. We argue that the contradictions and resistances identified throughout the process of institutional design can be better conceptualized and understood if analyzed as an example of *neoliberalisation of nature*. This broader theoretical framework and, more specifically, the notion of water *mercantilización* as applied to the case of Spain (Bakker, 2002; Del Moral et al., 2003), provides a sound framework for understanding this historically and geographically-specific case study.

In Spain, the specter of the state failure thesis (materialized in the rigidities and inefficient administrative allocation of water) combined with the development of a discourse of water scarcity, appeared over the last twenty years as a powerful justification for the expansion of markets as a social institution for the reallocation of scarce water resources. This process was initiated and guided by the state in support of specific strategic objectives and interests that could no longer be managed via the previously established mechanisms of the hydraulic paradigm. In Bakker's terms, *mercantilización* entails the (re)introduction of markets mechanisms into a resource subsector from which they were previously excluded. We have argued in this paper that the process of *mercantilización* of water in Spain is intensifying through the progressive displacement of allocation techniques based on public policy decision-making by market instruments.

It is generally assumed that markets are efficient reallocation mechanisms in situations of shortage or exhaustion of natural resources. Theoretically markets should facilitate the reallocation, with increased productivity, of existing resources, not increase pressure on ecosystems. However, in our case study we expose the paradox that markets function precisely as instruments of increasing pressure on aquatic ecosystems. Water that had never been consumptively used before was sold and diverted from the Tajo basin. Traders derived large benefits from the sale of water they were not using and to which they did not have previous access. From an environmental perspective, headwaters were diverted at a time when the basin was under severe drought conditions and streamflows were low. In fact, while water was being diverted through the sale agreements, some users downstream were suffering significant restrictions. It could be argued that, in

**Table 6**

Cost of water sales from Canal de las Aves Water User Association to MCT and ATS tariff exemptions (2005–2009). Source: Own elaboration with data gathered from: <sup>1</sup>Purchase agreements, <sup>2</sup>Annual Reports of the MCT and <sup>3</sup>unpublished data from the Tajo RBA Dam Release Commission (2006, 2007 and 2008).

Year	Volume contracted <sup>1</sup> (Mm <sup>3</sup> )	Volume purchased <sup>2</sup> (Mm <sup>3</sup> )	Price contracted <sup>1</sup> (€/m <sup>3</sup> )	Total paid (M€)	Volume transferred <sup>3</sup> (Mm <sup>3</sup> )	Ordinary transfers for MCT (Mm <sup>3</sup> )	Urban water supply tariff (parts (b) and (c)) (€/m <sup>3</sup> )	Total exemption (M€)
2006/2007	26–40	35.50	0.288	10.2	8.5	137.00	0.086	11.75
2007/2008	26–40	36.03	0.236	8.5	36.9	108.26		9.29
2008/2009	26–40	36.95	0.310	11.5	–	106.60		9.14
Total		108.48		30.19	45.4	30.20		30.18

Spain, water markets are a new variation of entrenched institutional practices, business as usual with a new face. However, instances of depoliticisation, misleading representation of decisions as neutral, efficient or economically rational agreements, new actors, new rules, all demonstrate that, in the Spanish case, this “new face” is an instance of water neoliberalization.

The introduction of water markets in Spain in 1999 did not face a solid ideological opposition. On the contrary, in the context of a strong debate questioning the traditional hydraulic paradigm and the role of the associated water policy community, the social sectors defending the innovative ideas of IWRM that the WFD represented (i.e. leftwing parties, citizen and environmental movements, academics), accepted the idea that economic instruments could be convenient mechanisms to improve efficiency and good environmental status. This consensus on what we have recognized as the *ecological modernization* thesis implied economic assessment and full cost recovery, in the way that the WFD explicitly poses. But it also encompassed, without ignoring the risks that these instruments could involve, a positive perspective on the potential of water markets as mechanisms that could replace the intensification of water resources exploitation through costly hydraulic infrastructures. Thus, in Spain, the criticism against water markets is not an ideological one, based on the presumption of *anti-neoliberal* perspectives but an outcome of rigorous analysis and understanding of actual experiences in the context of the developing theoretical framework of nature neoliberalization.

However, the specificities of each concrete case study obligate a careful application of the theoretical framework. Water resources play a role in socioeconomic restructuring, and are both transformed by and constraining of geographically contextualized political-economic choices and evolution. From a theoretical standpoint, therefore, it is important to reflect on whether the Spanish water markets and their “dysfunctionalities” are a singular result of context specific factors or whether they respond to a more general, global in fact, trend, materialized in institutional and geographical particular conditions. In this second perspective, the dysfunctions of Spanish water markets should be more a result of intentional water neoliberalism, rather than just of corruption and local interests. The perspective of this paper is closer to this second opinion. We recognize singular characteristics in the Spanish *mercantilización* process, but identify the influence of global “macro trends” (Del Moral et al., 2003) that promote market instruments as desirable alternatives for the achievement of natural resources management goals and condition the arguments, formats and chronology of their institutional development. The relevance of the case study is justified by the fact that Spain is the only country within the EU with operating water markets and the Tajo–Segura water sales are the most significant both in terms of volumes traded and of their importance driving policy reforms. It is therefore a meaningful and representative case study, an actual laboratory of *mercantilización* to test, corroborate and enrich the general reflection of the global neoliberalization process.

## 5. Conclusions

Starting in 1999, successive Spanish governments, both conservative and social-democratic, have progressively constructed a legal framework to facilitate water trading as an alternative to public sector action, with the purported goals of introducing flexibility and improve economic efficiency in water allocation decisions. Two major reforms (in 1999 and 2005–2008) were approved, either immediately following or in the context of nationwide droughts, which acted as catalysts for water policy reforms. After more than a decade of experience in water markets, and in spite of significant public sector support (both financial and

political) total volumes sold using formal water trading mechanisms remain small. However, these volumes are significant in specific water-stressed regions where administrative reallocation decisions are too costly. In addition, very few studies have assessed the environmental, social and economic implications of these trades.

Water trading agreements imply a change in the location, intensity and characteristics of the water use, with obvious implications for water quality, quantity and ecosystem health. No comprehensive information is publicly available on such basic issues as total volumes of water traded, the conditions of the contracts being signed, the contracting parties, or the socioeconomic or environmental impacts. In spite of this lack of knowledge of the real effects of water trading, water markets continue to be promoted uncritically as an effective means to allocate water efficiently from lower to higher economic uses. This is the case both in Spain and in the EU, where economic instruments are increasingly proposed as desirable tools to achieve natural resources management goals. The geographically-specific example of the experience with inter-basin permit trades between the Tajo and Segura river basins in the context of the 2005–2008 drought, and the later legal reform in 2013, serves to contest these presumptions and illustrate the dysfunctions of water markets on the ground.

Water trading, while presented as a more flexible and efficient alternative to public allocation decisions, in fact requires a significant process of institutional build up, through both *deregulation* and *reregulation* processes, and decisive public intervention to facilitate these exchanges. The process is heavily influenced by the pressures of powerful regional elites—based on the competitive advantage of Mediterranean intensive agriculture and a strong tourism industry and their significance in Spain's role within the larger European and global economic system—so that the regulatory outcomes are coherent with their interests. The experience with the Tajo–Segura water sales shows that in cases of unequal access to power and information water markets serve to heighten the lack of transparency and accountability and intensify unequal power relations. Furthermore, this case study illustrates how markets work to provide a win–win situation for the contracting parties at the expense of the public interest, which both subsidized the operations and suffered the environmental impacts. Thus it shows how the potential advantages that water markets can provide in specific and local situations (increased flexibility in allocation decisions, mitigation of drought impacts, explicitation of the economic value of the resource) are heavily dependent on the institutional context in which they are implemented.

This paper uses the example of an “actually existing neoliberalism”, an actual *mercantilización* process, to illustrate how the development of the regulatory framework for water markets in Spain was really driven by and targeted to the resolution of a territorial challenge that has been historically deemed as a key political and economic priority by all governments and political parties: the transfer of subsidized water resources to the Iberian southeast. The powerful economic and political interests that underlie this historical claim have influenced (and benefited from) the process of institutional design. The use of supposedly unquestionable arguments of efficiency and competition serve to impose management alternatives that are not impartial nor equitable in their outcomes. Using economic instruments for water resources management serves to remove significant management decisions from the political arena, allowing for the presentation of conflictive and contested allocation decisions as supposedly technically and economically sound and thus not subject to political debate. Administrative and political decisions are substituted by market instruments facilitated and enhanced by a constructed institutional framework that changes the rules of the game in favor of the most powerful players.



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## References

- Aguilera-Klink, F., Sánchez-García, J., 2002. Los mercados de agua en Tenerife. Bakeaz/Fundación Nueva Cultura del Agua, Bilbao.
- Aguilera-Klink, F., Sanchez-Garcia, J., 2005. Water markets in Tenerife: the conflict between instrumental and ceremonial functions of the institutions. *Int. J. Water* 3 (2), 166–185.
- Bailey, I., Maresh, S., 2009. Scales and networks of neoliberal climate governance: the regulatory and territorial logics of European Union emissions trading. *Trans. Inst. Br. Geogr.* 34, 445–461. <http://dx.doi.org/10.1111/j.1475-5661.2009.00355.x>.
- Bakker, K., 2002. From state to market?: Water mercantilization in Spain. *Environ. Plann. A* 34 (1), 767–790.
- Bakker, K., 2003. An Uncooperative Commodity: Privatizing Water in England and Wales. Oxford University Press.
- Bakker, K., 2005. Neoliberalizing nature? Market environmentalism in water supply in England and Wales. *Ann. Assoc. Am. Geogr.* 95 (3), 542–565.
- Bakker, K., 2010. Privatizing Water – Governance Failure and the World's Urban Water Crisis. Cornell University Press, Ithaca.
- Bauer, C., 2004. Results of Chilean water markets: empirical research since 1990. *Water Resour. Res.* 40, W09S06. <http://dx.doi.org/10.1029/2003WR002838>.
- Berbel, J., Pedraza, V., Giannoccaro, G., 2013. The trajectory towards basin closure of a European river: Guadalquivir. *Int. J. River Basin Manage.* 11 (1), 111–119.
- Brenner, N., Theodore, N., 2007. Neoliberalism and the regulation of “environment”. In: Heynen, N., McCarthy, J., Prudham, S., Robbins, P. (Eds.), *Neoliberal Environments: False Promises and Unnatural Consequences*. Routledge, London, New York, pp. 153–159.
- Brufao, P., 2008. La revisión ambiental de las concesiones y autorizaciones de agua. Bakeaz/Fundación Nueva Cultura del Agua, Bilbao.
- Bukowski, J., 2007. Spanish water policy and the National Hydrologic Plan: an advocacy coalition approach to Policy Change. *South Eur. Soc. Polit.* 12 (1), 39–57.
- Calatrava, J., Gómez Ramos, A., 2009. El papel de los mercados de agua como instrumento de asignación de recursos hídricos en el regadío español. In: Gómez-Limón, J.A., Calatrava, J., Garrido, A., Sáez, F.J., Sabadía, A. (Eds.), *La economía del agua de riego en España*. Fundación Cajamar, Almería, Spain, pp. 259–319.
- Castree, N., 2008a. Neoliberalising nature: the logics of deregulation and reregulation. *Environ. Plann. A* 40, 131–152.
- Castree, N., 2008b. Neoliberalising nature: processes, effects, and evaluations. *Environ. Plann. A* 40, 153–173.
- Castree, N., 2010. Neoliberalism and the biophysical environment: a synthesis and evaluation of the research. *Environ. Soc.: Adv. Res.* 1, 5–45. <http://dx.doi.org/10.3167/ares.2010.010102>.
- CHT, 2011. Borrador del Plan Hidrológico de la Parte Española de la Demarcación Hidrográfica del Tajo. November 2011 (withdrawn). [http://www.redtajo.es/index.php?option=com\\_content&view=article&id=170&Itemid=100](http://www.redtajo.es/index.php?option=com_content&view=article&id=170&Itemid=100) (accessed January 2015).
- CHT, 2012. Claves para la negociación del Plan de Cuenca del río Tajo. Unpublished Internal Document.
- CHT (Confederación Hidrográfica del Tajo), 2014. Plan Hidrológico de la Parte Española de la Demarcación Hidrográfica del Tajo. [http://www.chtajo.es/Informacion%20Ciudadano/PlanificacionHidrologica/Planif\\_2009-2015/Paginas/ProyPHC\\_2009-2015.aspx](http://www.chtajo.es/Informacion%20Ciudadano/PlanificacionHidrologica/Planif_2009-2015/Paginas/ProyPHC_2009-2015.aspx) (accessed January 2015).
- Crouch, C., 2004. Post-democracy. Polity Press, Cambridge.
- De Stefano, L., 2005. Los mercados de agua y la conservación del medio ambiente: oportunidades y retos para su implantación en España. WWF-Spain Position Paper. [http://awsassets.wwf.es/downloads/posicion\\_wwf\\_sobre\\_mercados\\_de\\_aguas.pdf](http://awsassets.wwf.es/downloads/posicion_wwf_sobre_mercados_de_aguas.pdf) (accessed January 2015).
- Del Moral, L., 1996. The debate on financial and economic regulation of water in contemporary hydrological planning in Spain. In: Allan, J.A., Radwan, L. (Eds.), *Perceptions of the Values of Water and Water Environments*. University of London-SOAS Water Issues Group, London, pp. 37–45.
- Del Moral, L., Silva Pérez, R., 2006. Grandes zonas regables y reparto del agua en España. El caso de la cuenca del Guadalquivir. *Mélanges de la Casa de Velázquez*, Monographic issue: Partage de l'eau en Espagne, au Portugal et au Maroc, 36(2), pp. 125–148.
- Del Moral, L., Giansante, C., Babiano, L., 2000. L'évolution des modalités d'allocation de la ressource en eau en Espagne. *Rév. d'Econ. Méditerran.* 2, 235–248.
- Del Moral, L., Van Del Werff, P., Bakker, K., Handmer, J., 2003. Global trends and water policy in Spain. *Water Int.* 28 (3), 358–366.
- Delacamara, G., Dworak, T., Gómez, C.M., Lago, M., Maziotis, A., Rouillard, J., Strosser, P., 2013. EPI-Water Deliverable 5.3: Guidance on the Design and Development of Economic Policy Instruments in European Water Policy. EPI-Water – Evaluating Economic Policy Instruments for Sustainable Water Management in Europe. [http://www.feem-project.net/epiwater/docs/epi-water\\_guidance\\_v2.pdf](http://www.feem-project.net/epiwater/docs/epi-water_guidance_v2.pdf) (accessed January 2015).
- EC (European Commission), 2011. Our Life Insurance, Our Natural Capital: An EU Biodiversity Strategy to 2020, COM(2011) 244 Final. [http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/2020/1\\_EN\\_ACT\\_part1\\_v7%5B1%5D.pdf](http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/2020/1_EN_ACT_part1_v7%5B1%5D.pdf) (accessed January 2015).
- Edwards, G.A.S., 2013. Shifting constructions of scarcity and the neoliberalization of Australian water governance. *Environ. Plann. A* 45, 1873–1890.
- Estrela, T., Rodríguez, A., 2008. La gestión de la sequía en los años 2004 a 2007. Ministerio de Medioambiente, Dirección General del Agua, 2008.
- Fernández-Bethancourt, J.D., Aguilera-Klink, F., 2000. El papel económico de las aguas subterráneas en Canarias. *Papeles de Aguas Subterráneas* 10, Fundación Marcelino Botín. [http://www.fundacionbotin.org/monografias\\_observatorio-del-agua\\_publicaciones.htm](http://www.fundacionbotin.org/monografias_observatorio-del-agua_publicaciones.htm) (accessed January 2015).
- FNCA (Fundación Nueva Cultura del Agua), 2013a. Informe relativo a la modificación del régimen de los trasvases dentro del Proyecto de Ley de Evaluación Ambiental. [http://www.fnca.eu/images/documentos/DOCUMENTOS/20131114\\_informe\\_modifica\\_trasvases.pdf](http://www.fnca.eu/images/documentos/DOCUMENTOS/20131114_informe_modifica_trasvases.pdf) (accessed January 2015).
- FNCA, 2013b. Informe relativo a la modificación del régimen del trasvase tajo-segura en el Proyecto de Ley de Evaluación Ambiental. [http://www.fnca.eu/images/documentos/DOCUMENTOS/20131030\\_informe\\_modifica\\_tajo-segura.pdf](http://www.fnca.eu/images/documentos/DOCUMENTOS/20131030_informe_modifica_tajo-segura.pdf) (accessed January 2015).
- Font, N., Subirats, J., 2010. Water management in Spain: the role of policy entrepreneurs in shaping change. *Ecol. Soc.* 15 (2), 25. <http://www.ecologyandsociety.org/issues/article.php/3344> (accessed January 2015).
- Furlong, K., 2010. Neoliberal water management: trends, limitations, reformulations. *Environ. Soc.: Adv. Res.* 1, 46–75. <http://dx.doi.org/10.3167/ares.2010.010103>.
- Garrido, A., Rey, D., Calatrava, J., 2013a. Water trading in Spain. In: De Stefano, L., Llamas, R. (Eds.), *Water, Agriculture and the Environment in Spain: Can we Square the Circle?* CRC Press/Balkema, Taylor & Francis Group, pp. 217–225. <http://www.fundacionbotin.org/fb-water-agriculture-and-the-environment-in-spain-can-we-square-the-circle-seminarios-internaci-787798051267687.htm> (accessed January 2015).
- Garrido, A., Maestu, J., Gómez-Ramos, A., Estrela, T., Yagüe, J., Segura, R., Calatrava, J., Arrojo, P., Cubillo, F., 2013b. Voluntary water trading in Spain: a mixed approach of public and private initiatives. In: Maestu, J. (Ed.), *Water Trading and Global Water Scarcity: International Experiences*. J RFF Press, Oxon, pp. 180–194.
- Giannocaro, G., Pedraza, V., Berbel, J., 2013. Analysis of stakeholders' attitudes toward water markets in southern Spain. *Water* 5, 1517–1532.
- Gómez, C.M., Delacamara, G., Pérez, C.D., Rodríguez, M., 2013. Droughts and Water Scarcity: Tagus and Segura Interconnected River Basins. Deliverable 4.3, EPI Water Project, FP7. <http://www.feem-project.net/epiwater/pages/download-public-deliv.html> (accessed January 2015).
- GWP (Global Water Partnership), 2000. Integrated Water Resources Management. TAC Background Paper n° 4. Global Water Partnership, Stockholm.
- Hajer, M.A., 1995. The Politics of Environmental Discourse. Ecological Modernization and the Policy Process. Oxford University Press, Oxford.
- Hernández-Mora, N., 2013. El Tajo: Historia de un río ignorado. Fundación Nueva Cultura del Agua, Zaragoza.
- Hernández-Mora, N., De Stefano, L., 2013. Los mercados informales de agua en España: Una primera aproximación. In: Embid Irujo, A. (Dir.), *Usos del agua. Concesiones, autorizaciones y mercados del agua*. Thomson-Reuters, Cizur Menor, Pamplona, pp. 375–407.
- Hernández-Mora, N., Garrido, A., Gil, M., 2013. La sequía 2005–2008 en la cuenca del Ebro: Vulnerabilidad, impactos y medidas de gestión. [http://www.ceigram.upm.es/sfs/otros/ceigram/LIBRO%20LA%20SEQUIA%20EN%20LA%20CUENCA%20DEL%20EBRO%20\(1\).pdf](http://www.ceigram.upm.es/sfs/otros/ceigram/LIBRO%20LA%20SEQUIA%20EN%20LA%20CUENCA%20DEL%20EBRO%20(1).pdf) (accessed July 2014).
- Hernández-Mora, N., Del Moral, L., La Roca, F., La Calle, A., Schmidt, G., 2014. Interbasin water transfers in Spain. Interregional conflicts and governance responses. In: Schneider-Madanes, G. (Ed.), *Globalized Water: A Question of Governance*. Springer, Dordrecht, pp. 175–194.
- Heynen, N., McCarthy, J., Prudham, S., Robbins, P. (Eds.), 2007. *Neoliberal Environments: False Promises and Unnatural Consequences*. Routledge, London, New York.
- IDR-UCLM (Instituto de Desarrollo Rural, Universidad de Castilla La Mancha), 2005. Estudio de evolución del regadío en la Cuenca del Río Segura. <http://wap.dipualba.es/InformeAgua/informefinal.pdf> (accessed January 2015).
- Izquierda Unida, 1997. Información de la Secretaría de Medio Ambiente sobre la Ley de Agua. Presidencia Federal, May 19, 1997, Madrid. Unpublished Document.
- Kaika, M., 2003. The WFD: a new directive for a changing social, political and economic European framework. *Eur. Plann. Stud.* 11 (3), 299–316.



- Lopez-Gunn, E., 2009. *Agua para todos: a new regionalist hydraulic paradigm in Spain*. *Water Altern.* 2 (3), 370–394.
- Mansfield, B., 2007. Privatization: property and the remaking of nature-society relations introduction to the special issue. *Antipode* 39 (3), 393–405.
- March, H., 2013. Neoliberalismo y medio ambiente: una aproximación desde la geografía crítica. *Doc. d'Anàl. Geogr.* 59 (1), 137–153.
- Martínez, J., Estévez, M.A., 2002. Agua, regadío y sostenibilidad en el Sudeste ibérico. Bakeaz/Fundación Nueva Cultura del Agua, Bilbao.
- Martínez Cortina, L., Hernández-Mora, N., 2003. The role of groundwater in Spain's water policy. *Water Int.* 28 (3), 313–320.
- Melgarejo Moreno, J., 2000. Balance económico del Trasvase Tajo–Segura. *Invest. Geogr.* 24, 69–95.
- Melgarejo Moreno, J. (Dir.), 2009. El Trasvase Tajo–Segura: Repercusiones económicas, sociales y ambientales en la cuenca del Segura. Caja de Ahorros del Mediterráneo.
- Naredo, J.M., 1998. Enfoques económicos y ecológicos en la encrucijada actual de la gestión del agua en España. In: Arrojo, P., Naredo, J.M. (Eds.), *La gestión del agua en España y California*. Bakeaz/Fundación Nueva Cultura del Agua, Bilbao, pp. 153–185.
- Naredo, J.M., 2007. Lo público y lo privado, la planificación y el mercado, en la encrucijada actual de la gestión del agua en España. Panel Científico-Técnico de Seguimiento de la Política de Aguas. FNCA-Universidad de Sevilla. <<http://www.fnca.eu/images/documentos/politica/informes/Lo%20p%C3%ABlico%20y%20lo%20privado,%20la%20planificaci%C3%B3n%20y%20el%20mercado.pdf>> (accessed January 2015).
- Peck, J., Theodore, N., Brenner, N., 2009. Neoliberal urbanism: models, moments, mutations. *SAIS Rev. Int. Aff.* 29 (1), 49–66.
- Raco, M., 2013. *State-led Privatisation and the Demise of the Democratic State: Welfare Reform and Localism in an Era of Regulatory Capitalism*. Ashgate, Hants, London.
- Rinaudo, J.D. (Coord.), 2014. *Water Cap & Trade Water Markets Scenarios for Southern Europe: New Solutions for Coping with Increasing Water Scarcity and Drought Risk? IWRM-NET. Final Project Report*. <<https://sites.google.com/site/capandtraderesearch/final-report>> (accessed January 2015).
- Sauri, D., Del Moral, L., 2001. Recent developments in Spanish water policy. Alternatives and conflicts at the end of the hydraulic age. *Geoforum* 32, 351–361.
- Swyngedouw, E., 1999. Modernity and hybridity: regeneracionismo, the production of nature and the Spanish waterscape, 1890–1930. *Ann. Assoc. Am. Geogr.* 89 (3), 443–465.
- Swyngedouw, E., 2007. Dispossessing H<sub>2</sub>O. In: Heynen, N., McCarthy, J., Prudham, S., Robbins, P. (Eds.), *Neoliberal Environments: False Promises and Unnatural Consequences*. Routledge, pp. 51–62.
- Swyngedouw, E., 2011. Interrogating post-democratization: reclaiming egalitarian political spaces. *Polit. Geogr.* 30 (7), 370–380.
- Swyngedouw, E., 2013. Into the sea: desalination as hydro-social fix in Spain. *Ann. Assoc. Am. Geogr.* 103 (2), 261–270.
- Varela, C., Hernández-Mora, N., 2010. Institutions and institutional reform in the Spanish water sector: a historical perspective. In: Garrido, A., Llamas, M.R. (Eds.), *Water Policy in Spain*. CRC Press/Balkema, Leiden, The Netherlands, pp. 117–131.
- WWF-Spain, 2015. *Modernización de Regadíos: Un mal negocio para la naturaleza y la sociedad*. WWF Report 2015. <[http://awsassets.wwf.es/downloads/modernizacion\\_regadios.pdf](http://awsassets.wwf.es/downloads/modernizacion_regadios.pdf)> (accessed April 2015).