

MISSING WATER MARKETS: A CAUTIONARY TALE OF GOVERNMENTAL FAILURE

VANESSA CASADO-PÉREZ*

California is facing a water crisis. Water is managed through a variety of mechanisms, including government administration and market tools. This Article argues for a regulated market-based solution. When it comes to water markets, the invisible hand needs help from the visible hand of government to prove effective. Administrative systems and markets are usually portrayed in opposition to each other, as mutually exclusive solutions. Water market advocates suggest government's role is minimal. However, as this Article identifies, to establish and maintain a functioning water market, government needs to play a variety of roles. These include the uncontested role of defining property rights, but additional roles are necessary such as reviewing transactions to prevent uncompensated externalities, structuring the management of water infrastructure and fulfilling the market maker role.

This Article presents a taxonomy of the roles that government must play to ensure that water markets operate efficiently. It then empirically tests that taxonomy with a case study of the water market Spain established in 1999. That market's mixed record has important implications for California and other U.S. water markets, especially during drought conditions. Spain's water market system was closely modeled on California's, in part

* Lecturer and Teaching Fellow of Environmental Law and Policy, Stanford Law School. Ms. Casado-Pérez holds a J.S.D. from the New York University School of Law; an LL.M. from the University of Chicago Law School; and an LL.B., LL.M., and B.A. from the Universitat Pompeu Fabra in Barcelona.

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because Spain and California share similar geographies and climates, and it was tested by a severe drought. However, as this Article shows, the volume of market transactions did not increase measurably during the drought, suggesting that the market failed in its role of mitigating inefficient water allocation. This Article argues that this failure resulted from the Spanish government not performing functions that could have facilitated market transactions—functions that California may also fail to play in the ongoing drought.

Drawing from this empirical case study of water markets in Spain, this Article argues that each of these roles is necessary for the success of water markets as a tool to mitigate the effects of drought crises. Spain introduced water market mechanisms in 1999 and explicitly stated it was imitating California's system. However, Spanish governmental agencies erred in their design and implementation, and water markets have not become an effective tool to respond to scarcity. These lessons about the proper role of government from the Spanish case study have important implications for states in the American West facing similar water management challenges.

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INTRODUCTION

California is currently suffering from the most severe drought in decades.¹ Governor Jerry Brown has declared a state of emergency.² Emergency measures may include cutbacks on household water use, perhaps even beyond non-essential outside uses.³ The mandatory emergency measures may produce long-lasting effects; some of the measures enacted may become permanent or bring permanent behavioral changes.⁴ People may become more conscious in their water use and reduce their consumption going forward.⁵ But this is not enough; government

¹ Press Release, Cal. Dept. of Water, Dry Water Year 2014 Ends Tomorrow (Sept. 29, 2014), available at <http://www.water.ca.gov/news/newsreleases/2014/092914drywateryear.pdf>.

² Press Release, Office of Gov. Edmund G. Brown Jr., Governor Brown Declares Drought State of Emergency (Jan. 17, 2014) available at <http://gov.ca.gov/news.php?id=18368>.

³ To meet the 20 percent reduction in water use mandated by the Governor, some local agencies have enacted measures prohibiting filling pools or irrigating lawns on consecutive days. See, e.g., Alameda County Water District, Cal., Ordinance 2014-01 (Mar. 13, 2014), available at <http://www.acwd.org/DocumentCenter/View/631>.

⁴ After the 2008 crisis, many emergency strategies became permanent in Catalonia, Spain, and many municipalities continue to irrigate their green areas with brackish water. *Reutilización y aprovechamiento de aguas* [Water Use and Reuse], AIGÜES DE BARCELONA, <http://www.aiguesdebarcelona.cat/reutilizacion-y-aprovechamiento-de-aguas-recursos-alternativos>, (last visited Feb. 27, 2015).

⁵ This is the case in Barcelona. As result of the several drought periods during the 2000s, consumption in Barcelona was reduced to 110 liters (29 gallons) per person per day, and during the drought, people consumed 10 percent less. See Joaquim Lloveras Macià, Consideracions sobre l'enginyeria per a l'estalvi d'aigua al sector domestic a Catalunya [Considerations for Water Conservation Engineerings in Catalonia], ETSEIB, available at <http://upcommons.upc.edu/e-prints/bitstream/2117/7564/1/consideracions.pdf>. In 2001, the consumption of water was 18 percent lower than in 1999. See Press Release, Ajuntament de Barcelona, Barcelona redueix un 15% el consum d'aigua en 12 anys [Barcelona Reduces Water Consumption by 15% in 12 Years] (Mar. 22, 2012), available at <http://w110.bcn.cat/portal/site/MediAmbient/menuitem.7120b3cf16112e13e9c5e9c5a2ef8a0c/?vgnextoid=70c609e15e936310>

policies to avoid and mitigate drought are necessary. Unfortunately, government action in the wake of a drought crisis might erode another government policy designed to avoid such a crisis in the first place: water markets. In particular, emergency measures may produce uncertainty if they override established expectations about water allocation, and this uncertainty would undermine parties' ability to trade in the market.

California has one of the most active, albeit imperfect, water markets in the western United States.⁶ Water markets are supposed to work as a mitigation tool for both structural scarcity (i.e., the misallocation between the agricultural sector and urban areas) and drought (when there is not enough water for all users entitled to it).⁷ Roughly speaking, California apportions its water based on a system of temporary priority, which ensures certainty about who will suffer the first cutbacks.⁸ These clear rules of allocation may wrongly identify the higher marginal value, since a junior user may value the water more highly than a senior one. To counteract this possibility, water market regulation in California allows for

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⁶ Jedidiah Brewer et al., *Law and the New Institutional Economics: Water Markets and Legal Change in California, 1987–2005*, 26 WASH. U. J.L. & POL'Y 183, 196 (2008) (“Over the 19 year period (1987–2005) in our sample, 493 transfers took place in California, which transferred over 11.3 million acre-feet (AF) of water. In comparison, in ten of the other eleven states in the West (excluding Colorado) there were 1047 water transfers totaling about 19.1 million AF. These numbers indicate that California accounts for almost half of the number of transfers and sixty-percent of the amount of water transferred in the West.”).

⁷ For an overview of the water crisis and a free-market environmentalist analysis of the potential of water markets to solve the problem, see TERRY L. ANDERSON, BRANDON SCARBOROUGH & LAWRENCE R. WATSON, TAPPING WATER MARKETS 1–19 (2012) [hereinafter ANDERSON, TAPPING WATER MARKETS]. A good bibliography of works discussing water markets can be found in Ronald A. Kaiser & Michael McFarland, *A Bibliographic Pathfinder on Water Marketing*, 37 NAT. RESOURCES. J. 881, 888–92 (1997). For background literature on water markets, where these goals are discussed in detail, see generally TERRY L. ANDERSON & PAMELA SNYDER, WATER MARKETS: PRIMING THE INVISIBLE PUMP (1997); Henning Bjornlund & Jennifer McKay, *Aspects of Water Markets for Developing Countries: Experiences from Australia, Chile and the US*, 7 J. ENV'T & DEV. ECON. 769 (2002); J.W. Milliman, *Water Law and Private Decision-Making: A Critique*, 2 J. L. & ECON. 41 (1959); Mateen Thobani, *Formal Water Markets: Why, When, and How to Introduce Tradable Water Rights*, in 12 THE WORLD BANK RES. OBSERVER 161 (1997).

⁸ CAL. WATER CODE § 102 (West 2014). This rule is tempered in the State and Federal projects where the urban customers get a bigger share of their allocation in times of shortage. 2 SCOTT S. SLATER, CALIFORNIA WATER LAW AND POLICY § 14.19 (2012).

private transactions to take place, which puts water to the highest value use and allows users to shield themselves from the risk of curtailments.⁹

However, California's water markets have apparently not succeeded in alleviating the current situation, because if the markets had worked, the drought should have had fewer effects. Because of the uncertainty surrounding the allocation under the emergency measures, parties who would otherwise consider transfers as a solution to their water woes are uncertain about whether they, or their counterparty, will receive the water. For instance, cities, usually presumed to put a higher value on water than the agricultural sector,¹⁰ will not resort to the market if state politicians will bail them out in order to avoid losing an election.

Ensuring that there are clear and enforced rules of allocation in times of shortage is not the only role of government in water markets. Indeed, given the nature of the resource and the social conception of the resource, water markets are plagued with failures that require government intervention. If government fails to play the roles it needs to, markets will fail and be an ineffective tool. This Article portrays markets as one tool in water agencies' toolkit to incentivize private parties to reach decisions that an agency would otherwise get wrong, either because it lacks local information or because of political considerations. The Article begins by analyzing in Section I the roles that government needs to play in order for water markets to thrive and make overall allocation more efficient. First, Section I.A will consider the non-controversial role of the state in defining property rights, and particularly the rights that strongly affect markets, which I have labeled security and tradability, as well as the possibility of defining non-consumptive rights for environmental uses. Section I.B will analyze the role of government in enforcing those water rights through the control of externalities arising from transactions. This is deeply connected to the definition of property rights,

⁹ See Barton H. Thompson, Jr., *Uncertainty and Markets in Water Resources*, 36 MCGEORGE L. REV. 117, 133–34 (2005) [hereinafter Thompson, *Uncertainty and Markets*] (“Water markets reduce the harm from uncertainty in two principal ways. First, water markets can enable water users to respond more effectively to the events about which they are uncertain. . . . Second, water markets allow water users who face uncertainty to reallocate the uncertainty to individuals or entities that can better bear the risk of the uncertainty.”).

¹⁰ For a discussion of transferring water between users with different marginal valuations, see ANDERSON, TAPPING WATER MARKETS, *supra* note 7, at 5.

because the definition determines whether there are compensable externalities and how easy it is to measure them. Section I.C examines the regulation of water transportation and distribution infrastructure, with particular focus on whether there is guaranteed third-party access. Finally, Section I.D describes measures taken to reduce transaction costs and enhance the framework for water transactions.

Sections II-VI of the Article illustrate how government failure produces water-market failure with a case study of how water markets have (not) worked in Spain in their first decade, from 2000 to 2009.

Since water market mechanisms are just one piece of the overall administrative puzzle,¹¹ an understanding of the water management scheme is useful in order to identify the role envisioned for water markets in Spain, to assess whether their goals have been achieved, and to draw potential lessons for other jurisdictions. Section II describes the Spanish water management scheme and the water property rights system. Section III explains the Spanish water market regulations and their evolution, emphasizing the political discussion around the regulations in order to understand why some groups supported the regulations and others did not. Section IV presents empirical data on transactions and briefly analyzes whether scarcity was the driver of the volume and number of transactions, as well as a trigger for governmental action. Finally, Section V examines whether and to what extent the necessary government roles identified in Section I have been fulfilled in the Spanish case. Those roles, and the changes in water market regulation, are put in relation to data on transactions and on drought, because drought can prompt governmental action.

The Conclusion notes that Spain has had a mixed record in fulfilling these roles, in part due to political interference. Water market transactions have not become a core part of the water management puzzle, even though Spain suffered a severe drought

¹¹ This did not prevent the opponents, however, from portraying water markets as a complete overhaul of Spanish water regulations. Inmaculada Gómez Mardones, *El Gobierno ultima una reforma legal que abre el camino a la compraventa del agua* [Government Finalizes Legal Reform Opening the Door for Water Sales], EL PAÍS, Jan. 26, 1997 [hereinafter Gómez, *Government finalizes legal reform*], http://elpais.com/diario/1997/01/26/sociedad/854233201_850215.html (describing the overhaul of the water regulations as “turning a sock inside out”).

crisis during the study period that should have dramatically increased the amount traded in the market. California water agencies should assess whether they are enhancing markets adequately, or whether they are in fact preventing the markets from working even before crises arise.

The Spanish case study is relevant to California's current situation because the introduction of water markets to Spain was inspired by the California experience, particularly its water banks,¹² and also because of similar climatological challenges and geographical characteristics.¹³ Those familiar with the history of water markets in California or other western U.S. states will be able to identify, by comparison, the institutional strengths and weaknesses of the Spanish system, which will be explicitly addressed in Section II. The role the Californian experience played in the 1999 political debate on amending Spain's Water Law directly relates to the thesis this project is based upon: water markets require governmental involvement.¹⁴

¹² Inmaculada Gómez Mardones, *El Gobierno ultima una reforma legal que abre el camino a la compraventa del agua* [Government Finalizes Legal Reform Opening the Door for Water Sales], EL PAÍS, Jan. 26, 1997, http://elpais.com/diario/1997/01/26/sociedad/854233201_850215.html ("The water market was an initiative of the State of California. It worked only during a period of drought and allowed the purchase of water from farmers to meet urban water needs. However, the decrease in agricultural production activities caused losses in all the related economic sectors, such as the agricultural and fertilizer industry.").

¹³ Richard E. Howitt, *Empirical Analysis of Water Market Institutions: The 1991 California Water Market*, 16 RESOURCE & ENERGY ECON. 357, 357–71 (1994). ("Mediterranean water economies are characterized by the same problems and climate that face California, namely spatial and temporal inequalities of water."); see Inmaculada Gómez Mardones, *El PSOE planteará hoy al Gobierno su rechazo a los mercados de agua* [Spanish Socialist Workers' Party States its Opposition to the Government's Water Markets], EL PAÍS, Mar. 15, 1999, http://elpais.com/diario/1999/03/15/sociedad/921452410_850215.html; Juan Fernández-Cuesta, *El Mercado del Agua queda bajo control con un precio máximo de 60 pesetas por metro cúbico* [Water Market Stays Under Control with Maximum Price of 60 Pesetas per Cubic Meter], ABC, May 3, 1999, at 44 ("[T]here are water market experiences that have not worked well, like the Chilean experience, while others did, such as in California.").

¹⁴ See *Comparecencias de personalidades al objeto de informar sobre el Proyecto de Ley de modificación de la Ley 29/1985, de 2 de agosto, de aguas* [Testimony on the Proposed Modifications to the Water Law 29/1985 of August 2], 723 Diario de Sesiones del Congreso de los Diputados 20655, 20660 (1999) (statement of Pedro Arrojo, New Water Culture) [hereinafter *Hearings*]. For a comparison between Spain and California's water policies before the market amendments were introduced in Spain which highlights the similarities between both jurisdictions, see PEDRO ARROJO & JOSE MANUEL NAREDO, *LA GESTIÓN DEL AGUA EN ESPAÑA Y CALIFORNIA* [WATER MANAGEMENT IN SPAIN AND CALIFORNIA] 37 (1997).

I. ROLES OF GOVERNMENT IN WATER MARKETS: MARKET FAILURES AND BEYOND

Normative scholarship on water markets is divided between the free market environmentalists, who see direct government regulation and markets as mutually excludable,¹⁵ and those who are opposed to markets altogether because they reject the commodification of water.¹⁶ There are very few pieces that comprehensively analyze the requirements for a water market to actually work. The few works on these issues address the requirements for water markets in developing countries¹⁷ or include both natural conditions and governmental roles in their analyses of water market requirements.¹⁸ This Section identifies the roles that governments need to play for a water market to achieve the goal of more efficient water allocation in developed economies, using the economic theories of regulation that call for government intervention when there is a market failure,¹⁹ and

¹⁵ See TERRY L. ANDERSON & DONALD R. LEAL, *FREE MARKET ENVIRONMENTALISM: REVISED EDITION* (2001); ANDERSON, *supra* note 7, at 20–23; James L. Huffman, *Institutional Constraints on Transboundary Water Marketing*, in *WATER MARKETING: THE NEXT GENERATION* 31, 32 (Terry L. Anderson & Peter J. Hill eds., 1997); James E. Krier, *The Tragedy of the Commons, Part Two*, 15 HARV. J.L. & PUB. POL'Y 325, 328 (1992) ([Free-market environmentalists] hope to rely on the market more or less entirely and side-step the government just about altogether.); see also *id.* at 338 (arguing that Hardin, in the celebrated *Science* article, just takes government for granted without analyzing how it is compelled to take action).

¹⁶ See generally Michael C. Blumm, *The Fallacies of Free Market Environmentalism*, 15 HARV. J.L. & PUB. POL'Y 371, 372–73 (1992) (describing problems with commodifying environmental resources in private markets). For a review of the debate, see generally Norman W. Spaulding III, Note, *Commodification and Its Discontents: Environmentalism and the Promise of Market Incentives*, 16 STAN. ENVTL. L.J. 293 (1997) (discussing the positive and negative implications of commodification of environmental resources). For a general theory of market inalienability, see generally Margaret Jane Radin, *Market-Inalienability*, 100 HARV. L. REV. 1849 (1987) (describing inalienability and commodification in the context of social interaction).

¹⁷ See generally Bjornlund & McKay, *supra* note 7 (analyzing existing water markets in Australia, the United States, and Chile, with lessons for water markets in developing countries); Mateen Thobani, *Tradable Property Rights to Water: How to Improve Water Use and Resolve Water Conflicts*, PUB. POL'Y FOR THE PRIVATE SECTOR Mar. 1995, at 9 (describing the benefits of water markets and the requirements of water markets, including infrastructure, property rights, and government oversight).

¹⁸ See generally Janet C. Neuman, *Beneficial Use, Waste, and Forfeiture: The Inefficient Search for Efficiency in Western Water*, 28 ENVTL L. 919, 992 (1998).

¹⁹ See BARRY C. FIELD, *ENVIRONMENTAL ECONOMICS* 69 (1994) (discussing

assuming the remedy will not be worse than the disease.

There is no absolute consensus on what amounts to a market failure, but the most commonly mentioned reasons for intervening in markets based on a market failure are: the existence of a natural monopoly; undersupply of public goods; imperfect information; and uncompensated externalities.²⁰ Government intervention is also warranted to reduce transaction costs, which prevent otherwise beneficial transactions from going forward.²¹

The economic rationales for government intervention in markets may coexist with non-economic reasons for government action, such as redistribution of wealth or human rights concerns. These other grounds may explain deviation from the hypothetical ideal types of intervention described in this Section, which are based on market failures. Alternatively, these non-economic rationales may be served by the same actions but justified on the basis of efficiency. Justice Stephen Breyer, who wrote extensively about administrative law and government regulation of markets before joining the U.S. Supreme Court, argued that any non-economic theory can be channeled through market failure rationales.²² That is, the coexistence of different rationales does not necessarily mean conflict.

In the case of water, economic and non-economic rationales for government intervention may interact in a number of interesting ways because water has a special place in our societies, due to the social value in water allocation. Certain actions undertaken by the government in relation to water markets are not

the mismatch of social and market values once the environment is taken into account, and asserting that “[a market failure] will often call for public intervention, either to override the markets directly or to rearrange things so that they will work more efficiently”); DEBRA SATZ, *WHY SOME THINGS SHOULD NOT BE FOR SALE: THE MORAL LIMITS OF MARKETS* 32 (2010) (describing situations where markets fail to provide public goods).

²⁰ This list compiles the rationales enumerated by different scholars. See ROBERT COOTER & THOMAS ULLEN, *LAW AND ECONOMICS* 43–47 (5th ed., 2007); ROBERT L. GLICKSMAN & RICHARD E. LEVY, *ADMINISTRATIVE LAW: AGENCY ACTION IN LEGAL CONTEXT* 15–19 (2010).

²¹ Some economists include transaction costs among market failures. See David Levi-Faur, *Market Failures*, UNIV. OF HAIFA, <http://poli.haifa.ac.il/~levi/failure.htm> (last visited Mar. 3, 2014). Cf. COOTER & ULLEN, *supra* note 21, at 225 (analyzing transaction costs as imperfect contracts).

²² Cf. STEPHEN BREYER, *REGULATION AND ITS REFORM* 7–8 (1982) (arguing that an analysis based on market failures can cover all justifications for regulation, and that those who defend other justifications will arrive at the same conclusions as an economic analysis).

clearly aimed at efficiency. For example, compensating local communities for the effects of water sales might be the only avenue for completing the transaction while overcoming social unrest and avoiding a political price.²³ Portraying this as a transaction cost or as a solution to a market failure seems too great a stretch, despite the fact that its cost might be exceeded by the benefits of the transaction; as shall be seen, we do not consider this type of cost when analyzing the reallocation of other assets, such as a factory. In addition, certain decisions may be skewed when special interests lobby government. For example, in Idaho, farmers have priority to buy rights at the price set by the water agency before any other users.²⁴

Four conditions are commonly cited to justify government's role in markets: natural monopoly conditions, markets dealing with public goods, the existence of externalities, and the existence of transaction costs.²⁵ This paper will focus on the government's role

23 The well-known and controversial agreement between the San Diego County Water Authority and the Imperial Irrigation District (IID), reached initially in 1998, combined temporary fallowing with irrigation efficiency improvements, and included compensation for the effects on the local economy. The agreement was approved in 2002 by the IID Board of Directors. It contained a clause establishing \$20 million to mitigate third-party economic effects. See Ellen Hanak & Richard Howitt, *Incremental Water Market Development: The California Water Sector 1985–2004*, 30 CAN. WATER RESOURCES J. 73, 78–79 (2005). In 2001, Butte County in California accepted a fee of 5 percent, which amounted to \$3.75 per AF, to handle the associated mitigation costs of a water transfer. ELLEN HANAK, WHO SHOULD BE ALLOWED TO SELL WATER IN CALIFORNIA? THIRD-PARTY ISSUES AND THE WATER MARKET 72 (2003).

24 See James M. Capurso, *Achieving Instream Flows in Idaho, Case Studies and Recommendations* 18 (Nov. 2011) (unpublished Ph.D. dissertation, University of Idaho), available at http://www.kysq.org/docs/Capurso_InstreamFlows.pdf.

25 There is no unanimous list of market failures that identifies these four conditions as possibly impeding perfect competition in a market and consequently impeding the desirable outcome of general equilibrium, thus requiring corrective public policies. Some conditions commonly cited include: monopoly and market power; externalities; public goods; and informational asymmetries. See Levi-Faur, *supra* note 22. Levi-Faur includes, apart from public goods, information asymmetries, and externalities, natural monopoly, transaction costs or moral hazard. COOTER & ULLEN, *supra* note 22, at 225 do not include transaction costs directly, but they are the rationale behind the imperfect contracts that they analyze as a type of market failure. Finally, Gert Tinggaard Svendsen's classification of market failures, which focuses on CO₂ markets, lists political interference and differentiated products as market failures. However, I believe that these could be understood respectively as a governmental failure and a public good. GERT TINGGAARD SVENDSEN, PUBLIC CHOICE AND ENVIRONMENTAL REGULATION 48–49 (1998).

in defining property rights, reviewing water transactions to prevent uncompensated externalities, regulating water infrastructure, and fulfilling the role of market maker. The type and degree of government intervention in water markets is difficult to specify with precision, and some overlap exists between the roles for government justified by different failures in water markets. Government intervention to address water market failures might take different forms, from compulsory regulation to soft law, conveying appropriate incentives to private parties, or public agencies participating in the market. It is also important to distinguish between the government's roles that are pre-requisites for markets to exist, roles that are necessary for markets' operation, and roles that ensure water markets work well and achieve their goals.

The experience of current water markets and other environmental and non-environmental markets illustrates the proper degree of intervention by identifying different failures in each market. The following Sections analyze the roles that government needs to play in order to establish the baseline against which the Spanish government's roles in water markets will be assessed.

A. *Definition of Property Rights*

Like other markets, a water market requires enforceable and transferable property rights and the enforcement of contracts over these property rights. The definition of property rights is assumed to be a function of government; this is an uncontested role that all scholars accept.²⁶ Property rights, like any efficient legal system, are a public good,²⁷ and therefore they require some sort of

²⁶ See J. Mark Ramseyer, *Water Law in Imperial Japan: Public Goods, Private Claims, and Legal Convergence*, 18 J. LEGAL STUD. 51, 52, 75 (1989) (“[A] public order that enforces private agreements to respect resource claims is itself a public good. Critical as the public order is to economic growth, few people will have the incentive to create it.”); see also Manuel Schiffler, *Intersectoral Water Markets: A Solution for the Water Crisis in Arid Areas?*, in WATER: ECONOMICS, MANAGEMENT AND DEMAND 362, 365 (M. Kay, T. Franks & L. Smith, eds., 1997) (“Government regulation can help in reducing transaction costs by establishing and enforcing a clear framework.”); Francisco Campos-Ortiz et al., *Security of Property as a Public Good: Institutions, Socio-Political Environment and Experimental Behavior in Five Countries 2* (Inst. for the Study of Labor in Bonn, Discussion Paper No. 6982, 2012), available at <http://ftp.iza.org/dp6982.pdf> (“Well-functioning modern societies also assign much of the task [of protecting private property] to collective institutions . . .”).

²⁷ See Carol M. Rose, “Enough, and as Good” of *What?*, 81 NW. U. L. REV.

collective action to be established.²⁸ In the case of water markets, property rights are not defined in a stateless scenario but can, and probably must, profit from the existing governmental structures.

For a water market to work, the government entity defining property rights, or amending the current definitions, must establish a clear apportionment method in periods of scarcity and address both the security and tradability of the right. Here, I will focus on how these three dimensions—scarcity, security and tradability— affect the incentives to trade.

In certain scenarios there might not be enough water to satisfy every single right, such as a drought where sources are over-allocated.²⁹ If apportionment rules are not clear before the drought crisis emerges, or if these rules are easily overruled or disregarded, right holders will hesitate to enter into water transactions because they cannot rely on the availability of water to satisfy the rights they are leasing or buying.³⁰ Prior appropriation rules establish a priority according to the date the right was appropriated,³¹ but if the prior appropriation rules are disregarded,³² we cannot expect private parties to plan ahead on how to face the restrictions imposed. A similar situation emerges in systems where apportionment is left to the discretion of a managing agency, and particularly where that discretion is exercised on a case-by-case

417, 438 (1987) (“Thus, in some ways, it is the community of recognizers that gives content to ‘appropriation,’ and thus the community’s recognition of something as ‘property’ is an essential element of the property regime that is supposed to make us all better off. It is in this sense that property is a ‘public good,’ or perhaps more accurately a ‘common good,’ since the property regime ‘belongs’ in common to the community that follows its precepts.”); see also Jay B. Kesan & Rajiv C. Shaw, *Deconstructing Code*, 6 YALE J.L. & TECH. 277, 378–80 (2004) (listing property rights regimes and highways among the classic examples of public goods). A clear case for the public good nature is made in Ramseyer, *supra* note 27.

²⁸ See Carol M. Rose, *Property as Storytelling: Perspectives from Game Theory, Narrative Theory, Feminist Theory*, 2 YALE J.L. & HUMAN. 37, 48, 51 (1990).

²⁹ Lawrence J. MacDonnell, *Montana v. Wyoming: Sprinklers, Irrigation Water Use Efficiency and the Doctrine of Recapture*, 5 GOLDEN GATE U. ENVTL. L.J. 265, 266–67 (2012) (portraying the overallocation of the Tongue and Powder Rivers).

³⁰ See generally Thompson, *supra* note 9, at 119, 131.

³¹ For a general description of prior appropriation, see BARTON H. THOMPSON JR., JOHN D. LESHY & ROBERT H. ABRAMS, *LEGAL CONTROL OF WATER RESOURCES* 168–73 (2013).

³² This is the case in New Mexico, where the seniority of alfalfa farmers was not respected in the recent drought. See Felicity Barringer, *New Mexico Farmers Seek ‘Priority Call’ as Drought Persists*, N.Y. TIMES, Mar. 27, 2013, at A11.

basis under the duress of a drought.

Beyond the natural variability of a water supply, security is affected by the limits imposed on the decision-making capacity of the title holder when the limits are not fully triggered by objective, foreseeable factors and often involve some administrative discretion. If market tools are adopted, some common rules need to be repealed or amended, such as the forfeiture of unused rights,³³ designed to prevent ossification, and the beneficial use doctrine,³⁴ intended to improve efficiency. Otherwise, private parties may fear these provisions will be triggered and take away their rights, which will discourage transactions.³⁵

Tradability is the other dimension that governments need to tackle if water markets are to flourish. Both scarcity and security are inherently related to tradability because the absence of either may impair tradability in practice. Tradability, in rough terms, is the possibility of leasing or selling the right to use water to someone else. More restrictions on the parties who can lease or buy rights should translate to a less demanding review procedure, since externalities are prevented by not allowing transactions in the first place. If, however, review procedures are not less demanding, those trading restrictions may respond to political motivations that may be preempting market activity.

B. *Externalities*

“There is something inherently integrative about rivers. Their uses are, and must be, shared. Upstream uses affect downstream uses. Private uses affect public uses. Human uses affect natural river functions.”³⁶ In a water stream, each use is interconnected with others. For example, a farmer withdrawing water from a stream and irrigating her field may affect the downstream users of the same watercourse by sending more nutrients down the river in the runoff from her land.

³³ See THOMPSON, LESHY & ABRAMS, *supra* note 32, at 367.

³⁴ See *id.* at 268.

³⁵ See generally Thompson, *supra* note 9.

³⁶ Peter Rogers, Lawrence MacDonnell & Peter Lydon, *Political Decision Making: Real Decisions in Real Political Contexts*, in THE EVOLUTION OF WATER RESOURCE PLANNING AND DECISION MAKING 220, 241 (Clifford S. Russell & Duane D. Baumann eds., 2009). Accordingly, the same water can be a private, public, or toll good and different rights to use, access or transfer may interact. Lakes offer another example. See generally Brett M. Frischmann, *Environmental Infrastructure*, 35 ECOLOGY L.Q. 151 (2008).

We may assume that public agencies granting water rights take into account these interactions. In jurisdictions with common law rights, like prior appropriation regimes, new uses must not affect senior ones, and if this occurs, the senior water users may sue the newcomer and a sort of equilibrium will be established.³⁷ However, when a transaction occurs, the order is distorted and externalities abound.³⁸ A transaction modifies the amount of water and often the quality of water in a stream, which affects users in the same watercourse, fish and wildlife, and perhaps the community from which water is sold or leased, most often negatively.³⁹

Externalities are market failures in water markets if the parties to a transaction are not taking into account the whole social cost or benefit of their actions, i.e., the effects arising from the changes in water quantity or quality that their transfer introduces with respect to other users of the watercourse. It is a governmental function to ensure that these effects are internalized—for example, through the judicial system or administrative review proceedings—so that only beneficial transactions move forward.⁴⁰

The most obvious way to deal with externalities is to prevent them from arising. For instance, the transferability of rights can be limited according to private parties' past consumption, so that a user can only transfer the amount consumed on average for the last five years, which is almost always less than the actual amount diverted. As a result, the amount of water available in the river for other users will not change and fewer externalities should arise. However, this is not a perfect solution to internalize the negative externalities, as a potential change in the point of diversion may have harsh consequences for areas with lower water flow. And even if the amount transferred is limited to past consumption, water quality degradation could still occur, as there might be more concentration of pollutants or different components—especially if the type of use changes from an agricultural use to an industrial

³⁷ *Prior Appropriation Law*, COL. DIV. OF WATER RESOURCES, <http://water.state.co.us/surfacewater/swrights/pages/priorapprop.aspx> (last visited Feb. 28, 2015).

³⁸ ROBERT S. PINDYCK & DANIEL RUBINFELD, *MICROECONOMICS* 613 (7th ed. 2009). (“There is an externality when a consumption or production activity has an indirect effect on other consumption and production activities that is not reflected directly in market prices.”)

³⁹ See THOMPSON, LESHY & ABRAMS, *supra* note 32, at 308–09.

⁴⁰ *Id.* at 307–30.

one.

In the real world, Coasean bargaining between all actors is hardly imaginable: the multiple third parties affected by those changes in water quality and quantity are unlikely to bargain with the parties to the transaction to agree on compensation. Hence, market regulations should provide for a sort of mechanism to make sure that third parties are not negatively affected by the water transaction, or else that they are properly compensated. While the definition of property rights determines who has a right upon which others cannot encroach, and may help reduce the possibility of third-party effects and, thus, their assessment, externalities will still occur. Procedures to make sure they are internalized should be spelled out. Without these internalization mechanisms in place, water markets would not bring about a more efficient state of affairs than the status quo, since the non-internalized costs of a transaction could be greater than the private benefits that accrue to the parties to the transaction. These negative externalities could also affect the environment, where there may not be a clear right holder unless property rights over in-stream flows have been defined.

There are two decisions to be made regarding the review procedure for externalities: first, whether the review should occur before or after the transaction takes place; and second, which institutions are best suited to the task. The most common scheme has been an *ex-ante* administrative review procedure, which may authorize or bar the transaction.⁴¹ But this is not the only option. It is important to highlight that any mechanism for the review of these third-party effects entails transaction costs that burden transactions, even impeding them.⁴² Therefore, the procedure should be designed with an eye to minimizing its costs, because otherwise it may impose more costs than the harm prevented.

A compensation fund is possibly the least burdensome system for the parties to the transaction to address externalities.⁴³ But it

⁴¹ See R. Quentin Grafton et al., *An Integrated Assessment of Water Markets: Australia, Chile, China, South Africa and the USA* 13–14 (Nat'l Bureau of Econ. Research, Working Paper No. 16203, 2010), available at www.nber.org/papers/w16203.

⁴² See generally Bonnie G. Colby, *Transactions Costs and Efficiency in Western Water Allocation*, 72 AM. J. AGRIC. ECON. 1184 (1990) (discussing transaction costs in the California context).

⁴³ The California Model Transfer Act combines administrative review with other mechanisms such as funds. Brian E. Gray et al., *A Model Water Transfer Act for California*, 4 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 3, 7-15 (1996);

shifts the burden of proof to the affected third parties to prove loss.⁴⁴ Here, the background assumptions are that water transactions are beneficial, because they lower the water stress in certain areas, and that any negative externalities will be lower than the benefits. If a compensation fund is adopted, the procedure to claim compensation should be as streamlined as possible; government estimates should make compensation more mechanical and less discretionary. Such a system is advisable for short-term transactions or for situations where there are minimal effects expected.⁴⁵ Public agencies managing water systems are supposed to have a comparative informational advantage, and they should therefore be better positioned than courts to adjudicate these ex post claims.

For long-term transactions, an ex ante review procedure seems to be the most sensible solution to the problem of externalities.⁴⁶ Once again, agencies, and not general courts, have comparatively better institutional capabilities to oversee these procedures. Given that celerity is less of a concern because long-term transfers usually satisfy structural needs, the procedure can be an adversarial one, in which third parties can protest after proper notice. However, in the absence of third-party protests, the transaction should be considered approved after a reasonably fixed time even if there is no formal decision; such a scheme ensures that the agency will be diligent about the timeliness of its decisions. If a third party protests, the amount of compensation could be decided in this same forum.

Even though allocating water rights to in-stream flows or establishing mandatory in-stream flows⁴⁷ would make the handling of environmental externalities less of a concern because they will be protected like any other right holder, there might still be negative effects on the environment because, for example, the

reprinted in 14 HASTINGS W.-N.W. J. ENVTL. L. & POL'Y 591 (2008). For an economic analysis of these other methods to address externalities, see generally James J. Murphy et al., *Mechanisms for Addressing Third-Party Impacts Resulting from Voluntary Water Transfers*, in USING EXPERIMENTAL METHODS IN ENVIRONMENTAL AND RESOURCE ECONOMICS 91 (J. List, ed. 2007) available at faculty.cbpp.uaa.alaska.edu/jmurphy/research.html.

⁴⁴ Gray et al., *supra* note 43, at 14.

⁴⁵ *Id.* The fund and its streamlined procedure only apply to certain transactions defined in sections 501 and 506(d). *Id.* at 10.

⁴⁶ See, e.g., *id.* at 7.

⁴⁷ Mandatory in-stream flows are restrictions on existing water rights without an agency or private party holding a right to the water.

quality of the water may change if the buyer puts water to a different use. These need to be handled through the review procedures with the open-ended standards mentioned above, or through taxes and compensatory funds.⁴⁸ Some of the effects are very difficult to measure: for example, the effects on bird migration after substantial amounts of water have been transferred, drying up wetlands. Even though taxes might only be a rough estimate for the value of the negative externality, they would eliminate the uncertainty present in a review procedure that resorts to public interest standards.⁴⁹ Further, taxes provide resources that could be used for targeted interventions in the most critical areas. The disadvantage is that the specific effects of particular transactions might not be addressed case-by-case.⁵⁰ Taxes in the form of water left in the stream might be more closely tied to the particular transaction and its environment. This happens when users are not allowed to transfer 100 percent of their right but a smaller percentage to protect the flow.⁵¹ Both could be combined, but the risk of this approach is clearly the overburdening of efficient transactions.

Finally, there is discussion about whether externalities in rural communities where water is sold or leased should be compensated. Those externalities are particularly acute when water sold or leased is the result of fallowing the fields.⁵² Fallowing generates more

⁴⁸ See Gray et al., *supra* note 43. Section 404 of the Model Water Transfer Act shows that ex-ante review takes fish into account. *Id.* at 9. The Department of Fish and Game is one of the agencies that could potentially fail a claim for compensation. *Id.* at 13.

⁴⁹ CAL. WATER CODE § 1725 (West 2014).

⁵⁰ An experimental study that replicated many features of the California water network, using a computerized market with a uniform price but with differences introduced by conveyance costs, showed that a revenue tax is more efficient than a per-unit tax. See Murphy et al., *supra* note 43, at 101–03; see also *id.* at 108 (discussing the equity implications of cross subsidies from wet to dry years as a result of tax imperfections).

⁵¹ A security exchange rate of 0.9 has been established for water sales from South Australia to New South Wales or Victoria (downstream to upstream transactions). Thus a sale of 1m³ from South Australia would mean that the buyer in Victoria will receive 0.9 m³. *The Pilot Interstate Water Trading Project, MURRAY-DARLING BASIN COMM'N*, http://www.mdba.gov.au/sites/default/files/archived/mdbc-SW-reports/2221-fact_sheet-Pilot_interstate_water_trading_project.pdf (last visited Nov. 10, 2013).

⁵² California's agricultural sector has opportunities to reduce its water use without impairing its production. See HEATHER COOLEY, JULIET CHRISTIAN-SMITH & PETER GLEICK, SUSTAINING CALIFORNIA AGRICULTURE IN AN UNCERTAIN FUTURE (2009), available at <http://pacinst.org/wp-content/uploads/sites/21/2014/04/sustaining-california-agriculture-pacinst-full-report.pdf>.

externalities than other methods of saving water, such as implementing more efficient irrigation systems or shifting to less water-consuming crops because those do not imply that fewer outputs will be produced. Compensating the effects that transfers have on communities is not clearly supported by economic arguments, because the particularities that these sorts of pecuniary externalities present in the water realm do not seem to justify a different treatment than any other industry reallocation, such as a car manufacturer shifting its production to a developing country. The effects of unemployment and lack of economic vitality in the region are very similar. Nonetheless, if fallowing is allowed, compensation may become necessary on political grounds because the effects on non-right holders are expected to be higher and the opposition to transactions may be difficult to handle.⁵³ This might be the case particularly in early market stages because of distrust and fear of markets due to lack of experience. In any case, if it is decided politically that these community effects need to be compensated, temporary subsidies are the appropriate solution to compensate for the non-pecuniary externalities: these subsidies will ensure transition to other economic activities, will lower transaction costs, and can be funded through transaction taxes.⁵⁴ If only the most egregious cases are to be addressed, the suitable measure is most likely a negotiated agreement.⁵⁵ One example of a mechanism that may foster such agreements is found in California, where the regulations provide that if more than 20 percent of the water from an area is transferred, hearings must occur,⁵⁶ possibly making bargaining easier.

C. *Management of Water Transportation Infrastructure*

Transportation and distribution refer to the activities of moving, carrying, shipping, and delivering water, connecting water sources to consumers. Without some physical transferability, water

All across Europe, agricultural water savings are possible too. See THOMAS DWORAK ET AL., EU WATER SAVING POTENTIAL 6 (2007), available at http://ecologic.eu/download/projekte/900-949/917/917_water_saving_1.pdf.

⁵³ Murphy et al. acknowledge the controversies regarding the definition of pecuniary externalities and accept that it is politically necessary to take them into account, but conceive of compensation in such cases as transitional; that is, funds allocated to mitigate these issues should be temporary in order to encourage efficient behavior. See Murphy et al., *supra* note 43 at 110.

⁵⁴ See *id.*

⁵⁵ For an example, see *supra* note 24 and accompanying text.

⁵⁶ CAL. WATER CODE § 1745.05 (West 2014).

markets cannot exist. While natural gas and electricity must be transported in human-built infrastructure, water can be transported in natural infrastructure, such as streams and rivers.⁵⁷ However, water mobility may still require transportation infrastructure to complement natural streams. Canals and pipes are thus essential for a water market; they have no close substitute.

It is very important to have human-built connections between users with different valuations of water, as they may or may not be along the same river. Different marginal values may exist between two neighboring farmers, but they are more likely to exist between two areas with different climatological characteristics—for example, the humid North and the arid South, as is the case in both California and Spain. Markets are expected to price water according to its real value,⁵⁸ and so high cost suppliers will enter a market when the price rises due to scarcity; these high cost suppliers will likely be those that are further away from the buyer.⁵⁹ For the purposes of the water market as defined in this Article, the important infrastructure is the large-scale infrastructure

⁵⁷ Mateen Thobani, *Formal Water Markets: Why, When and How to Introduce Tradable Water Rights*, in 12 THE WORLD BANK RES. OBSERVER 161, 172 (1997) (arguing that markets require more complex infrastructure than administrative systems, and that for a water market to succeed, infrastructure in place has to be flexible). Natural waterways connect a watershed, which makes a market within this scope easier to implement. See Scott S. Slater, *A Prescription for Fulfilling the Promise of a Robust Water Market*, 36 MCGEORGE L. REV. 253, 269–70 (2005) (acknowledging that most of the trading occurs intra-basin and conveyance is necessary for inter-basin transfers not connected by natural streams). It is convenient to briefly refer here to California’s regulation of natural waterways. The duty of the commingler is regulated in section 7075: “Water which has been appropriated may be turned into the channel of another stream, mingled with its water, and then reclaimed; but in reclaiming it the water already appropriated by another shall not be diminished.” WATER § 7075; see also Slater, *supra*, at 268. Agents’ use of natural waterways to transport water is subordinated to the “no injury” rule. Regarding quantity, the duty of the commingler using the channel entails that it cannot impair others’ rights. However in time of shortage, the position of the commingler is much more uncertain than the autochthonous ones since the presumption goes against her: if there is not enough water, the first use to be curtailed would be her’s. *Id.*

⁵⁸ See ANDERSON & LEAL, *supra* note 16, at 14–17.

⁵⁹ See Jon Stern, *Introducing Competition into England and Wales Water Industry: Lessons from the UK and EU Energy Market Liberalisation* (City Univ. Dept. of Economics, CCRP Working Paper No. 13, 2010), available at https://www.city.ac.uk/_data/assets/pdf_file/0012/81030/stern_introducing_competition.pdf. The key question is whether there is enough interconnection to equalize marginal prices. It is logical to think that the more far away regions are, the more their climate patterns will vary. Differences in marginal value of water can be expected to increase as distance increases. See *id.*

connecting low value sources, like farmers' water sources, to high value users like urban suppliers, farmers producing high-value crops, and industries. The urban water grid is not relevant here, because urban consumers are not expected to exchange water with each other. When it comes to a water market, the management of water infrastructure poses challenges because large-scale water infrastructure is a natural monopoly.

Historically, water infrastructure was publicly built to satisfy constituencies settled in areas where water was not readily available, and infrastructure design did not take water markets into account. Dams and canals in California predate the markets' surge. For example, the Central Valley Project was initially authorized in 1935, and is owned by public agencies.⁶⁰ But existing infrastructure might not be enough to satisfy the needs of a water market.⁶¹

Given the nature of infrastructure as a natural monopoly,⁶² it is important to ensure that the infrastructure is open for third-party use, as the movement toward competition in other sectors has

⁶⁰ See *Central Valley Project and State Water Projects Canals*, U.S. BUREAU OF RECLAMATION (Mar. 26, 2009), http://www.usbr.gov/projects/ImageServer?imgName=Doc_1238104613478.pdf (mapping the canals in California).

⁶¹ It is often claimed that government needs to provide water infrastructure based on the idea that it is a sort of public good. Bjornlund & McKay, *supra* note 7, at 791. This often builds on the misconception of water infrastructure as a public good, despite the fact that it is excludable. I am not going to discuss the nature of this misconception, or even the difference between the social perception and the economic conception of a public good. Suffice it to say now that if water were a public good, there would be no monopoly problems since whoever manages the infrastructure would not be able to exclude the potential other users. Cesari Dosi & K. William Easter, *Market Failure and Role of Markets and Privatization in Alleviating Water Scarcity*, 26 INT'L J. PUB. ADMIN. 265, 270 (2003).

⁶² HAL VARIAN, INTERMEDIATE ECONOMICS 435–37 (9th ed., 2014) (stating that natural monopolies arise “where there are large fixed costs and small marginal costs . . .”). According to this traditional definition, economies of scale (which decrease average costs) are a sufficient condition for a monopoly. Water infrastructure presents the cost structure of a natural monopoly as many large infrastructures for network industries do. Water infrastructure is precisely the example used to illustrate natural monopoly in *The Economist's* definition. *Economics A-Z*, THE ECONOMIST, <http://www.economist.com/research/Economic/s/searchActionTerms.cfm?query=natural+monopoly> (last visited Nov. 11, 2013). Water is difficult and more expensive to transport than gas or power: the costs of transporting it 100km represents about 50 percent of the wholesale cost of water, while the equivalent cost is 2.5 percent for natural gas and 5 percent for electricity. See Stern, *supra* note 59, at 120, 124.

suggested.⁶³ There are many theories about how the problem of a natural monopoly should be dealt with. The most common solution is to impose a common carrier duty to the owner or manager of the infrastructure.⁶⁴ However, even with that duty in place, there might be room for discrimination, because the owner of the infrastructure may want to disadvantage those who want to ship water if she is shipping her own water and selling it to the very same buyers. One way to discriminate against those users is by setting rates that are unduly high. One way, albeit imperfect, of preventing those abuses is by setting an infrastructure-wide use rate, but this requires the government to have a lot of information to ensure that the return on investment is appropriate.⁶⁵ In addition, the government will need to establish standards for when owners can deny use requests when there is spare capacity.⁶⁶

Some or all of these functions can be achieved by adopting a pooling model, which also saves on transaction costs because private parties can deal with a single entity to use the water infrastructure, instead of multiple owners where infrastructure projects are owned by different agents. Such a system requires an operator who compensates the owners and makes adjustments in the delivery pathways to increase the efficiency of the system.⁶⁷ The advantages and disadvantages of a pooling model compared to a bilateral bargaining model will be jurisdiction-contingent depending on how many connection infrastructures there are and who the owner is.⁶⁸

D. Market Maker Role

Beyond the proposed government roles just outlined, which respond to traditional market failures, further government action is

⁶³ Richard J. Pierce, Jr., *The State of the Transition to Competitive Markets in Natural Gas and Electricity*, 15 ENERGY L. J. 323 (1994).

⁶⁴ TONY BALANCE ET AL., INNOVATION, INCENTIVES AND COMPETITION; A NEW DEAL FOR THE WATER INDUSTRY (2009).

⁶⁵ For a basic overview of the price regulation of monopolies, see PAUL KRUGMAN & ROBIN WELLS, MICROECONOMICS 374 (2008).

⁶⁶ Brian E. Gray, *The Shape of Transfers to Come: A Model Water Transfer Act for California*, 4 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 23, 33 (1996).

⁶⁷ This operator is similar to an Independent System Operator in the electricity market. See, e.g., ISO NEW ENGLAND, <http://www.iso-ne.com/> (last visited Feb. 28, 2015).

⁶⁸ For a general analysis of when pooling is necessary, see Sarah Hollinshead, *Water Is Not Liquid: Securitization, Transaction Costs, and California's Water Market*, 33 COLUM. J. ENVTL. L. 323 (2008) (documenting the discussion of a pooling system in California).

required to actually bring about water markets and decrease transaction costs. In order for water markets to take off, operate smoothly, and become entrenched, the government must adopt four “market maker” roles: providing information to facilitate matches between buyers and sellers, proactively matching buyers and sellers, making rights fungible by acting as an intermediary, and guaranteeing certain transactions. The four roles are intertwined, and the ability to undertake one builds upon the others. For example, playing the function of a broker by matching buyers and sellers is closely related to the more traditional governmental function of registering rights; the registration of rights likewise relates to the provision of information, because public agencies have access to records about rights and potential restrictions on them.⁶⁹

Many of these roles are justifiable as a way to reduce transaction costs, ensuring that the market works effectively and increasing its activity. Transaction costs are the costs of reaching and enforcing agreements,⁷⁰ and they may prevent otherwise efficient exchanges from taking place.⁷¹ Hence, any action directed toward reducing these costs is welfare-enhancing if it reduces more costs than it entails. Costs can be divided into three types: “(a) the costs of locating and attracting potential trading partners and of pre-sale inspection; (b) contracting and fulfillment costs; [and] (c) policing and enforcement costs.”⁷² Transaction costs abound in economic transactions outside the world of blackboard economics and, in fact, regulation is a source of them.⁷³ It is important to note that transaction costs, and thus the roles defined here, are contingent upon the regulation in place, the market structure, and the existence of private parties working as intermediaries, among other things. When choosing between the

⁶⁹ Cameron Hepburn, *Environmental Policy, Government, and the Market*, 26 OXFORD REV. OF ECON. POL’Y 117, 121 (2010). However, when ranking the different degrees of governmental involvement, the provision of certain information by government ranks second, just after the free market provision—mainly due to externalities.

⁷⁰ There are different traditions in the definition of transaction costs: monetary, relational, or institutional. See M. Klaes, *History of Transaction Costs*, in THE NEW PALGRAVE DICTIONARY OF ECONOMICS 364 (Steven N. Durlauf & Lawrence E. Blume eds., 2008).

⁷¹ For a general overview of transaction costs, see KRUGMAN & WELLS, *supra* note 65, at 438–439.

⁷² Klaes, *supra* note 70, at 3.

⁷³ RONALD H. COASE, THE FIRM, THE MARKET, AND THE LAW 28–30 (1990).

different roles available to the government, the decision should be specifically aimed at minimizing transaction costs.

As has been widely studied in relation to land titling, registering existing rights is instrumental for a market to become entrenched because parties can then rely on their counterparties' rights.⁷⁴ This might be necessary in water if rights are badly recorded or not recorded at all; once water rights are recorded, they are backed at least to some extent by the certifying agency. Similarly, agencies allocating water rights and holding water rights themselves perform a guaranteeing function when they assume the role of a broker coupled with actually acquiring and reselling the rights.⁷⁵

In addition, water market participants need information, and public agencies are the parties in the best position to provide information about rights, potential trading partners, water availability, and past transactions.⁷⁶ A related role is the role of matchmaker, such as the 1991 California Water Bank.⁷⁷ As matchmaker, government acts not only as a clearing house but buys and sells water, thereby backing the transactions taking place.⁷⁸ Particularly in the early stages of the market, the existence of a water bank may change the game, building trust in the market as a management tool to cope with scarcity and drought. It may let private parties learn that they do not need to fear market transactions and reinforce the idea that if they participate in transactions their underlying rights will not be affected.

Governmental action must ideally not only improve the overall social benefit—that is, reduce more costs than it imposes—but also entail lower costs than the same actions undertaken by private parties. Many, if not all, of the market maker functions

⁷⁴ Benito Arruñada, *Institutional Support of the Firm: A Theory of Business Registries*, 2 J. LEGAL ANALYSIS 525, 526 (2010). For a comprehensive study on land and commercial registries, see BENITO ARRUÑADA, INSTITUTIONAL FOUNDATIONS OF IMPERSONAL EXCHANGE THEORY AND POLICY OF CONTRACTUAL REGISTRIES 3–4 (2012).

⁷⁵ See, e.g., Hollinshead, *supra* note 68, at 350 (discussing water markets in California).

⁷⁶ See, e.g., Brandon Winchester, *An Institutional Framework for a Water Market in Elephant Butte Irrigation District*, 49 NAT. RES. J. 219, 242 (2009) (describing an Agency recommendation that an irrigation district create a bulletin board with price and market information to facilitate trading).

⁷⁷ CAL. DEPT. OF WATER RES., THE 1991 DROUGHT WATER BANK 1 (1992), available at http://www.water.ca.gov/waterconditions/docs/10_1991-water_bank.pdf.

⁷⁸ *Id.*

listed, like the matching function, do not necessarily need to be performed by government. As other markets show, brokers could perfectly well fulfill the role of matching buyers and sellers, for example.⁷⁹ Thus, governmental action would only be justified if it has a comparative advantage over the action of private parties. Agencies benefit from economies of scope if there is something to be gained from the integration of different activities, like the brokerage and review functions, and therefore where government has a comparative advantage. These same economies of scope apply in other ways, such as offering guidelines to calculate past consumption if the transferable amount is based on past consumption. There are economies of scope because the agency may need those types of calculations to prepare the water plan. Those guidelines could serve to streamline the review procedure because parties following the administration's calculations should have their transactions authorized.⁸⁰ The economies of scope are even greater if these functions can be combined with the management of water infrastructure.⁸¹ Private brokers would not be able to substitute the role of the agency in the review of the transaction because it is the responsibility of the agency to take care of the public interest and third-party rights in the majority of jurisdictions. Private brokers therefore would not be able to offer the same sort guarantee, because the agencies are usually the ones who have the power to affect the rights if, for example, they are not being used efficiently.

II. INTRODUCTION TO THE SPANISH CASE STUDY

Spain's water regulations can be traced back to Roman law.⁸² Spain first introduced market mechanisms in December 1999 to alleviate the structural or temporary mismatch between supply and

⁷⁹ This is the case of the car insurance market, for example, where brokers may pool information about different insurance companies to select the option most suitable for a customer.

⁸⁰ Technology that provides technical information and forecasts about water markets is similar to water infrastructure, in the sense that it conforms to a natural monopoly framework. For a general analysis of how technology in measurement impacts water property rights, see Robert B. Naeser & Mark G. Smith, *Enforcing Property Rights in Western Water: Is it Better to Be Upstream with a Shovel or Downstream with a Model?*, in THE TECHNOLOGY OF PROPERTY RIGHTS 49 (Terry L. Anderson & Peter J. Hill eds., 2001).

⁸¹ See Hollinshead, *supra* note 68, at 351.

⁸² See DANTE A. CAPONERA, PRINCIPLES OF WATER LAW AND ADMINISTRATION 46 (2007).

demand.⁸³ These market tools coexist with the pre-existing administrative scheme, born of the Water Act of 1879 and entrenched by the 1985 Water Act.⁸⁴ The following Sections will describe the distribution of powers over water allocation in Spain.

A. *Distribution of Powers Over Water Allocation*

The distribution of power over water allocation depends on whether the river basin is located entirely within one region or located across regions. Water management comes under the power of the central government when the river basin is shared by different autonomous communities, which are politically decentralized units or regions.⁸⁵ If water is within the territory of only one region, the autonomous community has the power to manage the resource itself, although the main regulatory framework is set by the central government.⁸⁶ There are eighteen River Basin Authorities (RBAs, or *Organismos de Cuenca*) in Spain.⁸⁷ There are eleven interregional RBAs covering river basins in multiple autonomous communities—some of which are shared with other countries⁸⁸—and seven regional RBAs within the

⁸³ The preamble of the 1999 law highlights the country's experience during the intense drought of the 1990s as the motivating factor for the legislation, and identifies the aims of the law as enhancing efficiency and optimizing the social utility of a scarce resource. Modification of the Water Act (B.O.E. 1999, 298).

⁸⁴ This 1879 Act was the first attempt to comprehensively regulate water management, and stayed in place until it was replaced in 1986 by the Water Act. Water Act (B.O.E. 1985, 189). The Water Act largely maintained the main principles of the 1879 regulation. Even though the 1985 Water Act's spirit is still in force, it was amended in 1999. Modification of the Water Act (B.O.E. 1999, 298). It was altered again in 2001, when the Consolidated Water Act was issued to give coherence to the patchwork of water regulation that had emerged in the previous fifteen years. Consolidated Water Act (B.O.E. 2001, 176).

⁸⁵ CONSTITUCIÓN ESPAÑOLA, B.O.E. n. 149.22, Dec. 29, 1978. *See also* Consolidated Water Act art. 22 (B.O.E. 2001, 176).

⁸⁶ CONSTITUCIÓN ESPAÑOLA, B.O.E. n. 149.22, Dec. 29, 1978.

⁸⁷ *See* Consolidated Water Act art. 22 (B.O.E. 2001, 176). The European Water Framework Directive also adopted a basin-level approach for water management. *See* Directive (EC) 2000/60, 2000 O.J. (L 327) 3, 4 [hereinafter Water Framework Directive].

⁸⁸ The nine interregional RBAs are Miño-Sil, Cantábrico, Duero, Ebro, Guadalquivir, Guadiana, Júcar, Segura, and Tagus. *See*, Demarcaciones Hidrográficas, HISPAGUA, <http://hispagua.cedex.es/instituciones/demarcaciones> (last visited Apr. 17, 2015). There are also two basins shared with Morocco, corresponding to the cities of Ceuta and Melilla. *Id.* Ebro's RBA was the first that implemented an online register. *See* *Consultar Registro de Aguas*, CONFEDERACIÓN HIDROGRAFICA DEL EBRO, <http://iber.chebro.es/webche/raCriterios.aspx> (last visited Feb. 17, 2015). This operation is subsidized by the Ministry of the Environment through the "Alberca" program. MINISTERIO DE

boundaries of a single autonomous community.⁸⁹

The RBAs managing interregional basins are known as watershed confederations (CHs, or *Confederaciones Hidrográficas*).⁹⁰ Cooperation between different jurisdictions and layers of government is essential to water management because basins are an additional institutional level superimposed on the general existing political divisions.⁹¹ The composition of each CH ensures participation by a broad range of stakeholders, ranging from users to different levels of local and national government.⁹² The main power is retained by the central government, as it controls an effective majority of representatives on the different decision-making boards. The control of these organs is a relevant point because the boards approve private contracts transferring water rights,⁹³ determine the procedures to approve transactions, and decide whether to establish exchange centers once the central government has given its approval to the establishment of those centers.⁹⁴

Regulation by the central government sets the basic framework for water management for all of RBAs.⁹⁵ The Spanish Constitution gives the central government the power to establish the basic regulations regarding administrative agencies, the public property regime over water, and certain water law principles that the autonomous communities and the RBAs have to respect.⁹⁶ The public property nature of water is not a minor issue because it implies that the right to use water must be acquired through a

AGRICULTURA, ALIMENTACIÓN Y MEDIO AMBIENTE, <http://www.magrama.gob.es/es/agua/temas/concesiones-y-autorizaciones/uso-privativo-del-agua-registro-del-aguas/alberca/>.

⁸⁹ The seven regional RBAs are Andalusia-Atlantic, Andalusia-Mediterranean, Balearic Islands, Basque Country, Canary Islands, Catalonia, and Galicia. *Demarcaciones Hidrográficas*, *supra*, note 88. There has been a bit of fluidity regarding the configuration of basins. Some regions have defined as intra-regional areas which before were considered inter-regional. Despite the fact that basin should be a scientific concept, it has been politically twisted.

⁹⁰ Consolidated Water Act art. 22.1 (B.O.E. 2001, 176).

⁹¹ *Id.* art. 21.

⁹² *Id.* art. 27. The central government has five representatives on the Board and appoints the Board President. *See id.* art. 29. Users only control one-third of the seats at most, and autonomous communities and provinces will have a number of seats according to their population and territory covered by the basin. *See id.* arts. 31, 32, 35, 36.

⁹³ Consolidated Water Act art. 68 (B.O.E. 2001, 176).

⁹⁴ *Id.* arts. 68, 69, 72.

⁹⁵ *Id.* arts. 14, 18.

⁹⁶ CONSTITUCIÓN ESPAÑOLA, B.O.E. n. 149.22, Dec. 29, 1978.

permit and cannot be privatized by the autonomous communities.⁹⁷

Apart from the levels of government already mentioned, it is useful to highlight several other institutions that play a significant role in water allocation. First, it is important to emphasize that urban water distribution is the responsibility of the local municipal governments.⁹⁸ Thus local governments may decide to take it upon themselves to distribute water or outsource it to a private company. Urban water suppliers are expected to be buyers in the market, but they may also be sellers. Second, irrigation communities—organizations formed by farmers that pool resources from participating farmers and distribute water among them—play a very important role because they hold the right and supply water to individual farmers.⁹⁹ We expect them to be sellers. Apart from being potential participants in the market and the transmission chain between end users and the market, irrigation communities can also be a forum for an internal market between their members.¹⁰⁰ However, the internal transactions of allocations by the irrigation community are not the focus of this Article because there is no data available to track allocations, and because they have not contributed to solving the structural scarcity problem even though they were taking place before formal water markets were introduced.

B. *General Overview of the Property Rights Over Water*

As has been stated, the Spanish water regime is a public property one.¹⁰¹ All water resources are public property, and are thus under the dominion of the state as established in article 1.2 of the Water Act¹⁰² according to article 132.2 of the Spanish

⁹⁷ *Id.* n. 132.1; Consolidated Water Act arts. 1, 18, 59 (B.O.E. 2001, 176).

⁹⁸ Consolidated Water Act art. 25.2(*l*) (B.O.E. 2001, 176); Local Government Law (B.O.E. 1985, 80).

⁹⁹ Consolidated Water Act arts. 55.4, 61.4 (B.O.E. 2001, 176).

¹⁰⁰ Public Water Domain Regulations (B.O.E. 1986, 103).

¹⁰¹ Under the 1879 Water Act, Spain allowed water to be owned as private property, albeit infrequently; a private property right in water also existed in other Civil Law countries, after the French model. *See* CAPONERA, *supra* note 82, at 69; *see also* GASPARIÑO, LEYES DE AGUAS Y POLÍTICA HIDRÁULICA EN ESPAÑA (1999) (offering an overview of the development of water regulation in Spain).

¹⁰² “Surface continental water, removable groundwater, which both form the hydrologic cycle, are a unitary resource subordinated to the public interest part of the state public property as hydrologic public domain.” *See* Water Act preamble (B.O.E. 1985, 189).

Constitution.¹⁰³ Water is allocated to individual users mainly through administrative permits (*concesiones*).¹⁰⁴ These permit rights are the rights I will primarily focus on, since they are the object of the market regulations. There are sometimes other types of tradable rights, subject to certain limitations, but these are less quantitatively significant. They are historical private property rights and quasi-permit rights in certain irrigable areas recognized as “areas of public initiative” (i.e., irrigation areas developed by governmental authorities).¹⁰⁵

1. *Permits for Water Use*

Permits are required for both surface water and groundwater. These administrative permits give their recipients the right to use water. The RBAs grant permits on a discretionary basis, taking into account water availability¹⁰⁶ and the type of use it will be devoted to, since the issuance of permits has to respect the ranking of uses established in the River Basin Hydrologic Plan.¹⁰⁷ The permit application procedure is quite cumbersome and may require input from potentially affected users, the autonomous communities’ government in the area where the applicant is located, and irrigation communities.¹⁰⁸ Furthermore, if there is a pool of competing applicants, the applicant proposing the most efficient use of water will be preferred.¹⁰⁹

Permits are granted to individual users, companies supplying urban areas, irrigation communities,¹¹⁰ or private companies that

¹⁰³ “Assets under the state’s public property shall be those established by law and shall, in any case, include the foreshore beaches, territorial waters and the natural resources of the exclusive economic zone and the continental shelf.” *See* CONSTITUCIÓN ESPAÑOLA, B.O.E. n. 131.2, Dec. 29, 1978.

¹⁰⁴ Consolidated Water Act art. 59 (B.O.E. 2001, 176). However, there are exceptions to this rule since some private use permits are statutorily granted. Basically, article 54 of the Consolidated Water Act establishes that without being granted a concession, an owner of a piece land can scoop rainfall water, can use water trapped on it, and can exploit up to 7000 m³ from a spring or a well. Consolidated Water Act art. 54 (B.O.E. 2001, 176).

¹⁰⁵ Law Adopting Urgent Measures to Regulate Water Rights and Transactions (B.O.E. 2005, 301).

¹⁰⁶ Consolidated Water Act art. 59.4 (B.O.E. 2001, 176).

¹⁰⁷ *Id.* art. 60.1.

¹⁰⁸ Public Water Domain Regulations arts. 109, 110 (B.O.E. 1986, 103).

¹⁰⁹ Consolidated Water Act art. 79.2 (B.O.E. 2001, 176).

¹¹⁰ *Id.* art. 61.5. *See id.* arts. 81–92 (establishing the structure and powers of the community of users). Farmers within a certain area form *comunidades de regantes* for irrigation purposes, which self-regulate but must have their organic charters and norms approved by the basin administration. *Id.* Nevertheless,

supply irrigation water to farmers.¹¹¹ Communities of users can also be formed by individuals who hold their own water rights,¹¹² such as groundwater users who may have to form a community if their groundwater basin is overexploited or at risk of being so.¹¹³

Permits are defined according to different variables: term or length, maximum volume of flow, season of use (if it is a discontinuous use permit), equivalent average volume of flow, and location where it is to be used.¹¹⁴ If the permit is for irrigation, the permit will also establish the acreage to be irrigated, the location, the maximum flow to be diverted per acre per year, or the maximum flow per month.¹¹⁵ Any change to be introduced to these variables requires approval by the issuing institution, the RBA.¹¹⁶ It is common for farmers to receive water from an irrigation community, so both institutional actors and individual farmers holding rights could enter the market. Potentially, those farmers holding just a share could also enter the market if such an entitlement were to be made tradable. But they may need the approval of their irrigation organization. In any case, this link to the land does not prevent the lease of water to other agricultural land or urban user outside the agricultural area.¹¹⁷

Water for urban users is generally provided through a system of distribution with two phases. First, a company, either publicly or privately owned, holds the permit and brings water to the cities; second, another agency or company, again either public or private, distributes it to end users.¹¹⁸ Sometimes these phases are integrated. As stated, urban supply is under the power of the municipality, which chooses the system of management of the water supply system: private, public, or mixed.¹¹⁹

article 81 of the Consolidated Water Act imposes hurdles to the Administration's review since it requires a ruling from an advisory board within the central government in order to make a change. *Id.* art. 81.

¹¹¹ *Id.* art. 62.

¹¹² *Id.* art. 81.

¹¹³ *Id.* art. 56.

¹¹⁴ Public Water Domain Regulations art. 102 (B.O.E. 1986, 103).

¹¹⁵ *Id.*

¹¹⁶ Consolidated Water Act art. 64 (B.O.E. 2001, 176).

¹¹⁷ *Id.* arts. 61.2, 67.

¹¹⁸ Local Government Law arts. 25.2(e), 85 (B.O.E. 1985, 80). Article 25.2(e) enumerates water supply as one of the services that municipalities have to provide and article 85 enumerates the different structures such supply may take.

¹¹⁹ *Id.*

Each permit is restricted to a certain use.¹²⁰ The allowed use has important implications for water management, since the ranking of uses will determine where to allocate water in the case of competing, incompatible applications.¹²¹ Each of the RBAs can set up its own ranking system or use the central government's default ranking.¹²² Either way, the highest rank must be granted to household uses.¹²³ Rankings affect market transactions because, as will be described, users can only trade with right holders whose use is ranked equally or above the seller's.¹²⁴ The ranking of uses is not equivalent to the temporary priority of a prior appropriation system by law, and does not have the automatic effect of spreading the consequences of low water availability during drought seasons. However in practice, in emergency drought decrees and in Drought Preparedness Plans enacted by each RBA, household and urban uses take priority¹²⁵ and will hardly ever suffer cuts. Despite the fact that agricultural use ranks second in several River Basin Hydrologic Plans,¹²⁶ irrigation is usually the first to suffer cuts in times of low water availability.

The permit does not entitle the grantee to the volume there allocated; instead, the actual volume received will depend on water availability at any given time.¹²⁷ In addition, the public quality of water implies that the administrative agencies have important powers over its use. For instance, a CH may require a permit holder to substitute the water it normally uses for water from another source under conditions that may or may not amount to an

¹²⁰ Consolidated Water Act art. 59 (B.O.E. 2001, 176).

¹²¹ *Id.* art. 60.1.

¹²² *Id.* art. 60.

¹²³ Interview with Gabriel Borràs, Head of the Climate Change Office at the Catalan Ministry for the Environment and former Catalan Water Agency Supply Management Office (July 2, 2012). Borràs criticized the fact that all urban users are given priority despite not all uses being essential for survival.

¹²⁴ Consolidated Water Act art. 67.1 (B.O.E. 2001, 176).

¹²⁵ MINISTERIO DE MEDIO AMBIENTE, PLAN ESPECIAL DE ACTUACIÓN EN SITUACIONES DE ALERTA Y EVENTUAL SEQUÍA CUENCA DEL GUADALQUIVIR [SPECIAL PLAN FOR ALERT AND DROUGHT SCENARIOS IN THE GUADALQUIVIR BASIN] 104 (2007), available at http://www.juntadeandalucia.es/medioambiente/web/Bloques_Tematicos/agencia_andaluza_agua/gestion/infosequia/planes_especiales_sequia/distrito_hidrologico_guadalquivir/Plan0_1.pdf [hereinafter SPECIAL PLAN IN THE GUADALQUIVIR BASIN].

¹²⁶ *Id.* at 104; AGENCIA CATALANA DE L'AIGUA, PLA DDE GESTIÓ DE SEQUERES, DOCUMENT PRELIMINAR [DROUGHT MANAGEMENT PLAN, PRELIMINARY REPORT] 21–22 (2009), available at <http://www.cuadll.org/modules/home/files/2rgt2009.pdf>

¹²⁷ Consolidated Water Act art. 59.2 (B.O.E. 2001, 176).

emergency.¹²⁸ For example, during the 2008 drought, the Catalan RBA considered substituting irrigators' water from the Llobregat River for recycled water, but after resistance from stakeholders they ultimately opted for other measures.¹²⁹

Public planning for water shortages is necessary in an administrative system because it allows private users to plan ahead for drought periods without fearing unexpected discretionary decisions by the authorities. However, it is impossible to know whether the RBAs or the governments will uphold the Drought Preparedness Plans in an emergency, because these plans have only been in place since 2007.¹³⁰ Before then, drought responses were ruled by emergency decrees,¹³¹ and no new droughts have been experienced in the territory since the implementation of the Drought Plans.¹³² However, urban areas do not have an incentive to turn to the market to secure water supplies for times of low water availability because of the protection offered to urban uses by both emergency decrees¹³³ and drought planning.¹³⁴

¹²⁸ Consolidated Water Act art. 61.3 (B.O.E. 2001, 176).

¹²⁹ Reutilization is a strategy still in its infancy in Spain. It is still difficult to ensure the standards in quality or temperature required by the different uses. Interview with Gabriel Borràs, *supra* note 123.

¹³⁰ Interregional drought plans were approved by the central government. Orden Ministerial MMA/698/2007 (B.O.E. 2007, 7).

¹³¹ MINISTERIO DE AGRICULTURA ALIMENTACIÓN Y MEDIO AMBIENTE, MEDIDAS LEGISLATIVAS Y NORMATIVAS [LEGISLATIVE AND NORMATIVE MEASURES], available at http://www.magrama.gob.es/es/agua/legislacion/Medidas_Legislativas_tcm7-197416.pdf (listing the twenty three decrees—eighteen from the central government, four from the autonomous regions and one local—enacted to cope with the drought from 2005 to 2009).

¹³² The Drought Plans for interregional basins were also approved by the Central Government. Orden Ministerial MMA/698/2007 (B.O.E. 2007, 7). For an account of the drought conditions since 2007, see *Drought Observatory*, MINISTERIO DE AGRICULTURA, ALIMENTACION Y MEDIO AMBIENTE, <http://www.magrama.gob.es/es/agua/temas/observatorio-nacional-de-la-sequia/> (last visited Mar. 02, 2015).

¹³³ Law Adopting Exceptional and Emergency Measures for Water Resources in Catalonia (D.O.G.C. 2007, 4860).

¹³⁴ Drought emergencies were regulated in three stages depending on their seriousness: pre-alert, alert, and emergency. Household use only gets curtailed in the third stage, and mostly for discretionary uses, while agriculture suffers cuts already in the second state. See, e.g., SECRETARÍA GENERAL PARA EL TERRITORIO Y LA BIODIVERSIDAD, PLAN ESPECIAL DE SEQUÍA DE LA CUENCA DEL GUADIANA [SPECIAL DROUGHT PLAN FOR THE GUADIANA BASIN] 159–60 (2007), available at http://www.chguadiana.es/corps/chguadiana/data/resources/file/sequia/Plan_Especial_de_Sequias.pdf. Arrojo in his hearing before the Environment Committee on the 1999 Water Act amendment describes precisely a similar pattern of how droughts were managed prioritizing urban users. See *Hearings*

Another variable is length. A permit can last for up to 75 years from the time of the application,¹³⁵ although this maximum length can be modified by the specific River Basin Hydrologic plan for a specific river basin or by regional water regulations for those basins that are internal to a single region.¹³⁶ In addition, the number of years might be extended if some investment required to exploit the resource properly cannot be recouped within the permit's length.¹³⁷ Each permit has its own start and end date, and they are not particularly clustered around a specific time period.

Even though permits are temporary, the fact that they can run for long terms means they do not ensure that water adapts to new needs by changing hands quickly. Only when the permit's term expires can the RBA either free the water and wait for new needs to pop up, or renew the concession, perhaps opening a competitive process for alternative applicants with equally or higher-ranked uses.¹³⁸ In any case, the efficiency analysis has a reduced scope and only takes into consideration the incumbent use and the uses of those who may bid. It is inherently difficult for particular decisions to account for the overall interdependency of uses, and this is the case for both first time applications and renewals. Even though renewal could be an avenue to free the water or put it to a better use, there is a certain automatism in the review of permits.¹³⁹

supra note 14, at 20655 (statement of Pedro Arrojo, New Water Culture). This is further supported by the political explanation that the preeminence given to urban consumers above other types of users may well be rooted in the political importance of ensuring water supply for urban voters since the majority of population concentrates in urban areas.

¹³⁵ The Canary Islands, which do not share any water resource with other parts of Spain, present some peculiarities. Its system is mainly managed by its regional government. Canary Water Act (B.O.C. 1990, 94). According to the third transitional provision of this Act, previous private rights are grandfathered. *Id.* Trade of water rights is clearly stated in article 112 of Canary Water Act but notice of every transaction has to be provided to the water administration. *Id.*

¹³⁶ For instance, in Catalonia's internal basins the maximum length is fifty years. See AGÈNCIA CATALANA DE L'AIGUA, PLA HIDROLÒGIC DE LES CONQUES INTERNES DE CATALUNYA [WATER PLAN FOR THE INTERNAL BASINS OF CATALONIA] (1999), available at http://aca-web.gencat.cat/aca/appmanager/aca/aca?_nfpb=true&_pageLabel=P1204554461208200513322 (last visited Feb. 15, 2014). In Andalusia, the maximum length has been twenty years since 2010. See Andalusia Water Act art. 45.4. (B.O.J.A. 2010, 155).

¹³⁷ Consolidated Water Act art. 59.6 (B.O.E. 2001, 176).

¹³⁸ Public Water Domain Regulations arts. 140–42, 162.4 (B.O.E. 1986, 103).

¹³⁹ Interviews with Jordi Codina, Miquel Corredor, and Oriol Camacho, Water Lawyers at Codina Advocats in Prat del Llobregat (July 2, and Aug. 28, 2012).

In general, title holders have important advantages if they want to renew the permit once it expires.¹⁴⁰

Even though time limits seem to be the defining difference between a private and public property system in the abstract, the bundle of rights in Spanish permits seems to be closer to an ownership scheme, given the long length of the permits, the fact that they can be traded, and the ease of renewability. The limited time nature of the permits could be accounted for in the price paid for them in the market, so it cannot be assumed that it automatically deters transactions. In addition, in certain prior appropriation jurisdictions, water agencies have important oversight powers over the water rights, as is the case with post-1914 water rights in California.¹⁴¹ Those powers are similar to the ones Spanish administrative agencies have.¹⁴² Hence, once again, the different degree of overall administrative control does not explain the lack of success of Spanish water markets.

RBAs grant the rights on a case-by-case basis following the broad guidelines set forth in the periodical Hydrological Plans, which purportedly aim to ensure that water is used efficiently. In fact, water plans themselves try to allocate water, both at the basin level and at the national level.¹⁴³ However, planning might not be able to ensure efficiency even if it accounts for natural uncertainty, since the status quo cannot be cheaply changed, if at all, and Hydrological Plans do not deal with individual rights.¹⁴⁴

There are other opportunities for the water agencies to increase allocation efficiency. First, it can incentivize the use of efficient irrigation technology through subsidies or by increasing the prices paid by irrigators who receive water from a supplier or an irrigation community. Second, the RBA can also encourage users to shift to cutting-edge technology when granting or renewing the application by allocating less water than the amount requested.

The RBAs have a third set of mechanisms which can shift current distribution: revision of the permit if the same use could be

¹⁴⁰ Public Water Domain Regulations arts. 140–42 (B.O.E. 1986, 103).

¹⁴¹ SLATER, *supra* note 8, at § 2.14.

¹⁴² *See id.*; Consolidated Water Act art. 5966 (B.O.E. 2001, 176).

¹⁴³ Consolidated Water Act art. 40.1 (B.O.E. 2001, 176).

¹⁴⁴ *Planes Hidrológicos de Cuenca en Vigor*, MINISTERIO DE AGRICULTURA, ALIMENTACION, Y MEDIO AMBIENTE, <http://www.magrama.gob.es/es/agua/temas/planificacion-hidrologica/planificacion-hidrologica/planes-cuenca> (last visited Mar. 03, 2015).

satisfied with a lower volume,¹⁴⁵ mandatory reallocation during drought, or expropriation of current permits to allocate them to higher-value uses.¹⁴⁶ These review mechanisms have never been used despite being the most direct way to tackle wasteful uses and free water. Even though these review powers are not widely used, certainty of private parties is still undermined by their existence in the books. .

The Spanish water management system had tools to increase efficiency, but RBAs failed to use them. Thus, the scarcity crises shows the shortcomings of centralized control.

Turning now to the possibility of voluntary reallocation in order to improve efficiency, the Spanish system also prevents this mechanism from realizing its full potential. Prior to the 1999 amendment, tradability of permits was succinctly addressed in the 1985 Water Act.¹⁴⁷ Users could enter into transactions, but it was not a mechanism envisioned with the purpose of shifting the allocation of water. Transfers usually implied changes in the permit: for example, change in place of diversion, place of use, or river flow as a result of return flow.¹⁴⁸ These changes required authorization from the CH or a regional equivalent.¹⁴⁹ Changing just the permit holder would not have triggered this authorization procedure. The type of exchanges relevant to this Article—that is, transfers of permits to satisfy uses with a different marginal value—required authorization through the long and demanding permit modification review procedure.¹⁵⁰

In this scheme, which is still in place today and was the only way to modify or transfer permits prior to the 1999 reform, the period for review can take up to eighteen months, depending on the nature of the change in the permit.¹⁵¹ If a decision has not been made after eighteen months, the silence is understood to mean that the modification is not allowed.¹⁵² These review proceedings could possibly be analyzed as a tragedy of the anticommons,¹⁵³ since

¹⁴⁵ Consolidated Water Act art. 65.2 (B.O.E. 2001, 176).

¹⁴⁶ Consolidated Water Act arts. 58, 60.2 (B.O.E. 2001, 176).

¹⁴⁷ Except in the water regime of the Canary Islands, *see supra* note 139.

¹⁴⁸ Public Water Domain Regulations arts. 151.2–3 (B.O.E. 1986, 103).

¹⁴⁹ Water Act art. VXII (B.O.E. 1985, 189).

¹⁵⁰ *Id.*

¹⁵¹ Public Water Domain Regulations art. 116 (B.O.E. 1986, 103).

¹⁵² *Id.*

¹⁵³ The concept of the “anticommons” was first discussed by Michael Heller. *See* Michael Heller, *The Tragedy of the Anticommons: Property in the Transition*

they allow public participation at different stages and require reports from different governmental agencies that may complicate the procedure without a clear set of benefits resulting from these public comment requirements.

It is quite surprising that the Spanish literature dealing with water markets—from economics to engineering to law—has paid little attention to this mechanism since the 1999 amendment was passed, even though this mechanism still applies to all trading situations not covered by the amendment, such as a transaction between a current right holder and a new user who does not hold any permit. For example, a transfer between an irrigator and a new geothermal plant would be required to follow the pre-1999 procedure. Mistakenly, many commentators in the academic literature and beyond treat the 1999 reform as the first instance where permits could be traded.¹⁵⁴ The reason for this misconception is probably the fact that the procedure used to be very demanding.¹⁵⁵ There are some exceptions to this general misunderstanding, and some scholars do acknowledge that there was a formal market prior to the amendment.¹⁵⁶ And at the time of the amendment, some advocates of water markets used the

from Marx to Markets, 111 HARV. L. REV. 621 (1998). Heller used the term to describe those situations where the bundle of rights has been so fragmented that action cannot be taken, resulting in inefficiencies. *Id.* The water transactions review procedures have been described as an example of the tragedy of the anticommons. See Stephen N. Bretnen & Peter J. Hill, *Water Markets as a Tragedy of the Anticommons*, 33 WM. & MARY ENVTL. L. & POL'Y REV. 723 (2009); see also Enrico Bertacchini, Jef de Mot & Ben Depoorter, *Never Two Without Three: Commons, Anticommons and Semicommons*, 5 R. OF L. & ECON. 163, 163 n.2, 172 (2006) (analyzing water as a semicommons); Henry E. Smith, *Semicommons Property Rights and Scattering in the Open Fields*, 29 J. LEGAL STUD. 131 (2000) (coining the idea of “semicommons”).

¹⁵⁴ ANTONIO EMBID IRUJO, ASIGNACIÓN DEL AGUA Y GESTIÓN DE LA ESCASEZ EN ESPAÑA: LOS MERCADOS DEDERECHOS DE AGUAS [WATER ALLOCATION AND SCARCITY MANAGEMENT IN SPAIN: WATER RIGHTS MARKETS], EXPO ZARAGOZA (2008), available at <http://www.ayto-zaragoza.mobi/contenidos/medioambiente/cajaAzul/35S11-P1-Antonio%20EmbidACC.pdf>; see also “*Mercados públicos*” para gestionar la escasez [“*Public Markets*” to Manage Scarcity], FUNDACIÓN NUEVA CULTURA DEL AGUA, <http://www.fnca.eu/guia-nueva-cultura-del-agua/la-economia-del-agua/mercados-publicos-para-gestionar-la-escasez> (last visited Mar. 03, 2015).

¹⁵⁵ The procedure is the one described in the implementing regulations, discussed *supra* note 100. See also Public Water Domain Regulations art. 116 (B.O.E. 1986, 103).

¹⁵⁶ José Luis Moreu Ballonga, *Una explicación jurídica sobre el Mercado del agua* [A legal Explanation of the Water Market], EL PAÍS, May 31, 1999, http://el-pais.com/diario/1999/05/31/sociedad/928101610_850215.html.

previous procedure as a shield to say that the 1999 amendment was not such a break with the former legal tradition, but rather an incremental improvement—albeit with an experimental shade to it.¹⁵⁷

Very few examples of permit transfers before and after 1999 appear in the literature because data about them is not complete.¹⁵⁸ Some RBAs offer figures in their annual reports about changes in permits.¹⁵⁹ But the potential sales cannot be disentangled from other changes in the permit, such as inheritance or a change of business by the same owner, since all are conflated under the label “modifications of the permit.” There are, nonetheless, some well-known pre-1999 trades, particularly those by Emasesa, the company supplying Sevilla, the capital of Andalusia.¹⁶⁰ This southern city suffered intensely during the 1990s drought; there were even serious daily curtailments for household uses.¹⁶¹ The company bought water from the nearby irrigation community of El Viar.¹⁶² Even though the company had to resort to this strategy several times in Sevilla,¹⁶³ this purchase was seen as particularly exceptional because it was always framed as an emergency measure.¹⁶⁴ However, the strategy was criticized because urban supply is granted preeminence,¹⁶⁵ and it seemed against the public interest to opt for a market mechanism instead of a command-and-control solution.

Apart from permit transfers, other trades occurred in Spain

¹⁵⁷ Inmaculada Gómez Mardones, *No me sirve el Plan hidrológico de Borrell [Borrell's Hydrological Plan Does Not Work for Me]*, EL PAÍS, Aug. 5, 1996, http://elpais.com/diario/1996/08/05/espana/839196012_850215.html. The Constitutional Court has recognized that the leases do not strip water of its public property nature. S.T.C., 2011 (B.O.E. No. 258, pp. 8–13).

¹⁵⁸ Javier Calatrava Leyva, *Mercados y bancos de agua en España: Legislación y experiencias vigentes [Water Markets and Water Banks in Spain: Legislation and Experiences]*, in AGRICULTURA FAMILIAR EN ESPAÑA 99 (2006), available at http://www.upa.es/anuario_2006/pag_099-105_calatrava.pdf; Antonio M. Rico Amorós, *Sequías y Abastecimiento de Agua en España [Droughts and Water Storage in Spain]*, 37 BOLETÍN OFICIAL DE LA AGE 137, 168 (2004), available at <http://www.boletinage.com/37/07-SEQUIAS.pdf>.

¹⁵⁹ MINISTERIO DE MEDIO AMBIENTE, Y MEDIO RURAL Y MARINO, MEMORIA 2007 [2007 REPORT] 97 (2007), <http://www.chduero.es/descarga.aspx?fich=/Publicaciones/MemoriaCHD07.pdf>.

¹⁶⁰ Rico Amorós, *supra* note 158.

¹⁶¹ *Id.*

¹⁶² *Id.* at 166.

¹⁶³ *Id.* at 168.

¹⁶⁴ Calatrava Leyva, *supra* note 158, at 100.

¹⁶⁵ *Id.*

prior to the 1999 amendment. First, trades among members of the same irrigation community were and are a common practice.¹⁶⁶ Elinor Ostrom studied the auctions held by traditional irrigation communities in the Valencia region.¹⁶⁷ In fact, intra-community trades are still possible without being subject to review because they may generate fewer externalities, and because their institutional boundaries and rights are more fungible.¹⁶⁸ In the context of irrigation communities, there is the risk that formal mechanisms could crowd out the incentives for informal reallocation or deepen black markets that help alleviate scarcity at the local level. But this is not the case in Spain. Even after the 1999 reform, transactions between the members of the same irrigation community are still considered internal acts to the irrigation community, since the community holds the right and, thus, the transaction between two members of the irrigation community is not subject to administrative clearance.¹⁶⁹ Hence, the amount of trading within the irrigation communities should not be affected by the 1999 reforms. There could be some effects on external users as a result of these internal trades but it seems that the legislature has considered that they cannot be substantial. Second, water markets existed in the Canary Islands.¹⁷⁰ Water rights in the Canary Islands are groundwater rights, and there is a type of water pool, whereby multiple companies hold the extraction permits and others transport the water to the final customers.¹⁷¹ Finally, black markets have always existed, despite the improvements in policing and metering, and they may remain active.¹⁷²

¹⁶⁶ *Id.* at 102.

¹⁶⁷ ELINOR OSTROM, *GOVERNING THE COMMONS* 79 (1992). The irrigation community in the Tibi Dam in Alicante, Spain, made available important information—such as water storage, water delivered in the previous rotation, or price and quantities of water sold in the previous rotation—to the farmers prior to the auction to facilitate their choices.

¹⁶⁸ Public Water Domain Regulations art. 343.5 (B.O.E. 1986, 103).

¹⁶⁹ *Id.*

¹⁷⁰ See ARIÑO, *supra* note 101, at 197; see also *Hearings*, *supra* note 14, at 20661, 20663 (statement of Pedro Arrojo, New Water Culture).

¹⁷¹ José D. Fernández Bethencourt & Federico Aguilera Klink, *El papel económico de las aguas subterráneas en Canarias* [*The Economic Role of Groundwater in the Canary Islands*], in *LA ECONOMÍA DE LAS AGUAS SUBTERRÁNEAS EN ESPAÑA* 7 (2000).

¹⁷² José Antonio Hernández & Santiago Carcar, *El Gobierno reconoce que hay un mercado negro del agua en algunas regiones* [*Government Recognizes That There Is a Black Market for Water in Some Regions*], *EL PAÍS*, Nov. 29,

In sum, water trading existed in Spain before 1999, but regulation was not aimed at promoting transactions. The review mechanism for changes in the permits, a necessary step in the majority of transactions, was extremely cumbersome and not much different from an application for a new permit; it did not allow for a flexible response in times of crisis. There were other administrative mechanisms to purportedly guarantee that water would flow from low value to high value users, such as revision of the permits, but those were not effective either.

Neither the centralized mechanisms, nor the potential transactions undergoing this cumbersome procedure, nor informal trading helped much to cope with the effects of the 1990's crisis. Rivers were dry.¹⁷³ People in certain areas could not shower at any time they wished.¹⁷⁴ The situation created a blatant mismatch between the places where the majority of water was allocated (the agricultural sector) and the precarious supply where it was highly valued (cities). The crisis was managed through harsh curtailments and emergency measures, but the situation was so severe that reforms needed to be taken to prevent and mitigate future crises. They were not taken immediately, however, and when they were, they seemed partially motivated by a general conservative reform agenda in 1999.¹⁷⁵

2. *Private Property Rights*

Apart from the administrative permits for water use, there are still some private property rights in Spain, mainly over groundwater.¹⁷⁶ These are residual rights deriving from historic

1996, http://elpais.com/diario/1996/11/29/sociedad/849222011_850215.htm; Rafael Ruiz, *El fiscal denuncia un "mercado negro" del agua en Murcia* [District Attorney Claims There Is a Black Market for Water in Murcia], EL PAÍS, Feb. 2, 2004, http://elpais.com/diario/2004/03/22/espana/1079910045_850215.html. See generally GREENPEACE, EL NEGOCIO DEL AGUA EN LA CUENCA DEL SEGURA [THE WATER BUSINESS IN THE SEGURA BASIN] (2007), available at <http://www.greenpeace.org/espana/Global/espana/report/other/el-negocio-del-agua-en-la-cuen.pdf> (investigating the black market for water, illegal irrigation, and water contamination).

¹⁷³ M. Ramón Llamas, *Consideraciones sobre la sequía de 1991 a 1995 en España* [Considerations About the Drought from 1991 to 1995 in Spain], 4 INGENIERÍA DEL AGUA 39 (1997).

¹⁷⁴ Enrique Cabrera, *La transición en la política del agua en España* [Transition in Spanish Water Policy], EL PAÍS, Mar. 22, 1999, http://elpais.com/diario/1999/03/22/sociedad/922057212_850215.html.

¹⁷⁵ See *infra* notes 208–221

¹⁷⁶ Consolidated Water Act transitional provisions (B.O.E. 2001, 176).

regulation,¹⁷⁷ but they have been maintained by the 1985 Water Act and its amendments.¹⁷⁸ The government has aimed to homogenize all rights under the administrative permit system by giving incentives to the private right holders to exchange them for permits, which are time-limited and offer the protection provided by inscription in the centralized water registry of each CH.¹⁷⁹ The main reason to pursue homogenization is to ensure that planning covers as many water uses as possible, because otherwise planning could not achieve its sustainability and efficiency goals. These historical rights are property rights, but they are not absolute: they are subject to certain restrictions, including length and type of use.¹⁸⁰ However, they are less subject to administrative powers than permit rights are. For example, private property transactions are subject, in theory, to general contract rules.¹⁸¹

In practice, users seem to be reluctant to change their private rights for an administratively granted permit.¹⁸² Attorneys who specialize in water law issues affirm that farmers see this administrative oversight and purported protection as an encroachment on their rights.¹⁸³ The 1985 Water Act claimed that the rights would not be harmed by the transformation to water markets,¹⁸⁴ but users want to remain shielded from the regulatory powers of the administration.¹⁸⁵ According to water lawyers, users are not necessarily concerned about the power to oversee the

¹⁷⁷ See Water Law of 1879, available at http://sirio.ua.es/libros/BGeografia/ley_de_aguas/index.htm.

¹⁷⁸ The long lasting 1879 regulation was replaced in 1985 with a new Water Act, which maintained the main principles of 1879 regulation. See Water Act (B.O.E. 1985, 189). The spirit of the 1985 act is still in force, but amendments in 2001 attempted to give coherence to the patchwork of water regulations that emerged in the fifteen years following the Water Act's enactment, particularly following the 1999 reform. See Consolidated Water Act (B.O.E. 2001, 176).

¹⁷⁹ Consolidated Water Act art. 80.3 (B.O.E. 2001, 176).

¹⁸⁰ For an overview of those historical rights and the evolution of its regulation, see José Luis Moreu Ballonga, *El Maltrato Originario y Creciente, por la Legalidad Vigente, a la Propiedad Privada del Agua [The Original and Growing Mistreatment under Current Law of Private Property in Water]*, 193 REVISTA DE ADMINISTRACIÓN PÚBLICA 335 (2014).

¹⁸¹ *Id.*

¹⁸² Interviews with Jordi Codina, Miquel Corredor, and Oriol Camacho, *supra* note 139.

¹⁸³ *Id.*

¹⁸⁴ Spanish Central Government Cabinet, 1985 Water Act Legislative Report 17 (on file with author).

¹⁸⁵ Interviews with Jordi Codina, Miquel Corredor, and Oriol Camacho, *supra* note 139.

transaction, but about the RBAs' general powers of curtailment and modification of permits, which private rights holders believe would be triggered by the transaction.¹⁸⁶ They even fear the mere registration in the Water Registry.¹⁸⁷

According to this homogenization aim, the Water Act establishes that if a rights holder wants to change any of the definitional characteristics of his or her private property rights, the right becomes a permit.¹⁸⁸ A similar effect is envisioned if they enter into permit leases in certain regions, the mechanism authorized after 1999.¹⁸⁹

Although it is outside the period of study, it is worth mentioning an even more straightforward attempt at homogenization: the issuing of an emergency decree in May 2012, in which the central government authorized an Exchange Center in the Upper Guadiana Basin.¹⁹⁰ Private rights will be bought by the public agency and the agency will sell time-limited permits.¹⁹¹ The buyer will buy a permit, instead of a private right, with all the associated characteristics like stronger administrative oversight, and will receive less water in order to preventively mitigate some potential externalities.¹⁹²

Stronger property rights are expected to do better in the market because they offer more security and, thus, they might be traded more often than permits or receive a higher price. But in practice, private property rights may not be entering the market at all in Spain, for fear of falling under administrative oversight afterwards.

3. *Irrigation Rights in Irrigation Areas of Public Initiative*

Irrigation rights in areas of public initiative are a strange category. They are administrative rights, like permits, but the administrative oversight is more intense because these areas

¹⁸⁶ NURIA HERNÁNDEZ DE MORA & LUCIA DE STEFANO, LOS MERCADOS INFORMALES DE AGUAS EN ESPAÑA: UNA PRIMERA APROXIMACIÓN [INFORMAL WATER MARKETS IN SPAIN: A FIRST APPROXIMATION] 10 (forthcoming publication) (on file with author).

¹⁸⁷ Interviews with Jordi Codina, Miquel Corredor, and Oriol Camacho, *supra* note 139.

¹⁸⁸ Consolidated Water Act transitional provision 3 (B.O.E. 2001, 176).

¹⁸⁹ *Id.* additional provision 14.

¹⁹⁰ Emergency Environmental Law (B.O.E. 2012, 108).

¹⁹¹ *Id.* provision 7.

¹⁹² *Id.*

received investments of public funds to promote economic development.¹⁹³ These quasi-concessional rights generally cannot be leased or transferred.¹⁹⁴

III. WATER MARKETS: THE 1999 AMENDMENT

The 1999 amendment included several strategies to ensure that the scarce supply could meet new demands, such as setting a regulatory framework for desalination of water¹⁹⁵ and metering household consumption in order to charge tariffs according to volume consumed.¹⁹⁶ However, the most innovative and salient parts of the 1999 reform were the market mechanisms introduced.¹⁹⁷ These market mechanisms arguably go beyond the Water Framework Directive.¹⁹⁸

Drought was an important precursor to the amendment. The drought period from 1990 to 1995 showed that the permit regime did not ensure efficient water use.¹⁹⁹ The political process may have caused this delay, but even so, the later reform can be

¹⁹³ Agricultural Reform and Development Law (B.O.E. 1973, 30).

¹⁹⁴ They were temporarily allowed to be leased from 2006 to 2009 by emergency drought decrees, which were adopted in 2005 and prorogued. *See* Law Adopting Exceptional Administrative Measures to Manage the Hydrological Resources and to Correct the Effects of the Drought in the Watersheds of the Júcar, Segura, and Tajo Rivers (B.O.E. 2005, 256); Law Adopting Exceptional Administrative Measures to Manage the Hydrological Resources and to Correct the Effects of the Drought in the Watersheds of the Guadiana, Guadalquivir, and Ebro Rivers, (B.O.E. 2005, 301); Law Adopting Urgent Measures to Lessen the Effects of the Drought on the Population and Water-Intensive Agricultural Sectors in Certain Watersheds (B.O.E. 2006, 222); Law Adopting Urgent Measures to Lessen the Effects of the Drought on the Population and Water-Intensive Agricultural Sectors in Certain Watersheds (B.O.E. 2007, 240); Law Adopting Urgent Measures to Lessen the Effects of the Drought in Certain Watersheds (B.O.E. 2008, 258); Law Adopting Exceptional Administrative Measures to Manage the Hydrological Resources and to Correct the Effects of the Drought in the Watershed of the Ebro River, (B.O.E. 2008, 57).

¹⁹⁵ Modification of the Water Act art. V (B.O.E. 1999, 298) (introducing the new desalination regime).

¹⁹⁶ *Id.* art. XVIII.

¹⁹⁷ *Id.* art. XXIV.

¹⁹⁸ *See* Water Framework Directive, *supra* note 87 (focusing on water quality and emphasizing participation. The market mechanisms enacted in Spain may indirectly encourage efficient water use by internalizing the opportunity cost through market pricing, thereby serving one of the central tenets of the directive in pricing water following the full cost recovery principle).

¹⁹⁹ Modification of the Water Act art. V (B.O.E. 1999, 298). (“In this sense, the experience of the intense drought suffered by our country in the early years of the final decade of this century, calls for the search of new alternative solutions . . .”).

considered an achievement since water scarcity typically falls off the political agenda after a wet year.²⁰⁰ In this case, the mid-90s drought left such scars that the memories were not easily forgotten. Water administration officials had seen the Tagus run dry.²⁰¹ The prior crisis was therefore instrumental in achieving consensus among water administration officials that something needed to be done,²⁰² this support from public officials working on water management was indispensable for the passage of the 1999 amendment.²⁰³ But ideology also plays an important role in keeping markets high on the agenda.

Some additional description of the political debate surrounding them is needed to better understand how water markets were introduced and most likely designed in Spain. Scholars had already advocated for water markets before the markets were discussed in the political arena.²⁰⁴ The first appearance in official political discussions was in the draft of the “Improvement of Irrigation” Plan put forward in 1996 by the Socialist Party’s government.²⁰⁵ There, the discussion was whether intra-agricultural transactions should be adopted in order to enhance irrigation efficiency. However, the markets did not make it to the final document.²⁰⁶

Water market ideas reappeared during the first term of the conservative People’s Party (*Partido Popular*) government from 1996–2000, when Benigno Blanco²⁰⁷ was the Secretary of

200 Thiago Ferrer Morini, *Presente y futuro(s) del agua potable* [*The Present and the Future(s) of Drinking Water*], EL PAÍS, Mar. 14, 2013, http://economia.elpais.com/economia/2013/04/12/actualidad/1365789176_891025.html (quoting architect and graphic artist José María Pérez as saying, “Es cuando está lloviendo cuando toca hablar del agua.” [“It is when it is raining that we should be talking about water.”]).

201 Interview with Benigno Blanco, former Secretary of State of Waters and currently partner at IurisCT, in Madrid, Spain (July 15, 2012).

202 *Id.*

203 *Id.*

204 ANTONIO EMBID IRUJO, PRECIOS Y MERCADOS DEL AGUA [WATER MARKETS AND PRICES] (1996); Alberto Garrido Colmenero, *Mercados de aguas: ¿entelequias economicistas o soluciones a los problemas de asignación* [*Water Markets: Economic Potential or Solutions to the Problem?*], 167 REVISTA DE ESTUDIOS AGROSOCIALES 89 (1994).

205 Juan Fernández-Cuesta, *El PSOE aprobó un mercado “libre” en 1996* [*The Spanish Socialist Workers Party Approved a “Free” Market in 1996*], ABC, May 3, 1999, at 86.

206 *Id.*

207 It is important to understand who the people behind this proposal were. Benigno Blanco was a 38-year-old lawyer who previously worked for Iberdrola,

Water.²⁰⁸ Blanco put forward the sketch of a bill reforming the water regulatory system early in the administration,²⁰⁹ but it was not passed until 1999. Even if these water market ideas were based on some academic debates,²¹⁰ the People's Party added an ideological gloss to the bill.²¹¹ More flexible concessions were seen as reducing government involvement.²¹² In fact, the changes in water regulation and its push towards markets were understood as part of the overall liberalization agenda of that government, which included the privatization of national monopolies in public services such as power, gas, telephone and postal services.²¹³ However, in comparison to these other goods, water has always been a more local resource, and there was no national monopoly to dismantle after its privatization. In fact, those proposing the bill amending water regulation were softer on the liberalization rhetoric than they were in other reforms in the legislative debate. The amendment on water often referred to the experiences in California.²¹⁴ Interestingly enough, the water market mechanisms were not labeled as "market" in governmental and congressional documents by the pro-market right-wing party in power at that time.²¹⁵ On the other hand, those who opposed the amendment frequently characterized the reform as pro-market, using "market" as a stigmatizing word.²¹⁶ When the People's Party referred to

an electric company. This made him suspect of favoring the hydroelectric companies. Jointly with him, the team was composed of two civil engineers, one who was the representative on behalf of Iberdrola in the Júcar River Basin Authority and another who was the designer of the Taugus-Segura transfer, and a hydrogeology professor highly critical of the Socialist Party's water policy. See Gómez, *supra* note 12.

²⁰⁸ He reported to the Minister of the Environment on water management issues.

²⁰⁹ Gómez, *supra* note 157 (interview with Benigno Blanco).

²¹⁰ *Id.*

²¹¹ See *infra* note 217–218 and accompanying text.

²¹² Gómez, *supra* note 157 (interview with Benigno Blanco).

²¹³ *Period from 1996 until the Present*, SEPI, http://www.sepi.es/default.aspx?cmd=0001&IdContainer=50&idLanguage=_EN (last visited Feb. 18, 2015).

²¹⁴ See *Hearings, supra* note 18 (statement of Pedro Arrojo, New Water Culture). See also Antonio Embid Irujo, *Asignación del agua y gestión de la escasez en España: los mercados de derechos de aguas* [Water Allocation and Scarcity Management in Spain: Water Rights Markets], EXPOZARAGOZA 2008, <http://www.ayto-zaragoza.mobi/contenidos/medioambiente/cajaAzul/35S11-P1-Antonio%20EmbidACC.pdf>.

²¹⁵ See Proyecto de Ley 121/000171 (B.O.C.G. 1999, 21).

²¹⁶ *Hearings, supra* note 14, at 20660 (statement of Pedro Arrojo, New Water Culture).

markets, it was with many disclaimers or caveats: for example, “controlled market” in the People’s Party 1996 Electoral Program.²¹⁷ The People’s Party wanted to make this reform more palatable for both the opposition and their electorate.²¹⁸ In statements put forward at the time of the reform, then-Secretary Blanco maintained that he was not introducing a market,²¹⁹ but rather experimenting with making the permit regime more flexible.²²⁰ In fact, even the word used to denote transfer was “ceder,” which is less harsh than sell or lease and does not necessarily require the payment of a price in Spanish. In fact, the use of the word “ceder” could be considered a euphemism because it does not necessarily entail a price and it is less specific than “sell.”²²¹

While Blanco publicly denied that the Bill was creating a market, a national headline announcing Spanish Parliament’s upcoming debate on the bill summed up public perceptions: “Council of Ministers to Pass a Bill This Week Establishing Free Market for Water.”²²² As this Article argues,²²³ a water market is never a free one, and the Spanish case is far from the free market ideal.²²⁴ In fact, Blanco recognized in our private interview that his party tried to frame it as palatably as possible for the opposition, but that their main aim was to introduce a market.²²⁵

Opponents—mostly farmers and environmentalists—

²¹⁷ POPULAR PARTY, CON LA NUEVA MAYORÍA [WITH THE NEW MAJORITY], ELECTORAL PROGRAM 174 (1996), available at <http://www.pp.es/sites/default/files/documentos/1150-20090908161854.pdf>.

²¹⁸ Gómez, *supra* note 157 (interview with Benigno Blanco).

²¹⁹ María José Álvarez, “Ni se modifica el régimen económico, ni se privatiza la gestión del agua” [“There is Neither a Change in the Economic Regime nor a Privatization of Water”], ABC, May 25, 1995, at 56 (“[Benigno Blanco] states that water markets are not being established since the uses will still be decided by government when awarding the concessions, taking into account the availability of resources and needs, will ensure that water reallocations will occur without environmental damage.”).

²²⁰ Gómez, *supra* note 157 (interview with Benigno Blanco); see also Fernández-Cuesta, *supra* note 13 (quoting Benigno Blanco as suggesting that the introduction of water markets was an experiment).

²²¹ Inmaculada Gómez Mardones, *El Consejo de Ministros aprobará esta semana el mercado libre del agua* [Council of Ministers to Pass a Bill this Week Establishing Free Market for Water], EL PAÍS, Apr. 27, 1999, http://elpais.com/diario/1999/04/27/sociedad/925164001_850215.html.

²²² *Id.*

²²³ See discussion *supra* Section I.

²²⁴ See discussion *infra* Sections IV & V.

²²⁵ Blanco, *supra* note 201.

criticized the commodification of water and emphasized that water was a collectively owned resource.²²⁶ The majority of opposition parties voted against the 1999 reform of the Water Act, focusing their critiques on the lease contract that they said weakened the control of the administration over water, a public resource, despite the administrative review procedure.²²⁷ Water banks were more acceptable to those opposing the reform, because they understood the role of the administration to be more central in water banks, given its role as a broker in the water banks.²²⁸ The main opposition party, the Socialist Party, favored water banks despite its quite head-on opposition to water markets,²²⁹ because it did not consider the water banks to be markets.²³⁰

Fernando Moraleda Quílez, the representative of the Small Farmers Association (*Asociación de Pequeños Agricultores*), opposed the proposed amendment during the committee hearings on the 1999 amendment and emphasized that reallocation was already occurring prior to this amendment.²³¹ Moraleda Quílez argued that it would have been better to reinforce the framework of the practices already in place rather than introducing market mechanisms, which he feared would entail a rise in prices paid by irrigators to their suppliers.²³² It is important to note that irrigators have always received subsidized water, and small farmers feared they would be put out of business if there was an increase in the price of water as a result of water market transactions.²³³ Only big companies, either agricultural or hydroelectric, were expected to benefit.²³⁴ Every time an important water law bill has been discussed, even those not dealing with market reallocation, the farmers' associations have always criticized markets.²³⁵ For

²²⁶ *Hearings*, *supra* note 14, at 20620-21.

²²⁷ Inmaculada Gómez Mardones, *La nueva Ley de Aguas da vía libre a la compraventa de derechos entre particulares* [*New Water Act Will Enable the Free Exchange of Water Rights Between Private Users*], EL PAÍS, Nov. 26, 1999, http://elpais.com/diario/1999/11/26/sociedad/943570801_850215.html.

²²⁸ Gómez, *supra* note 13.

²²⁹ *Id.*

²³⁰ *Id.*

²³¹ *Hearings*, *supra* note 14, at 20620–21 (statement of Moraleda Quílez).

²³² *See id.* at 20621 (statement of Moraleda Quílez).

²³³ *Id.*

²³⁴ Luis D. Martínez, *Los expertos anteponen la gestión racional del agua en cuencas deficitarias a los trasvases* [*Experts Favor Efficient Water Management to Mandated Transfers in Regions of Scarcity*], EL PAÍS, Oct. 6, 2010, http://elpais.com/diario/2000/10/06/cvalenciana/970859882_850215.html.

²³⁵ Interview with Jose Manuel Delgado, Officer, Unión de Pequeños

example, the 2001 National Hydrologic Plan drew criticism from farmers' associations for serving the same big corporate interests as the 1999 water markets amendment,²³⁶ and for being part of the overall liberalization strategy of the People's Party.²³⁷

In addition, the environmental organization *Nueva Cultura del Agua* (New Water Culture)²³⁸ cautiously favors markets as long as they remain within the framework of "integrated water management"²³⁹ and the role of government administration is emphasized, particularly at the beginning stages.²⁴⁰

Related to the political debate, it is important to note that once the Socialist Party regained power in 2004, it never repealed these market tool provisions. This fact signals either that water markets were not as ideological and controversial as they had seemed, or that they were just nonoperational. In fact, the Socialist Party had proposed water banks as a substitute for the Ebro transfer²⁴¹ during

Agricultores y Ganaderos [Small Farmers' Union], in Madrid, Spain (July 3, 2012).

²³⁶ Sara Velert, "La nueva cultura del agua no es ni de derechas ni de izquierdas" ["The New Water Culture is Neither Conservative nor Leftist"], *EL PAÍS*, May 20, 2003, http://elpais.com/diario/2003/05/20/cvalenciana/1053458302_850215.html (interviewing Pedro Arrojo).

²³⁷ Interview with Jose Manuel Delgado, *supra* note 235.

²³⁸ New Water Culture, a high profile environmental organization devoted to water management, is generally considered aligned with Socialist Party ties, although it claims to be apolitical. See Velert, *supra* note 236.

²³⁹ *El reto del Desarrollo Sostenible [The Challenge of Sustainable Development]*, FUNDACIÓN NUEVA CULTURA DEL AGUA, <http://www.unizar.es/fnca/index3.php?id=1&pag=16&fund=04> (last visited Mar. 05, 2015). See *Hearings*, *supra* note 14, at 20654 (Arrojo defended water markets, but he thought that some other measures should be taken before them, like the actual revision of the concessions, limiting the amount of water to be used under current permits, which seems to resonate towards a cap and trade idea).

²⁴⁰ *Id.* at 20655 ("All this through water banks, markets operated and managed by the Administration. Second, limit banks to a basin region during the first experimental period of ten years or something like that with the aim to establish processes and criteria to use water efficiently and reallocate permits, and redeployment of concessions, administrative fine, what I said before, either administratively or via these other rearrangements in times of drought, in order to gain practical experience before taking risky steps in deficit areas").

²⁴¹ The Popular Party, while governing in the central Spanish government, put forward a National Hydrologic Plan, which included a transfer of 190 hm³/year from the Ebro River to the internal basins of Catalonia. The Plan was partly repealed later on by the Socialist government in fulfillment of one of its electoral promises. There had been huge opposition to the initial Ebro transfer, which had been used as an electoral platform by the Socialist party. For a general reference to the anti-transfer movement, see PLATAFORMA EN DEFENSA DE L'EBRE [PLATFORM IN DEFENSE OF THE EBRO], <http://ebre.net/bloc/> (last visited Mar. 05, 2015). The Government of the Autonomous Community of Aragon

the discussion of the highly controversial National Hydrologic Plan in the 2000s and during the 2004 political campaign, in which the Socialist Party ran on an anti-Ebro transfer platform.²⁴² The Socialist Party argued that these water banks would satisfy the need of reallocating water that the Ebro transfer was supposed to satisfy.²⁴³

The 1999 amendment created two market mechanisms: first, a contract for leasing permits between private parties; and second, water banks, called “exchange centers” (*centros de intercambio de derechos*).²⁴⁴ Water permits in Spain are old and poorly registered,²⁴⁵ which complicates any assessment of the extent of over-allocation. However, the consensus in the 1990s seemed to be that water was over-allocated and the water supply could not keep growing. Thus new water permits were not deemed a viable solution.²⁴⁶ The idea in the 1999 amendment was to increase the tradability of water use rights to respond to drought conditions,²⁴⁷ and also to prevent the ossification of uses as a result of the old permit system.²⁴⁸ Furthermore, the permit system was inflexible, and applications to change an allowed use were extremely cumbersome, whether motivated by a transfer or not. Market tools, by contrast, were thought to improve both alienability and adaptability of current allocations.²⁴⁹ Despite the time limits, the

offers a timeline of the conflict. Victor Mondelo, *Cronología del ‘no trasvase’* [*Chronology of ‘No Water Transfer’*], EL MUNDO, June 6, 2008, <http://www.elmundo.es/elmundo/2008/06/02/barcelona/1212399812.html>.

²⁴² Arantza Prádanos, *El decreto para paralizar el trasvase del Ebro estará listo en un mes* [*The Decree Stopping the Ebro Transfer Will Be Ready in a Month*], DIARIO DE LEON, Apr. 30, 2004, http://www.diariodeleon.es/noticias/espana/decreto-paralizar-trasvase-ebro-estara-listo-mes_135065.html.

²⁴³ Jose L. Lobo, *La otra batalla del Ebro* [*The Other Battle of the Ebro*], EL MUNDO, Feb. 25, 2001, <http://www.elmundo.es/especiales/2001/03/sociedad/trasvase/ques.html>.

²⁴⁴ Consolidated Water Act arts. 67–72 (B.O.E. 2001, 176).

²⁴⁵ According to the Socialist Party, 80 percent of the permits were not registered in 1999. See Gómez, *supra* note 13.

²⁴⁶ Modification of the Water Act preamble (B.O.E. 1999, 298).

²⁴⁷ Modification of the Water Act (B.O.E. 1999, 298).

²⁴⁸ *Id.* preamble (“These new solutions should, on the one hand, increase water production using new technologies, granting legal status to legal procedures desalination or reuse, and, on the other, enhance efficiency in water use given the flexibility needed under the current concession regime through the introduction of the new contract for the transfer of rights to use water, which will optimize socially uses of such scarce resource.”)

²⁴⁹ *Id.*

leases seemed to be aimed at mitigating structural scarcity, while water banks were seen as a mechanism for alleviating the effects of a drought.²⁵⁰ Although imperfect, lease contracts are a natural substitute for the transfer mechanism already in place.²⁵¹

After 1999, few other regulatory milestones are worth mentioning. In 2003, regulations were issued implementing the 1999 amendment and giving coherence to the regulations passed under the 1985 Water Act, but they only specified what was included in the 1999 amendments. Even with those 2003 regulations in place, the 1999 provisions regarding water banks are not self-executing, as they need the authorization of the central government.²⁵² Water banks were authorized in several basins in 2004.²⁵³ Additionally, a harsh drought in 2006 triggered an emergency decree,²⁵⁴ which authorized CHs and regional equivalents to launch public offers to lease or even buy rights for environmental purposes using the water bank framework.²⁵⁵ The same 2006 decree authorized the titleholders of the irrigation rights in public interest irrigation areas to enter into contracts.²⁵⁶

In Section V, these two mechanisms – leases and water banks – are analyzed mainly under two roles of government: definer of property rights and market maker.

IV. TRANSACTION FIGURES AND DATA SHORTCOMINGS: HAVE WATER MARKETS IN SPAIN BEEN ACTIVE?

In order to be able to ascertain whether water markets have been successful in Spain, and in order to try to trace the causes of such success or lack thereof, this Article uses water market activity data on volume traded and number of trades. This is an imperfect proxy, but it is a common variable in the empirical literature on

²⁵⁰ Article 71 of the Consolidated Water Act only allows water banks when there is a drought or overexploitation of the aquifer. Thus, it seems that they can only operate during crisis, while transfer of rights could work under normal conditions. Consolidated Water Act art. 71 (B.O.E. 2001, 176).

²⁵¹ See Public Water Domain Regulations arts. 151.2–3 (B.O.E. 1986, 103).

²⁵² Consolidated Water Act art. 71, (B.O.E. 2001, 176).

²⁵³ Acuerdo del Consejo de Ministros (Oct. 15, 2004) (authorizing the establishment of “*centros de intercambio de derechos*”).

²⁵⁴ Law Adopting Urgent Measures to Lessen the Effects of the Drought on the Population and Water-Intensive Agricultural Sectors in Certain Watersheds (B.O.E. 2006, 222) (third additional provision).

²⁵⁵ *Id.*

²⁵⁶ *Id.*

water markets.²⁵⁷ The level of market activity in Spain has been generally low except for the activity in water banks. Water Banks ended up being similar to the CALFED Environmental Water Accounts²⁵⁸ because the majority of the water leased or purchased was devoted to environmental protection; Spanish water banks did not facilitate trades between private parties.²⁵⁹

Spanish data is not widely available. There is no integrated database, public or private, nor is there a publication reporting transactions. Transactions are not easy to track from primary sources, even though they are supposed to be recorded in water registries.²⁶⁰ Water registries are in a poor state: not all rights are registered, and not all transactions have been properly registered. Furthermore, my requests to the CHs for data on permit leases and water exchange centers were not answered. Thus, the sources used in this Article are mainly from secondary literature. This work will rely on the data presented by Jesús Yagüe Córdova, a high-ranking official at the Ministry of the Environment,²⁶¹ at the Expo 2008 in Zaragoza.

Moreover, some transfers are not reported at all. Data on private bargaining exchanges is incomplete, since transactions between members of the same irrigation organization are not reported if the members are not individual permit holders but receive an assignment from the community, which holds the right.²⁶² Irrigation communities in Spain acknowledge the

²⁵⁷ See generally Jedidiah Brewer, Michael Fleishman, Robert Glennon, Alan Ker & Gary Libecap, *Law and the New Institutional Economics: Water Markets and Legal Change in California, 1987-2005*, 26 WASH. U. J. L. & POL'Y 183 (2008) (legal changes are included here as explanatory variables); Jedidiah Brewer, Robert Glennon, Alan Ker & Gary Libecap, *Transferring Water in the American West: 1987-2005*, 40 U. MICH. J.L. REFORM 1021, 1031-35 (2007) (attempting to explain the difference between the trading activity of different states using their institutional differences). An additional measure of how well water markets work is price: prices should be the same for all different types of transactions in a competitive market, controlling the differential in costs. But data in Spain was insufficient to reach any conclusion in relation to price.

²⁵⁸ See WATER TRANSFER PROGRAM PLAN, CALFED BAY-DELTA PROGRAM (2000), available at <http://calwater.ca.gov/content/Documents/library/308a.pdf>.

²⁵⁹ JESÚS YAGÜE CÓRDOVA, EXPERIENCIA DE LOS INSTRUMENTOS DE MERCADO EN ESPAÑA [EXPERIENCES OF THE MARKET INSTRUMENTS IN SPAIN], EXPO ZARAGOZA 2008, at 11, available at <http://www.zaragoza.es/contenidos/me dioambiente/cajaAzul/37S12-P1-JesusYagueCordovaACC.pdf>.

²⁶⁰ Consolidated Water Act art. 68.4 (B.O.E. 2001, 176)..

²⁶¹ See *supra* note 259.

²⁶² Public Water Domain Regulations art. 343.5 (B.O.E. 1986, 103).

existence of trades between their members without any formal recording;²⁶³ these have been happening for many years.²⁶⁴ Internal trades are not even regulated in the irrigation communities' bylaws.²⁶⁵ In fact, Spanish regulation establishes that such trades are internal acts.²⁶⁶

Some information on water banks is available in the official gazette,²⁶⁷ since water banks have followed a strict public procurement model that imposes certain transparency requirements.²⁶⁸ However, the gazette only publishes the offers and the adjudicatory decisions.²⁶⁹

This Section will focus on formal exchange mechanisms between those who hold the right to trade, since informal mechanisms have not been the solution to the problem.

²⁶³ Telephone Interview with Juan Valero de Palma, President, FENACORE [Spanish National Association of Irrigation Communities] (Jul. 14, 2012).

²⁶⁴ HERNÁNDEZ DE MORA & DE STEFANO, *supra* note 186, at 2.

²⁶⁵ Telephone Interview with Juan Valero de Palma, *supra* note 263.

²⁶⁶ Public Water Domain Regulations art. 343.5 (B.O.E. 1986, 103).

²⁶⁷ For CH Segura, see Announcements (B.O.E. 2007, 82) and Announcements (B.O.E. 2008, 47). For Jucar, see Announcements (B.O.E. 2006, 312), (B.O.E. 2007, 165, 191, & 311), and (B.O.E. 2008, 47, 77, & 191). For CH Gadiana, see Announcements (B.O.E. 2006, 270 & 275), (B.O.E. 2007, 81, 95, 213, 219, & 313), (B.O.E. 2008, 27, 45, & 234), and (B.O.E. 2009, 40, 62, 236, 248, & 266).

²⁶⁸ See generally Public Sector Contract Law (B.O.E. 2011, 276) (establishing general regulations for public procurement); Public Sector Contract Law (B.O.E. 2007, 271) (governing public sector contracts from 2007 to 2011); Public Administration Contract Law (B.O.E. 2000, 241) (governing public sector contracts from 2000 to 2007). Public procurement regulations are increasingly influenced by the EU requirements. Basically, the principles of transparency and competition must be carefully respected to prevent favoring certain companies with taxpayer money or which will not provide proper public services. This means that the RBA has to issue a Public Offer of Acquisition calling for applications of those who want to lease their water and fulfill the requirements set forth in the offer. Those applications must be handed in before a deadline in secret envelopes. All the applications are reviewed at once and then the RBA chooses who to lease water from. After that the resolution of which ones will be bought will be publicized.

²⁶⁹ For example, CH Jucar published a water bank adjudication in 2007. See Jucar Resolution (B.O.E. 2007, 165).

Number and Volume of Transactions Table

Type of Transaction	Year	Number of Transactions	Volume in Acre-Feet (AF)
Private transactions	2000–2009	63 (38 intrabasin; 25 interbasin) ²⁷⁰	25,294.3
Guadiana water bank	2006–2008	204	No data available
	2009	223	No data available
	Total	427	23,561.7 ²⁷¹
Júcar water bank ²⁷²	2006	No data available	46,048.5
Segura water bank	2007	41	2,352.0 ²⁷³
	2008	No data available	No data available

From 2000 to 2009, the total volume traded according to the available data amounted to 296,521.8 acre-feet (AF).²⁷⁴ As for the

²⁷⁰ Calatrava Leyva, *supra* note 158, at 103 (reporting transactions between irrigators and urban users in the Guadiana Region, but without offering further details).

²⁷¹ ROSA REQUENA, CENTRO DE INTERCAMBIOS EN EL ALTO GUADIANA [EXCHANGE CENTER IN ALTO GUADIANA] 8 (2011), available at http://www.ceigram.upm.es/sfs/otros/ceigram/Contenidos%20Investigaci%C3%B3n/contenido%20seminarios%20cientificos/CENTROS%20DE%20INTERCAMBIO%20MADRID_27062011.ppt. In practice, however, only 11,015.31 AF were available for sale, because the volume bought was calculated according to rights on paper.

²⁷² The publication by Yagüe Córdova mentions other offers of acquisition by the CH Júcar but no further information has been found. Yagüe Córdova, *supra* note 259, at 10.

²⁷³ *Id.* at 11.

²⁷⁴ Adding to it the second Júcar offer, assuming it amounted to the same volume as the first one, the result would be 342,579.294 AF. As a point of comparison, the 1991 state drought bank in California bought around 821,000 AF and sold 405,000 AF. Brian E. Gray, *The Market and the Community: Lessons from California's Drought Water Bank*, 14 HASTINGS W-NW. J. ENVTL L. & POL'Y 41, 50 (2008) (reporting that 821,045 AF were bought and around

number of transactions in Spain, transactions amounted to 531 between 2000 and 2009.

The idea behind water markets is usually that they will serve as mechanisms to move water away from agriculture,²⁷⁵ which supposedly values water less than other uses.²⁷⁶ Spanish data is very scattered in relation to origin and destination. For the private mechanism—that is, permit leases—there is no data about who the seller is in the transaction.²⁷⁷ The transactions analyzed in more depth by scholars all have their origins in the agricultural sector.²⁷⁸ As for water banks, even though it is not explicitly stated, all transactions between the seller and the bank use acreage cultivated as a unit of measure,²⁷⁹ which means sellers were invariably farmers.

Scarcity can serve both to spur government to implement water markets and to encourage users to engage them. The drought crisis in Spain prompted the Spanish government to introduce water markets and to implement them. The wet years after the 1999 amendment may explain the lack of trading until 2001.²⁸⁰ In a subsequent drought period, Spain had more transactions, which may have been a result of scarcity during the long but interrupted drought during 2004–2008.²⁸¹ However, it is difficult to disentangle whether it was the low availability alone or also the result of the enabling function performed by government regulation responding to the crisis, such as setting up water banks or allowing the use of interbasin infrastructure, discussed below.²⁸² Thus, droughts affect both the number of transactions and the roles of government regarding markets, because government feels

400,000 were sold); Hanak & Howitt, *supra* note 24 (reporting that 810,713.19 AF were bought and 405,356.59 AF were sold).

²⁷⁵ Robert Glennon, *Water Scarcity, Marketing, and Privatization*, 83 TEX. L. REV. 1873, 1888 (2005).

²⁷⁶ *Id.* at 1885.

²⁷⁷ Yagüe Córdova, *supra* note 259.

²⁷⁸ *Id.* at 5.

²⁷⁹ *Id.*

²⁸⁰ Mónica Sastre, *Posibilidades de crear un mercado al amparo de la nueva Ley de Aguas* [*Possibilities for Creating a Market under the Shelter of the New Water Law*], 4 REVISTA DEL INSTITUTO DE ESTUDIOS ECONOMICOS 293, 294 (2001).

²⁸¹ *Precipitación* [*Precipitation*], MINISTERIO DE AGRICULTURA, ALIMENTACIÓN Y MEDIO AMBIENTE, http://servicios2.marm.es/sia/indicadores/ind/ficha.jsp?cod_indicador=01&factor=det (last visited Feb. 10, 2014).

²⁸² These and other measures, such as allowing the transfer of certain types of rights were allowed by the emergency decrees cited *supra* note 133.

compelled to act in order to respond to a crisis. However those roles in water markets, even if first introduced in times of drought, are also indispensable even in years of relative abundance.

V. GOVERNMENTAL ROLES

A. *The Uncontested Governmental Role in Water Markets: Definer of Property Rights, a Public Good*

This Subsection describes the definition of property rights, analyzing the definitional variables that are key for the market: security and tradability.²⁸³ This Subsection also analyzes the possibility of protecting in-stream flows through the definition of property rights. The introduction of water markets did not introduce a new system of property rights or fundamentally change the system. For the most part, it grandfathered in the current system but expanded the tradability of some of the rights.

1. *Security*

With respect to the security variable, the surviving historical private rights²⁸⁴ may fare better than permits, given that there is less administrative intervention,²⁸⁵ at least while their homogenization is not complete.

The potential control over permits by water agencies may be perceived as too great.²⁸⁶ Few holders of historical rights have used the possibilities that the regulation offers them to transform their rights into permits, even though permits purportedly offer more guarantees—or so the legislature said when opening these avenues to convert the historical rights into permits.²⁸⁷ Right holders also fear entering the regulated market because it brings administrative intervention and uncertainty. The fear seems to be related to administrative control in general and not only transactions, since there are many exchanges in the shadow of the law between

²⁸³ See discussion, *supra* Section I.

²⁸⁴ See discussion, *supra* Section II.B.2

²⁸⁵ See JUAN MIGUEL DE LA CUÉTARA, MARCO LEGAL DE LOS MERCADOS DEL AGUA EN ESPAÑA [LEGAL FRAMEWORK FOR WATER MARKETS IN SPAIN] (2013), available at http://www.fundacionbotin.org/89dguuytdfr276ed_uploads/Observatorio%20Tendencias/Sem%20NACIONALES/11%20sem%20nacional/11%20sem%20nac-delacuetara.pdf.

²⁸⁶ *Id.*

²⁸⁷ Whether the conversion is merely voluntary is a highly controversial topic among scholars.

neighboring farmers,²⁸⁸ and even in the black market.²⁸⁹

The general powers of the RBAs and the particular enhanced powers during drought periods erode security. These powers will significantly affect whether and how water users plan ahead and interact in the market; users may not be sure whether their own supply or that of a potential seller is reliable, due not only to the natural variability of the resource, but also to the decisions by the agency. Administrative decisions based on the powers described below are not perfectly correlated with external factors such as rainfall, and discretion plays an important role. Therefore, water users might not be able to alleviate drought in the short term or plan ahead using the market because they will not be sure how their needs will be affected by administrative decisions. As the previous discussion pointed out, these discretionary powers might be necessary to achieve certain praiseworthy objectives, but if markets are to have a role in allocation, these powers may need to be rethought.

The first power that RBAs enjoy under any condition is the possibility of reducing the volume granted by the permit if they consider that the user could achieve the same goals with less water and more efficient use.²⁹⁰ This is similar to the doctrine of beneficial use in some prior appropriation jurisdictions.²⁹¹ Despite an RBA's assurances that leasing water in the market will not trigger a revision, and despite the fact that this power is seldom used in Spain,²⁹² the existence of this unilateral revision power may increase the reluctance to trade in the market.

A second step available to the RBA that may erode security is to declare the forfeiture of a permit if it has not been used for three

²⁸⁸ Javier Calatrava Leyva, *Mercados informales de agua en varias zonas de la cuenca del Segura* [*Informal Water Markets in Various Zones of the Segura Basin*], (2013), http://www.fundacionbotin.org/89dguuytdfr276ed_uploads/Observatorio%20Tendencias/Sem%20NACIONALES/11%20sem%20nacional/11%20sem%20nac-javiercalatrava.pdf.

²⁸⁹ Hernández & Carcar, *supra* note 172.

²⁹⁰ Consolidated Water Act art. 65.2 (B.O.E. 2001, 176); *see also* Drought Law (B.O.E. 1996, 15) (introducing the volume reduction provision); Drought Law (B.O.E. 1995, 174).

²⁹¹ 2-12 Waters and Water Rights § 12.02 (Amy K. Kelley, ed., 3rd ed. LexisNexis/Matthew Bender 2015).

²⁹² Interview with Mónica Sastre, attorney at Ariño Villar, Madrid, Spain (July 27, 2012); Interview with Alberto Garrido, Deputy Director Water Observatory, Professor Polytechnic University of Madrid (July 2 and 13, 2012).

years.²⁹³ Administrators generally have the power to strike a balance between the rights of individual users and the prevention of unproductive speculation and hoarding in order to manage water resources.²⁹⁴ However, market regulations should completely shield potential sellers or lessors from its application. The market provisions enacted in 1999 only expressly protect against total forfeiture, not partial forfeiture or the use-revision mentioned above.²⁹⁵

A third administrative prerogative that undermines security is the process for permit renewal, and in particular, their time limits.²⁹⁶ The renewal process may trigger changes in the permit if the RBA considers that the same use could be achieved with a lower volume.²⁹⁷ While this has the obvious potential of reducing security, in practice it does not seem to have had a negative effect on private right holders, and renewal is generally an easy path for incumbent right holders."²⁹⁸

Fourth, compensated public taking of water permits can occur in favor of another use that ranks higher in the priority of uses established in the River Basin Hydrologic Plan.²⁹⁹ This taking power, triggered during emergencies, weakens the reliability of supply for both the buyer and the seller. A buyer might choose not to alleviate his shortage on the market, because he might fear that in later stages of the drought, the administration will curtail the seller's right to some extent unexpectedly.

The fifth power that relates to security is the discretion given to the administration to apportion water when there are shortages. RBAs may reduce the amount of water granted to permit holders due to resource unavailability if the aquifer is overexploited or undergoing a severe drought,³⁰⁰ given that the amount in the permit is not guaranteed.³⁰¹ This discretionary apportionment power is probably one of the main market setbacks.

Security is thus related to administrative prerogatives like

²⁹³ Public Water Domain Regulations art. 148.4 (B.O.E. 1986, 103).

²⁹⁴ Sandra Zellmer, *The Anti-Speculation Doctrine and Its Implications for Collaborative Water Management*, 8 NEV. L.J. 994 (2008).

²⁹⁵ Consolidated Water Act art. 69.2 (B.O.E. 2001, 176).

²⁹⁶ See discussion *supra* Section II.B.1.

²⁹⁷ Public Water Domain Regulations arts. 140–42 (B.O.E. 1986, 103).

²⁹⁸ *Id.* art. 89.3.

²⁹⁹ Consolidated Water Act art. 67.1 (B.O.E. 2001, 176).

³⁰⁰ *Id.* arts. 55, 58.

³⁰¹ *Id.* arts. 50–55.

expropriation, and the mechanisms of permit revision, such as the renewal power or the inefficient use revision. Some of these administrative powers are actually imperfect alternatives to markets since they centralize the cure for inefficient allocation, whereas markets, being decentralized, can often achieve better results.³⁰² The shortages experienced in Spain show that these administrative powers are ineffective at actually achieving an efficient response and making the allocation flexible.³⁰³ The administration either does not have sufficient information or does not have the political power to implement what surely will be contentious decisions. RBAs have not even used the toolkit to deal with drought crises, enacting emergency decrees instead.³⁰⁴

Since the introduction of the Drought Preparedness Plans around 2009, emergency powers have been more predictable.³⁰⁵ During much of the period of study, the first decade of the 2000s, drought response was not heavily based on those powers listed above, but rather was piecemeal and channeled through emergency regulations. This reliance on emergency regulations further undermines the security of the permits, because such emergency powers are more discretionary by nature.³⁰⁶ Those regulations have usually favored urban users discouraging urban water utilities from using the market to buy extra supplies to prepare for times of low availability.³⁰⁷

These emergency decrees and the general powers weaken the decision-making capacity of water rights holders and, thus, their

³⁰² R. Quentin Grafton, Clay Landry, Gary D. Libecap & Robert J. O'Brien, *Water Markets: Australia's Murray-Darling Basin and the US Southwest*, 1 (NBER Working Paper No. 15797, 2010), http://www.nber.org/papers/w15797.pdf?new_window=1 ("Australia's Murray-Darling Basin (MDB) and the US Southwest offer a 'window to the future' on the growing problem of water scarcity and the potential for water rights and markets to provide information on current consumption patterns and alternative values, incentives for adjustments in use, and smoother reallocation across competing demands.").

³⁰³ Modification of the Water Act preamble (B.O.E. 1999, 298).

³⁰⁴ Rico Amorós, *supra* note 158; *supra* note 130 and accompanying text.

³⁰⁵ Interregional basins' drought plans were approved by the central government. Inter-community Drought Plans (B.O.E. 2007, 71) (approving special plans for alert and drought scenarios in interregional basins).

³⁰⁶ MAGRAMA, MEDIDAS LEGISLATIVAS Y NORMATIVAS [LEGISLATIVE AND LEGAL MEASURES], available at http://www.magrama.gob.es/es/agua/legislacion/Medidas_Legislativas_tcm7-197416.pdf (list of the twenty-three decrees—eighteen from the central government, four regional, and one local—enacted to cope with the drought from 2005 to 2009).

³⁰⁷ See *supra* note 194.

incentives to trade—whether or not these powers are frequently exercised. For example, a farmer may be reluctant to sell water due to the fear that the RBA will determine that he has a right to more water than he needs, and declare the excess use forfeited. Therefore, if these powers are seldom used, or if their use is not achieving the intended goals, one might wonder whether limiting many of these powers would send a signal to the market that water rights will be more secure.

There is still a sixth instance where the definition of property rights plays a role in security, which deals with the volume that can be traded after the 1999 amendment. The volume is limited to the amount effectively used by the lessor,³⁰⁸ which is actually a positive feature for security since the right holder can anticipate a minimum amount of water secured by prior use. However, such a volume is subject to corrections due to extreme hydrologic circumstances, with respect to in-stream flows, or, where in-stream flows have not been defined, based on the proper use of water. Such standards involve discretion and, if they are not properly implemented, users could fear arbitrariness.

Finally, in-stream flow protection can also create uncertainty and depress trading on water markets. Spain has opted for a strategy dominated by quantification of environmental in-stream flows as a result of European regulation.³⁰⁹ The RBA decides on the specific in-stream flow volumes in their plans,³¹⁰ and during droughts the in-stream flow regime is allowed to be relaxed.³¹¹ The implementation of in-stream flows tries to be as respectful as possible of already allocated rights, given the risk of having to pay compensation to those who see their rights reduced,³¹² and has eased participation of the affected parties in the procedure to establish them.³¹³ These in-stream flow volumes are binding in

³⁰⁸ Consolidated Water Act art. 69.1 (B.O.E. 2001, 176).

³⁰⁹ Water Framework Directive, *supra* note 87.

³¹⁰ Consolidated Water Act art. 59.7 (B.O.E. 2001, 176).

³¹¹ If there is a long period of drought the instream flow requirement could be relaxed. Hydrology Planning Regulations art. 18.4 (B.O.E. 2007, 162) (regulating water planning); *see also* Rafael Sánchez Navarro & Julia Martínez Fernández Lecture before the Panel Científico-Técnico de Seguimiento de la Política del Agua [The Water Policy Scientific-Technical Panel] (Jan. 24, 2008), (reviewing and critiquing the procedure leading to the establishment of instream flows).

³¹² National Hydrological Plan art. 26 (B.O.E. 2001, 161).

³¹³ CONSEJERÍA DE AGRICULTURA, GANADERÍA, PESCA Y MEDIO AMBIENTE, DEMARCACIÓN HIDROGRÁFICA DEL TINTO, ODIEL Y PIEDRA, APÉNDICE 11.4,

cases of modification or new permits.³¹⁴ However, critiques abound regarding the definition of in-stream flows, because in many cases they have been found to be not scientifically sound.³¹⁵ Suffice it to say now that quantification offers more security than the protection of flows through open-ended standards.

2. *Tradability*

In general, the 1999 amendment tried to lower the barriers, mostly legal, for permits to exchange hands. It defined which permits could be traded and outlined the review mechanisms. This analysis will focus mostly on the regulations covering permits to be leased, rather than on the water bank, which pertains more to the government's market-maker function.

Since the passing of Act 1999/46, permits can be leased,³¹⁶ which was not clearly possible before this legislation. In the previous scheme, permits could be transferred, which would imply that *a maiore ad minus* the permits could also have been leased. But it might not have been feasible to do so since applying for modification of the permit title took up to eighteen months. Eighteen months might have been too onerous a time cost, particularly for leases because the change in the title needs to be filed both at the beginning and at the end of the lease.

However, the 1999 lease contract provision constrains the ability to lease permits.³¹⁷ The first of the requirements is that the lease only operates between a seller and a buyer where the buyer employs the water for a use ranked equal or higher to the seller.³¹⁸ This prevents a user who sold the right to use water to a higher-ranked buyer from buying back the water at a later point in time.³¹⁹

available at, http://www.juntadeandalucia.es/medioambiente/portal_web/agencia_andaluza_del_agua/nueva_organizacion_gestion_integral_agua/planificacion/planes_aprobados_consejo_gobierno/dh_tinto_odiel_piedras_aprobado/Anejos_memoaria/Anejo_11_Participacion_Publica_TOP/Apendice_11_4.pdf.

³¹⁴ Consolidated Water Act arts. 59.7, 68.3, 98 (B.O.E. 2001, 176). However, social and economic considerations also enter into the definition of instream flows. See Hydrology Planning Internal Regulations (B.O.E. 229, 2008). For an analysis of these regulations, see Mónica Sastre Beceiro, *Proceso de concertación de los caudales ecológicos [Agreement Process in Ecological Flows]*, in XII CONGRESO NACIONAL DE COMUNIDADES DE REGANTES DE ESPAÑA (2010).

³¹⁵ See Sánchez Navarro & Martínez Fernández, *supra* note 311.

³¹⁶ Consolidated Water Act art. 67 (B.O.E. 2001, 176).

³¹⁷ *Id.* arts. 67–70.

³¹⁸ *Id.* art. 67.1.

³¹⁹ *Id.*

The default ranking is as follows, from highest to lowest: domestic users and small industry connected to the municipal water net; agriculture; hydroelectric or other electric power producers; industry; fish farms; recreation; navigation.³²⁰ Any particular River Basin Hydrologic Plan may choose to modify this ranking.³²¹ There are several interpretations of what lies behind ranks; probably they express a combination of the competing interpretations. Rank purportedly expresses the public interest.³²² Ranking seems to be a proxy for the social valuation of water, although it probably lags behind real-time valuation because it is not amended often enough to update to new uses and interest groups may prevent real valuation from being reflected there. It also reflects the otherwise relatively abstract inelasticity of demand for different users, by assuming that domestic consumers and farmers cannot do without water. However, rank is a very rough proxy for marginal value, and marginal value may not follow these rules. This ranking of uses requirement could be waived during drought times which would allow transfers between a use ranked higher, like farmers, to a user ranked lower, like industry.

It is important to note that some of the requirements, though limiting the potential transactions, could be a way of increasing tradability if they translate into a less demanding review process. Some of the externalities could be prevented by the limits on trading and, thus, require less review. But as shall be seen, the review is still cumbersome.

An additional way to increase the tradability of permits related to the ranking of uses should be mentioned. Environmental uses are not included in the general rankings of uses.³²³ There are no permits for environmental uses, and other in-stream uses—like recreational uses—do not offer avenues to use permits instrumentally to protect the environment at the same time as they fulfill other purposes. In-stream flows are considered a restriction on uses—that is, they may impose duties on other permit

³²⁰ *Id.* art. 60.3.

³²¹ For example, in the River Basin Hydrologic Plan of the Segura River Basin, industry takes precedence over electric power production. *NORMATIVA, PLAN HIDROLÓGICO DE LA CUENCA DEL SEGURA [SEGURA RIVER WATER PLAN]*, art. 14, available at https://www.chsegura.es/export/descargas/planificaciony dma/plandecuenca/contenido_normativo/docsdescarga/NORMATIV.pdf.

³²² Gómez, *supra* note 13.

³²³ Consolidated Water Act art. 60 (B.O.E. 2001, 176).

holders.³²⁴ Nonetheless, in order to make a clear statement of the central relevance of environmental protection, some Basin Plans classify in-stream flows as uses, but those RBAs cannot grant a permit.³²⁵ The fact that environmental uses are not specifically recognized with permits prevents an environmental organization from applying for a permit or from entering the market to buy water and provide this public good that is highly valued by its members. When the 1999 approval was being discussed, the government considered the use of sales as a mechanism to recover water (which, again, is to some extent public property) for the environment as a cheap and viable option.³²⁶ But the 1999 regulation did not expressly authorize that.

Even though permits are not awarded for environmental uses, there are several ways for government to acquire rights on behalf of the environment. First, RBAs have a preferential right—which has never been exercised—to obtain a lease of the water that is being contracted between two parties applying for its authorization.³²⁷ Therefore, there is no clear barrier preventing RBAs from retiring those permits from use. Second, direct public purchases have occurred. In 2006, a central government decree allowed environmental purchases through the water banks,³²⁸ which initially were understood only as clearinghouses.³²⁹ In this context, some RBAs have bought water rights in order to improve the quality of the aquatic ecosystem, particularly in overexploited aquifers, including the Guadiana, Júcar, and Segura RBAs.³³⁰ But private parties cannot protect the environment by purchasing rights, because there is no protection for a user whose use consists of leaving the water in the river.³³¹

³²⁴ *Id.* art. 59.7.

³²⁵ Segura River Water Plan, *supra* note 321, at art. 6.

³²⁶ Fernández-Cuesta, *supra* note 13.

³²⁷ Consolidated Water Act art. 68.3 (B.O.E. 2001, 176).

³²⁸ Law Adopting Urgent Measures to Lessen the Effects of the Drought on the Population and Water-Intensive Agricultural Sectors in Certain Watersheds (B.O.E. 2006, 222) (third additional provision).

³²⁹ Consolidated Water Act art. 71 (B.O.E. 2001, 176) (establishing that the possibility of water banks does not cover the possibility of the administration buying water without transferring it to third parties, that is, the administration is conceived as a broker not as the lessee of water for instream purposes).

³³⁰ *See* Law Adopting Urgent Measures to Lessen the Effects of the Drought on the Population and Water-Intensive Agricultural Sectors in Certain Watersheds (B.O.E. 2006, 222) (third additional provision) (authorizing the exchange centers to buy water rights).

³³¹ There is no protection because only users who hold a permit are protected

Returning to the limits and their effect on tradability, a second limit is the time-limited nature of the lease contract.³³² What we are concerned with here is not a sale; it is a lease. In the case of a sale, the procedure has not changed since before the 1999 amendment. However, in the case of a lease, it is time limited. There is no specific amount of time set for the lease, but its limit is the expiration date of the permit.

Third, both the buyer and the seller have to be permit holders.³³³ There are exceptions, as was briefly pointed out when describing the types of rights present in the Spanish water regime.³³⁴ Historical property rights that were recorded and transformed into permits can also be transferred.³³⁵ Additionally, from 2006 to 2009 irrigation rights from areas of public initiative could be leased under emergency decrees which had a sunset provision.³³⁶ However, in general, both buyers and sellers must be permit holders, which poses a problem for new energy producers (for example, thermal solar plants) that want to buy water in already fully allocated streams or avoid the time-consuming permit application. Under the Consolidated Water Act (CWA), all new uses must apply for a permit; without a permit, they cannot count on transactions to quench their thirst. This is a stark difference from the regulation of SB 610 & 221³³⁷ in California, where transfers are seen as a mechanism to cover future, new demands, not requiring the buyers or lessees to be permit holders.

A fourth limit is that non-consumptive uses cannot be transferred to consumptive ones.³³⁸ Although this restriction did not appear in the early drafts, the government decided to introduce it as a response to those who feared that the hydropower companies would control the market, as happened in Chile.³³⁹

Fifth, the amount of water traded is limited to the amount used on average by the lessor in the last five years, not the formal

and permits cannot be granted for instream uses.

³³² Consolidated Water Act (CWA) art. 59.4 (B.O.E. 2001, 176).

³³³ *Id.* art. 67.1.

³³⁴ *See supra* Section III.C.

³³⁵ Public Water Domain Regulations art. 343.4 (B.O.E. 1986, 103).

³³⁶ *See supra* note 194.

³³⁷ ELLEN HANAK, WATER FOR GROWTH: CALIFORNIA'S NEW FRONTIER 52; 64-65 (2005).

³³⁸ Consolidated Water Act art. 67.1 (B.O.E. 2001, 176).

³³⁹ Gómez, *supra* note 227. For a critical account of the Chilean experience, see CARL J. BAUER, SIREN SONG: CHILEAN WATER LAW AS A MODEL FOR INTERNATIONAL REFORM (2004).

amount granted in the permit.³⁴⁰ The average consumption limitation reduces the probability of externalities since it ensures that there will be no increase in consumption. In terms of efficiency, it is a good feature that the consumed volume is averaged over five years. If it were not averaged over a multi-year period it would discourage savings, since lessors would have incentives to increase their consumption in the period before leasing their permit. In relation to the volume used, there is a problem common to other jurisdictions: farmers fear disclosing too much information about current consumption and triggering a permit's review.

There is a potential sixth limit, because the maximum price for leases could be fixed by government regulation.³⁴¹ In fact, before the 1999 amendment was passed, the government leaked the information that the maximum price would be set at 60 *pesetas* (less than \$ 0.50 USD),³⁴² but no official regulation was ultimately enacted. Most probably, the government wanted to comfort those who feared that the price of water would skyrocket as a result of market speculation,³⁴³ making it too expensive for farmers. The government has never used this power, but it could.

Finally, there is a seventh limit: the preferential acquisition right held by the RBA. During the period granted to the RBA to review the transaction, the RBA can take over the contract, since it has legally granted priority to get the water in order to leave it in-stream.³⁴⁴ This is a provision introduced to purportedly preserve the public interest over a resource that is public property. It is also a politically cheaper mechanism than expropriation for the administration.³⁴⁵ The preferential right has never been exercised and the literature has never paid attention to it. However, even though it might be inactive in practice, it could still have a chilling effect.

The tradability is slightly more expanded if instead of a trade between private parties, the trade occurs through a water bank.³⁴⁶

³⁴⁰ Public Water Domain Regulations art. 345.1(a) (B.O.E. 1986, 103).

³⁴¹ Consolidated Water Act art. 69.3 (B.O.E. 2001, 176) (instead of price, the word used is compensation).

³⁴² Fernández-Cuesta, *supra* note 13.

³⁴³ In fact, the price was defended by the Ministry of the Environment and Benigno Blanco on those terms. *See id.*

³⁴⁴ Consolidated Water Act art. 68.3 (B.O.E. 2001, 176).

³⁴⁵ Fernández-Cuesta, *supra* note 13.

³⁴⁶ Consolidated Water Act art. 71 (B.O.E. 2001, 176); Public Water Domain

While private parties without the brokerage of the administration cannot enter into “sales” unless they go through the pre-1999 procedure, water banks can either enter into sales or into leases.³⁴⁷ The subjective limit also appears in water banks: only holders of permits or those with private rights inscribed in the Water Registry can participate, without specific mention of the need of having transformed their rights to a permit. However, in the 2010 Andalusian Water Act, applicable only to internal basins of Andalusia, even non-right holders can be buyers in the water bank, which sells water bought from private parties as well as recovered as a result of permit revisions.³⁴⁸ This suggests that there is room for improvement.

The transferability of permits following the lease procedure is also defined by the review procedure that transactions go through in order to be authorized since the costs it imposes may be anticipated by those considering whether to enter into transactions, and may impair their will to do so. The suitability of the Spanish review scheme will be analyzed next.

B. *Externalities: Apparently Not a Major Concern*

Externalities have been the primary focus of U.S. regulations and academic literature on the topic of water markets.³⁴⁹ It is quite striking how little attention externalities have received in the Spanish literature and regulations. Neither the CWA nor the implementing regulations offer detailed information about how externalities are to be accounted for in the review of permit leases,³⁵⁰ and the review procedure is not very detailed. Since there are no public records on the applications, review documents, or decisions,³⁵¹ the focus of this Section will be on the law as written, with some references to the law as perceived in practice by water law practitioners.

The authorization to lease a permit can be denied if the lease

Regulations arts. 354–55 (B.O.E. 1986, 103).

³⁴⁷ Public Water Domain Regulations art. 355(d) (B.O.E. 1986, 103).

³⁴⁸ Andalusia Water Act art. 45.4 (B.O.J.A. 2010, 155).

³⁴⁹ See, e.g., Robert Glennon & Michael J. Pearce, *Transferring Mainstream Colorado River Water Rights: The Arizona Experience*, 49 ARIZ. L. REV. 235 (2007).

³⁵⁰ Public Water Domain Regulations art. 68 (B.O.E. 1986, 103).

³⁵¹ See Public Water Domain Regulations art. 347 (B.O.E. 1986, 103) (referring to the reasons listed in article 68.3 in the Consolidated Water Act without further elaborating on them).

does not fulfill the formal requirements,³⁵² and the procedural steps, or if the transaction is found to negatively affect the exploitation regime of the basin, the rights of third parties, regulated in-stream flows, or the state or conservation of the aquatic ecosystems.³⁵³ Thus the standard of review for permit leases can be summarized as no injury to other users or the environment.³⁵⁴ The denial does not give the parties any right to compensation.³⁵⁵ In theory, according to the CWA, in-stream flows should be set taking ecological criteria into account.³⁵⁶ Respecting in-stream flows should reduce the problem of environmental externalities, particularly given that, in addition, the tradable volume is already restricted to historical use. The mention of aquatic ecosystems mean that the impacts of a change of use on water quality would not be captured by a simple quantity restriction. Thus, it might well be that in some cases open-ended standards are required because quality variables cannot be reduced to a single quantitative measure. This intersects, again with the use rankings.³⁵⁷ These open-ended standards could be restricted to those cases where the type of use changes, making the review less demanding and more certain to those who do not change uses, such as an agricultural-agricultural transaction.

Regarding the procedural regulation, few issues need to be mentioned. The RBA has one month to reject a contract between users of the same irrigation community, or two months if they are not of the same irrigation community.³⁵⁸ The difference in the length of time for review very likely takes into account the externalities differential that might arise given the market's scope. The larger the distance between the two parties to a contract, the more externalities may occur. A written contract has to be submitted to the RBA for its approval within fifteen days of the agreement.³⁵⁹ In the requirements to which the contract's content is subject, there is no mention of any document assessing the impact

352 See discussion, *supra* Section V.A.ii.

353 Consolidated Water Act art. 68.3 (B.O.E. 2001, 176).

354 *Id.*

355 *Id.* (failing to mention compensation).

356 See Consolidated Water Act art. 42.1 (B.O.E. 2001, 176).

357 For a discussion on rankings, see footnotes 121 to 125 and accompanying text.

358 Consolidated Water Act art. 68.2 (B.O.E. 2001, 176).

359 *Id.* art. 68.1.

on other users or the environment.³⁶⁰ In other words, the burden of proof is not allocated in the review procedure,³⁶¹ and so it seems to lie with the administration. Actual practice indicates that the parties do not supply information to the administration beyond the application and the contract unless it is requested.³⁶²

One of the mandatory terms of the contract is the volume to be transferred.³⁶³ This is defined by Spanish legislation in a way that should minimize potential externalities, since it has to account for the actual use of the seller averaged over the last five years, and must respect the in-stream flows established.³⁶⁴ However, there is no mention of a duty to include these findings in the application. This means that it is the administration that must undertake all the analysis.

The burden placed on the administration is even more striking given that there are no fees for the review procedure. Instead it must be funded by the RBA's general funds.³⁶⁵ The reason might be that there are so few transactions that they do not represent a substantial share of the workload at the RBA. The procedure, according to the text of the regulation, does not allow for the participation of third parties,³⁶⁶ thus preventing an anti-commons tragedy, but third-party participation was later allowed following a 2011 decision by the Constitutional Court.³⁶⁷ The likely reason behind the current review scheme is the belief that the

³⁶⁰ *Id.*

³⁶¹ Public Water Domain Regulations art. 344 (B.O.E. 1986, 103).

³⁶² My interviews with lawyers confirm this. Interviews with Jordi Codina, Miquel Corredor, and Oriol Camacho, *supra* note 139; interview with Mónica Sastre, *supra* note 292.

³⁶³ Public Water Domain Regulations art. 344.1(c) (B.O.E. 1986, 103).

³⁶⁴ *Id.* art. 345.1.

³⁶⁵ This is just a logical inference from the fact that there are no fees. This is the case in California where the SWRB imposes a fixed filing fee plus some additional fees in tied to quantity for inter-basin transfers. To this, the \$850 fee for the Department of Fish and Game has to be added. *See* DIV. OF WATER RIGHTS, STATE WATER RES. CONTROL BD., PETITION FOR CHANGE INVOLVING WATER TRANSFERS, *available at* http://www.swrcb.ca.gov/waterrights/publications_forms/forms/docs/pet_transfer.pdf.

³⁶⁶ There is no direct prohibition against third party participation, but there is no enabling provision either. *See* Consolidated Water Act art. 68 (B.O.E. 2001, 176). The likely reason behind such a scheme is the belief that the administration would not allow transactions affecting other users to go forward. This assumes that the RBA reviewing the transaction does not have incentives to favor the interested parties over other interests, which seems to run afoul of any public choice account of administrative action.

³⁶⁷ S.T.C., Sept. 28, 2011 (B.O.E., No. 258, p. 94).

administration would not allow transactions affecting other users to go forward because it embodies the public interest. The court ruled in 2011 that the gap could be filled with the general principles of administrative law, which always favors the participation of third parties.³⁶⁸ By allowing third parties' participation, the administration may save on information costs, but it may increase transaction costs by the parties. In addition, it makes potential compensation difficult because there are no incentives for the parties to the transaction to compensate affected third parties, since it is unlikely the third parties will resort to the judicial procedure for such small stakes.

Even though private parties do not have a clear avenue to participate, certain public agencies do. In leases regarding irrigation permits, the central government's Agricultural Department, the autonomous communities involved, and the irrigation communities all have a say.³⁶⁹ This requirement obviously causes delays, and may increase uncertainty about the criteria really underlying the review even if the reports are mandatory but not binding.³⁷⁰ The participation of those other bodies does not seem to contribute much if the review focuses on external effects on other water users or the environment.

In any event, while the consensus in California seems to be that there is a need to ease the review of transactions,³⁷¹ some Spanish practitioners I interviewed did not seem particularly troubled by this review process.³⁷² On the contrary, some in Spain

³⁶⁸ *Id.*

³⁶⁹ Public Water Domain Regulations art. 346.3 (B.O.E. 1986, 103).

³⁷⁰ *Cf.* Bretsen & Hill, *supra* note 153, at 744–45 (discussing transaction costs).

³⁷¹ The Water Transfer Decision Tree reflects the complexity. DIV. OF WATER RIGHTS, STATE WATER RES. CONTROL BD., A GUIDE TO WATER TRANSFERS 2–3 (1999) available at <http://www.waterrights.ca.gov/watertransferguide.pdf>. Governor Brown's emergency measures to tackle the drought also reflect the complexity of the review procedure by expediting the review process. Press Release, Office of Governor Edmund G. Brown, Governor Brown Issues Executive Order to Streamline Approvals for Water Transfers to Protect California's Farms ¶¶2, 20 (May 20, 2013) available at <http://gov.ca.gov/news.php?id=18496>.

Furthermore, Gray et al., propose amendments that would streamline the procedure. *See* Gray et al., *supra* note 43.

³⁷² This is anecdotal evidence based on interviews with lawyers from Codina and Ariño Villar, which are the two main legal firms working in water related issues in Barcelona and Madrid respectively and have contacts with others across the territory. Interviews with Jordi Codina, Miquel Corredor, and Oriol Camacho, *supra* note 139; Interview with Mónica Sastre, *supra* note 292.

thought that the review did not guarantee the protection of public interest: one of the arguments made to challenge the 1999 amendment and the 2001 CWA by the Autonomous community of Aragon was that the administration did not have thorough control in this review.³⁷³ The Constitutional Court dismissed the argument and considered the two-month period sufficient for the administration to reach a meaningful decision.³⁷⁴

There is no provision related to the review procedure in the water banks. There seems to be an assumption that, given the requirements that the RBA establishes in the public call for those who wish to participate, there is no need to undergo a review procedure.³⁷⁵ Instead, the high barriers to entry in the bidding process ensure fungibility between the rights, and further, RBAs are expected to be truly involved in the process.³⁷⁶ The public call issued by the CH or the regional basin administration expressing its willingness to acquire water must establish: the maximum volume that can be leased, which type of users can participate, the maximum and minimum prices, contract length, the criteria to be used to decide which rights will be leased or bought, and the procedural deadlines.³⁷⁷ However, current regulation only establishes the rules that guide the offer of acquisition, but not the selection of the buyers, which will obviously affect the potential externalities. There is not much reason for concern, because up to now most of the water rights have been reallocated to the environment, letting the water flow in the river, not to other users. If water is not taken from the river, no one should be greatly affected.

In the water banks where water was allocated to private users, or where water was intended for private users, experiences are mixed. On the one hand, in the Júcar basin, environmental or third party externalities are mitigated, since the amount sold will be reduced by a certain percentage in order to contribute to the recovery and maintenance of the water.³⁷⁸ On the other, in the case of the Guadiana Basin, there have been serious claims of fraud. It appears that some users kept using the water they were required to

³⁷³ S.T.C., Sept. 28, 2011, *supra* note 367, at 94–99.

³⁷⁴ *Id.* at 99–106.

³⁷⁵ Public Water Domain Regulations arts. 354–55 (B.O.E. 1986, 103).

³⁷⁶ *Id.* art. 355.

³⁷⁷ *Id.*

³⁷⁸ Yagüe Córdova, *supra* note 259, at 10.

transfer to the bank.³⁷⁹

Up to now, the analysis has focused on externalities affecting other water users or the environment, but externalities imposed on communities need to be considered. Even the anticipation of those community effects may improve the perception of water markets and increase their visibility. Given the lack of major reallocations in Spain, externalities affecting communities as a result of market transactions has not been a big issue, despite the fact that it was one of the major concerns in the legislative debate.³⁸⁰ At that time, many representatives of the farmers claimed that water markets would dry up traditional, small farming and benefit corporate agricultural interests, or other enterprises.³⁸¹ In practice, these concerns are similar to those that seem to underlie the 2005 transactions by the Mancomunidad de los Canales del Taibilla, a public company supplying water to municipalities in southeastern Spain. The central government exempted Mancomunidad from certain water tariffs to compensate the company for its economic efforts by leasing water to the Mancomunidad to cope with the crisis.³⁸² This prevented the prices faced by private users from going up, and avoided a market distortion.

Community externalities appeared more clearly in the 2001 National Hydrologic Plan, which discussed the major reallocation from the Ebro to the Mediterranean area.³⁸³ The communities along the river, and particularly at the delta, argued against the transfer on the basis of environmental and community impact.³⁸⁴ However, it is important to remember that this was a mandated transfer ordered by the government. The strong opposition suggests that similar attitudes may arise if market reallocations occur because not everyone in the community will be a part to those transactions. In order to avoid community protest, there should be a mechanism to compensate the community at large—perhaps through the municipalities—with programs aimed at

³⁷⁹ David Zetland, *An Expensive Groundwater Governance Failure*, AGUANOMICS (Jan. 22, 2013), <http://www.aguanomics.com/2013/01/an-expensive-groundwater-governance.html>.

³⁸⁰ *Hearings*, *supra* note 14, at 20649, 20653, 20660.

³⁸¹ *Id.* at 20670 (De las Heras, General Secretary of the Agricultural and Cattle Breeders Union).

³⁸² Law Adopting Urgent Measures to Lessen the Effects of the Drought on the Population and Water-Intensive Agricultural Sectors in Certain Watersheds (B.O.E. 2006, 222).

³⁸³ National Hydrological Plan (B.O.E. 2001, 161).

³⁸⁴ *See supra* note 241.

reactivating the economy, or at least ensuring public participation in the review procedure.

C. *Infrastructure: Provision and Management*

Historically, big infrastructure development was a state monopoly and an expression of national pride—as is the case with gigantic dams³⁸⁵—and infrastructure is still subject to state control today. Infrastructure projects are considered “public works of general interest”³⁸⁶ and only the government can undertake them. Their construction can be contracted out, but under the auspices of the central government. The role of government fuels the mischaracterization of big infrastructure as a public good and even though it is technically an excludable good, it may not be politically feasible to exclude users from it.

Spain has quite a few infrastructure connections, but none directly between the humid North and the dry South—unlike California, which does have such a connection.³⁸⁷ The most important connections are those serving the Southeast, an area that has experienced great development in recent years.³⁸⁸ The existing connections were not built with the Spanish market in mind, but rather were just part of the command-and-control strategy to transfer surplus water, provide water for all at a subsidized price, and regulate distribution.³⁸⁹ However, actual surplus was not always taken into account by the projects.³⁹⁰ In any event, during the drought crisis there were larger water reserves in the areas of

³⁸⁵ In Spain, currently there are around 1,200 dams and their total capacity is approximately 68 million AF. Luis Berga Casafont, *Presas y embalses en la España del siglo XX* [*Dams and Reservoirs in 20th Century Spain*], 3438 REVISTA DE OBRAS PUBLICAS 37 (2003), available at http://ropdigital.ciccp.es/detalle_articulo.php?registro=18348&anio=2003&numero_revista=3438.

Nowadays, the dams' era seem to be over in both jurisdictions. Many of these dams were built and managed by the central level of government (US federal government and Spanish central government). The majority of those dams were built under the dictatorship of General Franco (1939–1975).

³⁸⁶ Consolidated Water Act art. 124 (B.O.E. 2001, 176).

³⁸⁷ California State Water Project, CAL. DEP'T OF WATER RES., available at <http://www.water.ca.gov/swp/docs/SWPmap.pdf> (map, showing the two large projects connecting Northern and Southern California: the State Water Project and the Central Valley Project).

³⁸⁸ Jordi Grau, *El transvasament obliga a informar* [*The Transfer Requires Giving Information*], EL PAÍS, Apr. 16, 2008.

³⁸⁹ *Id.*

³⁹⁰ For example, it is not clear how the surplus was calculated in the Ebro transfer case. Lobo, *supra* note 243.

origin,³⁹¹ and so there still seems to be room for transactions, if allowed.

Among these connecting infrastructures, the largest is the Tagus-Segura aqueduct, which was designed to solve the structural deficit of the Segura Basin.³⁹² The Segura Basin is the only basin in Spain that has a demand higher than its supply under normal conditions.³⁹³ However, the mismanagement in the Segura Basin—including, for example, illegal diversions or speculative urban development—³⁹⁴raises the question of whether water savings and more efficient management could reduce water needs, now partly satisfied by the Tagus basin, and whether less water would be consumed if the full cost of water were internalized.

Other examples of connections include the Negratín-Alzamora pipeline, which connects the Guadalquivir Basin with the South, and the interconnection between the two main internal Catalan rivers, the Ter and the Llobregat. The most recently built connection was between the Júcar and the Vinalopó in the Valencia region,³⁹⁵ to quench the thirst of the farmers in the Vinalopó area. This transfer was envisioned, again, as a mandated transfer of water surpluses existing in the river, not as a channel for water transactions of existing rights.³⁹⁶

In general, there is a sense that connections must be improved to ensure reliability in water provision. New connections could be built to achieve the ideal pool envisioned by Juan Benet, the novelist and engineer behind some of the big hydraulic projects in Spain, who firmly believed that the water system in Spain should replicate the electric grid.³⁹⁷ Some new connections, such as the

³⁹¹ See Rafael Méndez, *Las Diez Claves Para Entender la Guerra del Agua* [Ten Key Issues to Understand the Water Wars], EL PAÍS, Apr. 16, 2008, http://elpais.com/diario/2008/04/16/espana/1208296812_850215.html.

³⁹² WWF/ADENA EL TRASVASE TAJO-SEGURA, LECCIONES DEL PASADO [LESSONS FROM THE PAST] 4 (2003).

³⁹³ MINISTERIO DE MEDIO AMBIENTE, LIBRO BLANCO DEL AGUA EN ESPAÑA [WHITE BOOK ON WATER IN SPAIN] 571–605 (2000), available at http://hercules.cedex.es/Informes/Planificacion/2000-Libro_Blanco_del_Agua_en_Espana/Cap_5.pdf.

³⁹⁴ Greenpeace, *supra* note 172.

³⁹⁵ Méndez, *supra* note 391.

³⁹⁶ Sara Velert, *La ribera se opone a que sirva al consumo urbano el Júcar-Vinalopó* [The Riverbank Opposes Serving Urban Consumers in Júcar-Vinalopó], EL PAÍS, July 26, 2009, http://elpais.com/diario/2009/07/26/cvalencia/1248635879_850215.html.

³⁹⁷ Julio Llamazares, *El Sueño de Juan Benet* [Juan Benet's Dream], EL PAÍS, Jan. 27, 2009, http://elpais.com/diario/2009/01/27/opinion/1233010805_850215.

proposed Ebro pipeline, may have made the Spanish water system closer to this ideal description, but they have never been completed because riparian communities utterly opposed them.³⁹⁸ Demonstrations were even organized in Brussels, Belgium,³⁹⁹ and as soon as the Socialist Party regained power in 2004 it complied with its electoral promise and abolished the Ebro transfer before any infrastructure had been built.⁴⁰⁰ However, less publicly debated mandated transfers have taken place contemporaneously, such as the one from the Ebro to the city of Santander, in the Northern Basins. This transfer built on a previous connection, but it was enlarged to ensure that the popular tourist area of Santander would have enough water during dry summers.⁴⁰¹ This transfer is bidirectional, because the mandatory transfer regulation requires the Northern Basins to “return” the same amount of water as they take within four years.⁴⁰² This is an interesting approach, but it must be analyzed whether in the interim, the damage to the ecosystem will be easily repaired. The timing suggests that this transfer was discussed almost in parallel with the controversial Ebro transfer and was actually executed by the Socialist Party that opposed the Ebro transfer.

New infrastructure does not necessarily need to be as colossal

html (reviewing the ideas of the engineer for the Spanish Water System).

³⁹⁸ For a general description of the groups in favor and against the transfer, see Pau Brunet, *El Traspase del Ebro* [*The Ebro Transfer*], AR@CNE, Mar. 5, 2002, <http://www.ub.edu/geocrit/arac-69.htm>. Recently the central government has reopened the debate about the Ebro transfer and opposition has peaked again. See Roger Xuriach, *La rebelión contra el trasvase del Ebro se extenderá a Europa* [*The Rebellion Against the Ebro Transfer Will Extend Across Europe*], PÚBLICO, Mar. 20, 2014, <http://www.publico.es/espana/rebellion-trasvase-del-ebro-extendera.html> (analyzing the protests over time).

³⁹⁹ Sandro Pozzi, *Miles de españoles se manifiestan en Bruselas contra el trasvase del Ebro* [*Thousands of Spaniards Protest in Brussels Against the Ebro Transfer*], EL PAÍS, Oct. 9, 2001, http://elpais.com/diario/2001/09/10/espana/1000072805_850215.html.

⁴⁰⁰ Camilo Valdecantos, *El Congreso deroga el trasvase del Ebro y aprueba el nuevo Plan Hidrológico* [*Congress Abolishes the Ebro Transfer and Approves the New Hydrologic Plan*], EL PAÍS, Apr. 22, 2005, http://elpais.com/diario/2005/04/22/espana/1114120820_850215.html.

⁴⁰¹ I. Aristu. Zaragoza, *Santander recibe por primera vez agua del Ebro con el trasvase reversible a Cantabri* [*Santander Will Receive Water from the Ebro River for the First Time with the Reversible Cantabri Transfer*], HERALDO, Aug. 31 2008, http://www.heraldo.es/noticias/aragon/santander_recibe_por_primera_vez_agua_del_ebro_con_trasvase_reversible_cantabria.html.

⁴⁰² *Id.*

as the State Water Project in California,⁴⁰³ a relatively small system of pipes might be sufficient. In fact, during 2008, a mandated, non-market transfer to Barcelona of the water that Tarragona receives from the Ebro was discussed. One option to ship the water to Barcelona was a removable connection through a pipe.⁴⁰⁴ Perhaps if the transfer had been framed as a market enabler, it would have mitigated the opposition.⁴⁰⁵

In the absence of new connections, transactions will have to be more local, or current infrastructure will have to be better utilized.⁴⁰⁶ In fact, permit leases are supposed to take place between parties in the same river basin unless there is an express authorization to use infrastructure by the central government.⁴⁰⁷ Interbasin transfers were authorized in 2005 by *Real Decreto-Ley* 2005/15 because of the extreme drought suffered during the summer of 2005 and the scarce rainfall expected in its near future, which was predicted to be insufficient to overcome severe drought effects.⁴⁰⁸ In particular, the use of two infrastructure connections in the southeast of Spain was allowed: the Tagus-Segura Aqueduct and the Negratín-Alzamora Connection. This *Real Decreto-Ley* was extended several times and ended up expiring on Nov. 30, 2009.⁴⁰⁹

The key role of infrastructure in the success of water markets is made clear by looking at the data. 2006 was the year with the

⁴⁰³ See *California State Water Project Overview*, CAL. DEP'T OF WATER RES., <http://www.water.ca.gov/swp/> (last visited Mar. 07, 2015).

⁴⁰⁴ For an account on the opposition of the irrigators to the market framing of the catchment, see Arnau Urgell, *Transvasament del Consorci d'Aigües de Tarragona a l'Àrea Metropolitana de Barcelona* [*Transfer from the Tarragona Water Consortium to Barcelona*] TERRITORI: OBSERVATORI DE PROJECTES I DEBATS TERRITORIALS A CATALUNYA (Dec. 31, 2008), <http://territori.scot.cat/cat/viewer.php?IDN=174> (last visited Nov. 10, 2013).

⁴⁰⁵ Some Ebro irrigators, in early stages of the discussion, defended market transactions instead of direct water transfers. See Ramón-Llin *no descarta la compra de agua como alternativa al trasvase* [*Ramón-Llin Does Not Discard the Possibility of Purchasing Water as an Alternative to the Transfer*], EL PAÍS, Dec. 19, 1998, http://elpais.com/diario/1998/12/19/cvalenciana/914098697_850215.html. Afterwards, during the 2008 Catalan water crisis, politicians changed their minds. See Urgell, *supra* note 404.

⁴⁰⁶ See discussion *infra*, outlining the ways current regulation leads infrastructure to be underutilized.

⁴⁰⁷ Consolidated Water Act art. 72 (B.O.E. 2001, 176).

⁴⁰⁸ Urgent Measures to Regulate Water Rights Transactions (B.O.E. 2005, 301).

⁴⁰⁹ Law Adopting Urgent Measures to Lessen the Effects of the Drought in Certain Watersheds (B.O.E. 2008, 258).

most transactions,⁴¹⁰ more than all the transactions during 2000–2005,⁴¹¹ mainly because the use of inter-basin connections was allowed between areas with different marginal values for water.⁴¹² While it is true that 2006 was a drought year, so were 2004 and 2005, and transactions did not flourish then. In fact, 2004 and 2005 were much drier years than 2006 in terms of precipitation.⁴¹³ However, it is possible that 2006 was actually drier because of a lag in the effects of the lack of precipitation.⁴¹⁴ Alternatively, the high volume of transactions in 2006 could be explained because agreements between private parties could not be reached once the 2005 measures were enacted. In addition, the decree allowed water users in “irrigable areas of public initiative” to lease those rights.⁴¹⁵ These rights were particularly relevant in the transactions between the Tagus and Segura basins, since many of the contracts leased those types of rights.⁴¹⁶

Nonetheless, even considering scarcity and the expanded tradability of this latter type of right, the fact that the majority of transactions were between the areas connected by infrastructure—mainly Tagus-Segura and Negratín-Alzamora—cannot be denied. Crucially, the situation was so harsh that the government waived transportation fees for the use of the Tagus-Segura infrastructure in order to promote transactions.⁴¹⁷ This resulted in a rebate of 0.11 €/m³.⁴¹⁸ This suggests that governmental action and scarcity are clearly complementary. However, since the use was allowed at more or less the outset of the crisis, we do not have a counterfactual, and thus it cannot be known whether other

⁴¹⁰ See *supra* Table, Section IV.

⁴¹¹ *Id.*

⁴¹² Urgent Measures to Regulate Water Rights Transactions (B.O.E. 2005, 301).

⁴¹³ MINISTERIO DE MEDIO AMBIENTE, LA GESTIÓN DE LA SEQUÍA DE LOS AÑOS 2004 A 2007 [DROUGHT MANAGEMENT IN 2004 TO 2007] 30 (2008), available at http://www.magrama.gob.es/imagenes/en/0904712280126415_tcm11-17915.pdf (last visited Feb. 15, 2014)

⁴¹⁴ *Id.*

⁴¹⁵ See Agricultural Reform and Development Law (B.O.E. 1973, 30).

⁴¹⁶ E-mail from Antonio Embid Irujo, Professor, Universidad de Zaragoza, to Vanessa Casado-Pérez (April 27, 2013) (on file with author). Moreover, Professor Abel La Calle suggests that the leases did not happen because the rule authorized them but because the lessors and lessees asked the government to change the rule. E-mail from Abel La Calle, Professor, Universidad de Almería, to Vanessa Casado-Pérez (April 30, 2013) (on file with author).

⁴¹⁷ Calatrava Leyva, *supra* note 158, at 104. This is approximately \$185/AF.

⁴¹⁸ *Id.*

transactions without infrastructure—that is, more local transactions—would have occurred in the absence of the transfer authorization or whether the subsidy made the difference.

As discussed above, public works of general interest are a legally created monopoly, so to duplicate large infrastructure is not legal. In practice, small-scale infrastructure is also unlikely to be duplicated; although it is not very expensive to replicate these small pieces of infrastructure, resources would still need to be pooled by a group of users, and the potential free-riding problem must be overcome by creating an umbrella institution in charge of the infrastructure. In fact, much infrastructure is owned by private parties,⁴¹⁹ such as the irrigation communities. For a market to succeed, infrastructure should be regulated in a way that eliminates the risk of monopolization. The risk exists if there are no feasible alternative ways to ship water between two points and building a new connection would not be profitable.⁴²⁰ Although determining whether a monopoly exists should be analyzed case-by-case, a general discussion of water infrastructure monopoly regulation can illustrate the main points.

Given how Spanish regulation is structured, there are two issues to analyze: first, the procedure when the infrastructure is owned by the RBA; and second, the risk of exclusion.

When the infrastructure is owned by the RBA approving the transaction, the application to use the pipes, canals, and mains is independent from the application for the review of the lease contract.⁴²¹ This seems an unnecessary duplication of proceedings, since the same administrative body authorizes both applications. And provided there is spare capacity in the facilities moving water, there is no need for many other findings. Interestingly, even the decision periods are different. Whereas the RBA must make a decision on the transaction within 2 months,⁴²² the RBA can take up to four months to decide on the infrastructure application.⁴²³ If the RBA does not make a decision on time, the infrastructure

⁴¹⁹ CH DUERO, EXECUTIVE SUMMARY WATER PLAN PROPOSAL 9 (2008) (on file with the author).

⁴²⁰ For example, shipping water by boat may be possible but not a real option, unless the government subsidized the cost of shipment in order to avoid the political cost.

⁴²¹ Consolidated Water Act art. 70.4 (B.O.E. 2001, 176).

⁴²² *Id.* art. 68.2.

⁴²³ Public Water Domain Regulations art. 70.4 (B.O.E. 1986, 103).

application is considered authorized,⁴²⁴ as it is the case when the RBA does not make a decision on time authorizing the transaction.⁴²⁵ The general consensus among lawyers who deal with lease contracts is that the authorization for the use of existing infrastructure is less of a hurdle than the use of interbasin infrastructure, since the latter always involves both delay and more complex transactions, given the greater potential for externalities.⁴²⁶ In some cases, the authorization of interbasin transfers may become a political question, and some externalities might be disregarded to serve particular interests.

Regulations require that there must be agreement between the infrastructure private owner and the parties to a transaction in order to use the facilities.⁴²⁷ There is no imposition of any common carrier duties.⁴²⁸ The regulation does not rule out either direct denial of permission by the owner or other practices such as discriminatory rates.⁴²⁹ This may happen no matter whether the person owning the infrastructure is a public agency or a private party because public agencies may have conflicting interests if they participate in other sectors of the market. This would be the case of an agency that not only manages infrastructure but it is the main provider of water in the wholesale market.

In Catalonia, Aigües Ter Llobregat (ATLL) controls the distribution system and is the supplier for the urban water distribution companies.⁴³⁰ ATLL was once a governmentally owned and managed company.⁴³¹ But recent financial problems for the autonomous community of Catalonia have prompted the privatization of the services managed by ATLL. Although the company might be overseen by public bodies, it will be more difficult to presume that general interest—which should favor the most efficient use of water—will be guiding its actions, and it may adopt monopolistic practices that would render transactions impossible. For instance, ATLL supplies several municipalities

424 *Id.* art. 351.

425 *Id.* art. 351.5.

426 Interview with Mónica Sastre, *supra* note 292.

427 Public Water Domain Regulations art. 70.1 (B.O.E. 1986, 103).

428 Consolidated Water Act art. 70 (B.O.E. 2001, 176).

429 *Id.* art. 70.1.

430 *Gestió de l'aigua [Water Management]*, ATLL, <http://www.atll.cat/ca/page.asp?id=34> (last visited Mar. 07, 2015).

431 Press Release, ATLL, DOSSIER DE PREMSA [PRESS RELEASE] 4 (2014).

that have a single connection to the network.⁴³² If these municipalities want to buy from a different provider, such as an irrigation community, ATLL may charge excessive rates or simply deny them use of its infrastructure if it deems the transaction would be detrimental to its own business.⁴³³

D. *Market Maker Role*

Transaction costs underlie all regulation, and reduction of these costs was one of the major motivations for the very birth of the market tools in Spain.⁴³⁴ Prior to 1999, the mechanisms to change any of the definitional characteristics of a permit were too demanding to allow for a more decentralized market solution.⁴³⁵ Here, the focus will be on the transaction costs generated by current regulation, as well as the strategies undertaken to reduce them. Many of the roles identified as potential transaction-cost reduction strategies, such as assuming a broker function, have been adopted, at least on the books.⁴³⁶ But government action has not been bold enough, or else was not well implemented. The roles analyzed next are: recording and providing information; guaranteeing rights and transactions; increasing fungibility; and matchmaking through the water banks.

According to the law on the books, transactions must be recorded in the basin's Water Registry.⁴³⁷ In the case of trading permits for agricultural use, the origin of the unused water must be registered, either by letting fields lay fallow or proving that water will be more efficiently used and specified in the registry's

⁴³² *La xarxa de distribució* [*The Distribution Network*], ATLL, <http://www.atll.cat/ca/page.asp?id=32> (last visited Mar. 07, 2015) (map, showing that some municipalities are only served by one connection).

⁴³³ However, the interplay between infrastructure use and regulated prices must also be analyzed. If ATLL cannot charge any price it wishes, but instead is limited by regulation in what it can charge for its water, then when there is not enough water, which would be the moment when someone may resort to a market, there would be no reason to restrict the use of the infrastructure, since, despite scarcity, ATLL will not be able to increase its price. However, in an ideal world, parties may find cheaper water even taking into account higher transportation costs under normal conditions. In such a scenario, the monopolistic position could become problematic.

⁴³⁴ Modification of the Water Act preamble (B.O.E. 1999, 298).

⁴³⁵ *See supra* Section II.

⁴³⁶ For example, article 71 of the Consolidated Water Act establishes water banks. Consolidated Water Act art. 71 (B.O.E. 2001, 176).

⁴³⁷ Consolidated Water Act art. 68.4 (B.O.E. 2001, 176).

entry.⁴³⁸ The shortcomings of the Water Registry have already been noted.⁴³⁹ And the record of trades—like the record of permits—is more a desideratum than a reality, as evidenced by the lack of data detailed earlier in this Article.⁴⁴⁰

Although the CWA establishes a central database for all rights in Spanish basins, it has never been implemented⁴⁴¹ and there have been no private initiatives in this regard.

As the previous Section described, rights and transactions are recorded.⁴⁴² Beyond the provision of information, Water Registries in Spain claim to protect the rights, but they are not reliable.⁴⁴³ The administrative protection afforded by the Registries is, in fact, one of the appeals purportedly offered by the regulator to incentivize those with private property rights to transform them into concessions.

To provide water information a net to monitor current uses and water availability is necessary. In fact, new permit leases require meter installation.⁴⁴⁴ The 1999 reform emphasized the need to measure consumption.⁴⁴⁵ However, such a requirement does not help to measure past consumption, and given how difficult it might be to calculate certain features like leakages and return flows, sellers and buyers may be uncertain about how much they can transfer. In order to reduce uncertainty, the government could have used the reference volume established in the River Basin Plan to define the amount tradable.⁴⁴⁶ In general, using a reference value would reduce transaction costs, maybe at the cost of ignoring certain minimal externalities, since agents may know beforehand how much water can be leased and anticipate the result of the

⁴³⁸ *Id.* art. 68.1. Article 67.2 of the Consolidated Water Act authorizes the Ministry of the Environment to exceptionally and temporarily allow transactions that do not observe the rank of uses. *Id.* art. 67.2.

⁴³⁹ *See supra* Section II.B.2.

⁴⁴⁰ *See supra* Section IV.

⁴⁴¹ Public Water Domain Regulations art. 197 (B.O.E. 1986, 103). The Ministry of the Environment has never set it up and has not replied to the requests by the author for this information.

⁴⁴² *See* discussion, *supra* Section II.B & IV.

⁴⁴³ LIBRO BLANCO DEL AGUA EN ESPAÑA DOCUMENTO DE SÍNTESIS [*White Book on Water in Spain Executive Summary*], MINISTERIO DE MEDIO AMBIENTE 15–17 (Dec. 4, 1998), available at http://www.magrama.gob.es/es/agua/temas/planificacion-hidrologica/sintesis_tcm7-28955.pdf.

⁴⁴⁴ Public Water Domain Regulations art. 347.1 (B.O.E. 1986, 103).

⁴⁴⁵ Modification of the Water Act preamble (B.O.E. 1999, 298).

⁴⁴⁶ Public Water Domain Regulations art. 345.1(b) (B.O.E. 1986, 103).

review. Some users may be allowed to sell less water if they follow this definition of the right, but resorting to this definition may be beneficial if the cost of measuring past consumption and presenting evidence (if necessary) to the reviewing agency is high. However, if incorrectly calculated, those guidelines may pose problems. If these values are too tight, they may discourage savings.⁴⁴⁷ If reference values were too loose, they would allow some farmers to sell more water than they are really consuming.⁴⁴⁸ Today, the regulation establishes that the reference volume in the Basin Plans can be used by the RBA to correct the volume the parties can transfer during the authorization of the transaction.⁴⁴⁹ This measure is an avenue to encourage efficiency. This suggests that the reference volume is used more as a threat than a tool to save transaction costs.⁴⁵⁰

In addition to recording rights and transactions, the government can also offer strong guarantees in the water banks. RBAs can act as brokers in water banks and also back up the transactions, since they actually buy and sell the water. There might even be a sort of securitization if different rights are pooled together and therefore become more fungible.⁴⁵¹ These water banks are the clearest instance where public agencies could take up the role of matchmaker, which in the Iberian peninsula has not been undertaken by private parties. In addition, the transfer of water rights to the RBA could help improve buyers' confidence, since there should be some sort of governmental guarantee that the contract will be fulfilled in case of low water availability. This

⁴⁴⁷ A farmer using more water than she should if efficiently watering his crops may not want to introduce an expensive, but very efficient, irrigation method if it cannot sell all the water it saves because the guidelines are calculated for smaller improvements.

⁴⁴⁸ Reference values are not exempt from controversy: in Andalusia the reference values in different documents or across regions are full of inconsistencies, according to an organization of irrigation communities. See *Feragua advierte que las dotaciones propuestas por la administración andaluza arruinarán los cultivos más competitivos* [*Feragua Claims that the Proposed Allowances in the Andalusian Regulations Will Make the Most Competitive Crops Go Bankrupt*], FERAGUA (July 4, 2012), http://www.feragua.com/FERAGUA-ADVIERTE-QUE-LAS-DOTACIONES-PROPUESTAS-POR-LA-ADMINISTRACION-ANDALUZA-ARRUINARAN-LOS-CULTIVOS-MAS-COMPETITIVOS_a1178.html (claiming that the reference values set by the Andalusia's water plans are not high enough to ensure the viability of many highly profitable crops).

⁴⁴⁹ Consolidated Water Act art. 69.1 (B.O.E. 2001, 176).

⁴⁵⁰ Public Water Domain Regulations art. 345.1(b) (B.O.E. 1986, 103).

⁴⁵¹ Hollinshead, *supra* note 68.

seems well tailored to the early stages of a water market, when buyers may not be as experienced and can figure out less perfectly how to shield themselves from risk in a contract.

Water Banks are envisioned as spot markets,⁴⁵² a low transaction cost option to compare to private water transfers because the administration takes a more active role in the transfer procedure. Water Banks also increase the trust in the market because, through the experience of buying and selling water in a bank, permit holders may become more accustomed to the idea and understand that some of their fears, like the fear of forfeiture, are not real. However, Spanish water banks are not ideal. First, they are not permanent, and RBAs are allowed to set up water banks only in exceptional circumstances: overexploitation of aquifers, severe droughts, and those cases where the uses should be limited to guaranteeing a rational exploitation of the resource.⁴⁵³ The bank lasts only until the crisis is over.⁴⁵⁴ These structures were inspired by California's experience in 1991.⁴⁵⁵ But the scope of water banks in Spain is smaller, since they cover transactions only within basis, and not within the whole country.⁴⁵⁶ Water banks require an authorization by the central government's cabinet;⁴⁵⁷ such an authorization can be quite broad, like the one in 2004 authorizing water banks in the Guadiana, Segura, and Júcar water basins.⁴⁵⁸

This prior authorization requirement can delay the reaction to a drought unless the authorization is granted in advance, as was the case in the 2004 water bank authorization.⁴⁵⁹ The time taken to overcome these bureaucratic hurdles may be precious time wasted.

⁴⁵² David Sunding, *The Price of Water: Market-based Strategies Are Needed to Cope with Scarcity*, 54 CAL. AGRICULTURE 56, 58 (2000).

⁴⁵³ Consolidated Water Act art. 71 (B.O.E. 2001, 176). The exceptional situations are described in articles 55, 56, and 58 of the Consolidated Water Act. *Id.*

⁴⁵⁴ *Id.* art. 71.1.

⁴⁵⁵ In the debate in the Commission, California is mentioned nearly 20 times. *See Hearings, supra* note 14.

⁴⁵⁶ Consolidated Water Act art. 71.1 (B.O.E. 2001, 176). *Cf.* THE 1991 DROUGHT WATER BANK I (1992), available at http://www.water.ca.gov/watertransfers/docs/10_1991-water_bank.pdf.

⁴⁵⁷ Consolidated Water Act art. 71.1 (B.O.E. 2001, 176).

⁴⁵⁸ Acuerdo del Consejo de Ministros [Cabinet Decision] (Oct. 15, 2004) (authorized the establishment of "centros de intercambio de derechos" in the Guadiana, Segura, and Júcar water basins).

⁴⁵⁹ *Id.* The water bank for the Guadiana, Segura and Júcar water basins was authorized in October 2004, a rainy month, before the 2005 drought began.

The nested nature and the lack of permanency slow down the reaction to a crisis. For example, in the Segura Basin, it took more than two years from the authorization of the water bank to the actual decision of which water would be bought.⁴⁶⁰ Currently, in the Drought Plans passed since 2007, several CHs include a water bank as a measure triggered by certain drought scenarios.⁴⁶¹ However, as stated, they cannot be automatically triggered, and this ends up being just programmatic: it is required that the central government gives the green light beforehand.⁴⁶²

Water banks follow the public procurement regulations that impose several formal requirements to ensure that the bidding process is competitive.⁴⁶³ Private parties have to adapt to the requirements of the bid, which may reduce the pool of potential sellers. The tender also curtails administrative discretion, like any other public procurement contract, in order to ensure that there are no corrupt practices.⁴⁶⁴ These requirements do not seem to target the needs of water management since they slow down the process. Also, in general, water transactions involve very little danger of favorable treatment: they would consist of buying or leasing low volume water rights at a fixed price with certain established characteristics to then resell or release them. These regulatory constraints also curtail the flexibility of the administration, since the time period between the offer publication, the reception of the bids, and the resolution is quite long.⁴⁶⁵ In any case, the requirements imply that these banks have to operate in batches. Additionally, the time period between offers and adjudications is too long to properly respond to a crisis. For example, in the Júcar Basin, an offer was published in the Official Gazette on December 2006 and the decision about which rights were leased was

⁴⁶⁰ Calatrava Leyva, *supra* note 158, at 103.

⁴⁶¹ *E.g.*, PLAN ESPECIAL DE ACTUACIÓN EN SITUACIONES DE ALERTA Y EVENTUAL SEQUÍA DE LA CUENCA HIDROGRÁFICA DEL TAJO [EXECUTIVE REPORT DROUGHT PREPAREDNESS PLAN TAGUS RIVER BASIN], MINISTERIO DE MEDIO AMBIENTE 97 (Mar. 2007), *available at* <http://www.chtajo.es/DemarcaTajo/SequiasyAvenidas/Documents/Memoria.pdf> (mentioning that more water leases might be expected).

⁴⁶² Consolidated Water Act art. 71.1 (B.O.E. 2001, 176).

⁴⁶³ *Id.* art. 71.3.

⁴⁶⁴ *Id.*

⁴⁶⁵ For example, in the Júcar Basin, an offer was published in the Official Gazette on December 2006 and the decision about which rights were leased was published on July 2007. Announcements (B.O.E. 2006, 312), (B.O.E. 2007, 165).

published on July 2007.⁴⁶⁶ Parties may not want such a slow process even if they could benefit from the guarantee. Even though water banks should be theoretically closer to spot markets,⁴⁶⁷ Spanish water banks are far from being so.

Initially water exchange centers were devoted to shifting water from low-value users to high-value ones, serving the function of a broker by matching buyers and sellers. But in 2006, an emergency decree authorized CHs and regional equivalents to launch public offers to lease or even buy rights for environmental purposes.⁴⁶⁸ Guadiana's water bank performed a sort of indirect broker function, but the reallocation was not based on pure market criteria.⁴⁶⁹ In addition to providing an interesting case study, the Guadiana water bank is also worth mentioning because it reflects how politics trumped the market's operation. From 2008 to 2012, Guadiana launched six public offers to acquire water within the Plan to recover the Upper Guadiana basin under the framework of a water bank. This bank was supposed to assign the acquired water, mostly groundwater, either to the environment, the main priority, or to the regional government, the autonomous community of Castilla-La Mancha. The latter would re-assign it to farmers who fulfilled certain social criteria.⁴⁷⁰ Social criteria tried to favor certain kinds of farms, such as those run by young farmers. However, in practice, all water ended up being used to legalize illegal boreholes as a result of the pressures by the Castilla-La Mancha government.⁴⁷¹ In addition, there was a severe enforcement problem.⁴⁷² Many of the rights sold had not been used in previous years—that is, they were “paper rights,” according to the non-governmental organization WWF España.⁴⁷³

In addition, some water banks may exist in the purely regional basins. Catalonia and the Balearic Islands announced water banks

⁴⁶⁶ Announcement (B.O.E. 2007, 165). There was an extension to present more offer of rights to be acquired.

⁴⁶⁷ See *supra* note 447.

⁴⁶⁸ See *supra* note 131.

⁴⁶⁹ Requena, *supra* note 271, at 22.

⁴⁷⁰ *Id.*

⁴⁷¹ See *WWF denuncia la compra pública de agua fantasma en el Alto Guadiana por 66 millones de euros* [*WWF Denounces the Public Purchase of Missing Water in the Alto Guadiana for 66 Million Euros*], WWF ESPAÑA (Oct. 8, 2012), <http://www.wwf.es/?22540/WWF-denuncia-la-compra-pblica-de-agua-fantasma—en-el-Alto-Guadiana-por-66-millones-de-euros>.

⁴⁷² *Id.*

⁴⁷³ *Id.*

in their internal basins, but they never took off.⁴⁷⁴ These cases also illustrate how, despite the availability of the structure, politics may prevent the success of water banks.

CONCLUSION

Water market mechanisms were introduced in 1999 in Spain as a reaction to the mid-90s drought. The ruling People's Party had an agenda based on economic liberalization, and water markets were regarded by many opponents as a part of that wider agenda. Market mechanisms were expected to help make the system more flexible than the traditional, constrained, administrative permit system, and better able to cope with droughts and solve the structural scarcity problems. The liberalization agenda helps explain why in Spain, as in many other areas, water markets have been attacked with the same critiques as any privatization and liberalization proposal, even though in this case only existing rights were tradable and even though the water markets established extensive administrative oversight.

Trading took place, but only in a very limited manner. Some trades occurred during the mid-2000s drought, but, in general terms, markets have not achieved their full potential. To a large extent, this is a consequence of both the law on the books and the law in practice. In fact, drought forced the government to play many of the roles that are necessary for a functioning water market. Many of these roles were established by water market regulations, but the regulations did not go far enough to ensure that water markets would succeed. Further, in practice, government support of water markets was not strong enough or was reactive, not proactive. As a general conclusion, government failed to appropriately act in the ways needed to establish water markets: define property rights, internalize externalities, manage water infrastructure, and act as market maker.

In sum, the limited version of markets in Spain is too constrained to succeed. Administrative intervention in the market is simultaneously too little and too intense: too little, because

⁴⁷⁴ Catalan Emergency Drought Decree (D.O.G.C. 2007, 4860) (third additional provision) (Catalan Decree adopting exceptional and emergency measures in relation to the use of water resources); Provision (B.O.I.B. 2003, 50) (establishing the center of water use rights exchange); Derogatory Provision (B.O.I.B. 2005, 58) (acknowledging the lack of trade and, hence, abolishing the water bank).

enabling action such as providing infrastructure and reducing transaction costs are almost not performed at all; and too intense regarding both permit leases and water exchange centers. The review procedure regarding permit leases, about which there is little information, seems to go beyond a no-harm rule, and to some extent may penalize those willing to participate. Water exchange centers must be authorized by the central government's cabinet, which delays the response to a drought, and must follow public procurement regulations, which seem too burdensome given the low stakes. The unused powers of the administration may be further deterring transactions.

Markets were never portrayed in Spain as the ultimate solution to water scarcity, but they were expected to at least contribute to a better allocation of water and to be useful as a management tool for water crises. Unfortunately, more than a decade after their introduction, they have achieved very little in either regard. In sum, government inaction may explain the low number of transactions, and why water markets have not been part of the daily water management toolkit.

I can only speculate at this point about why government has not fulfilled the roles identified as necessary for water markets. Nonetheless, it is worthwhile to sketch some of the political economy issues operating backstage as potential drivers of government inaction. Beyond the failure of government to effectively play the abovementioned roles, a further problem is that some regulations do not convey appropriate incentives to participants in the market. This is the case with the rules setting forth that domestic users are at the top of the ranking for the assigning of new permits, while they are also given priority in times of drought crisis, which erodes the security of the property right as mentioned. During the 2006–2008 crisis, in the absence of Drought Preparedness Plans, the supply for urban users was privileged despite the possibility that some urban users indulged in extravagant uses.⁴⁷⁵ The response was then to issue Emergency Decrees regulating uses, instead of really resorting to markets. In any event, urban areas were still favored. It seems widely known in urban areas that the political costs of cutting water for

⁴⁷⁵ Even when extravagant urban use has been banned—for example, prohibitions on filling private swimming pools—these prohibitions are very difficult to enforce given the high monitoring costs. *See* Emergency Drought Measures in Catalonia (D.O.G.C 2007, 4860).

households during certain hours of the day are undesirable, and it will typically be a last resort.

Hence, urban suppliers do not have incentives to resort to the market to satisfy their current needs. Nor do they have incentives to do so for new uses, since the market does not provide water rights to satisfy future demands. And if urban users decide to enter into permit leases, like Mancomunidad Canales del Taibilla did, they may get a favorable deal. Thus, for instance, the Mancomunidad was exempted from certain water tariffs to compensate for the effort it had made in entering the market.⁴⁷⁶

Another troublesome issue is the opposition of farmers to water markets, which is particularly problematic because they are the group envisioned as the seller. Many of the arguments raised by agricultural organizations were framed as concerns related to the public property over water and the importance of protecting the public interest. But these arguments probably hide concerns about keeping subsidized water for the agricultural sector. Such a worry makes no real sense given that markets are voluntary mechanisms and if farmers did not want to enter into transactions they would not need to. Even though as a collective they opposed the market mechanisms, if those mechanisms are in place, individual farmers, who are titleholders, may decide to sell their water, opening the path for water prices to rise. The provision that allows government to fix a maximum price in water leases may have been introduced to calm the farmers' worries. However, RBAs have never seen the need to fix the price. Farmers' strong opposition to water markets hinders the markets' operation and waters down the incentives of the RBAs to enhance them, because the agricultural sector is a powerful constituency, usually favored except during low water availability periods. And even when farmers suffer cuts during droughts, they are compensated ex post for the loss of crops due to low water availability with public subsidies.⁴⁷⁷

Environmentalists are another group which could influence the adoption of water markets even if they are not very powerful in Spain. Environmentalists defended deep administrative control, but

⁴⁷⁶ R.D.-Ley 9/2006, *supra* note 194.

⁴⁷⁷ For example, flower farmers have received loans so that they can distribute drought-related losses over several years, and then subsequently received subsidies to cover these already favorable loans. See *Ordre AAR/433/2010* (D.O.G.C. 2010, 5713) (awarding subsidies to flower and ornamental plant farms to mitigate the borrowing costs of loans after the 2008 droughts).

they did not align themselves with farmers, given the latter's unsustainable practices. Environmentalists seemed to act out of fear of speculative practice and of the reign of corporate interests.⁴⁷⁸

It is not clear that government was catering to any of these three interests by establishing and implementing water markets. Beyond the political party's libertarian ideology, it is possible that the initial motivation when introducing water banks was to favor certain corporate interests, like the hydropower sector and the construction sector, which was developing in certain areas. However, in the end, water market mechanisms were watered down in order to ease the concerns of the opposition and some of the lobby groups just mentioned. Even though the mechanisms in the final bill were more timid than the initial proposals, the members of parliament of the opposing political parties did not vote in favor. Beyond the initial push in favor of water markets, further actions were required, and the political economy did not incentivize the RBAs and the Spanish government to act and make the most of water market provisions. Urban users are shielded from drought curtailments while the agricultural sector receives cheap water the rest of the time even if it is curtailed during harsh times.

One may wonder why water markets have not been either repealed or amended in the successive years. To some extent, as described above,⁴⁷⁹ government responded to the mid-2000s crisis using markets, but it did not go beyond taking the measures required by the 1999 regulation to set up the market instruments. The Socialist Party, which criticized the reform undertaken by the People's Party, did not change the market regulations at all once in power in 2004, although it repealed the Ebro transfer. It did not even enact regulation to enhance water banks, which it had previously embraced. The reasons might be that these issues did not have the salience of the Ebro transfer, and that markets had been little used. This minimal use of markets could well have contributed to preventing a water market culture from solidifying.

The regulation, even if far from perfect, is still in place, and perhaps another drought will provide the necessary impetus to fully implement water markets, providing long-lasting fruits at last.

⁴⁷⁸ See *supra* notes 238–240.

⁴⁷⁹ See *supra* notes 245–248 and accompanying text.