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Top picture: Jucar River
Source: Nuria Hernández-Mora, November 2014

Bottom picture: Pintado reservoir (Viar River, Seville, Spain)
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LIST OF ACRONYMS

AM:	Adaptive Management
CIS:	Common Implementation Strategy
CWA:	Clean Water Act
CWN:	Citizen Water Networks
EC:	European Commission
EQW:	Proposal for a Council Directive on the Ecological Quality of Water
EU:	European Union
FD:	Floods Directive
FRMP:	Flood Risk Management Plans
ICT:	Information and Communication Technologies
IWRM:	Integrated Water Resources Management
MS:	Member States
PoM:	Programme of Measures
RBMP:	River Basin Management Plan
WFD:	Water Framework Directive

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1. INTRODUCTION

1.1. THE ORIGINS OF THE WATER FRAMEWORK DIRECTIVE

The approval of Directive 2000/60/EC of the European Parliament and of the Council in December 2000 established a framework for Community action in the field of water policy, better known as the Water Framework Directive (WFD). Some authors argue that the WFD held the promise of a fundamental change in water policy (Moss, 2008; Hering et al., 2010), by shifting the emphasis from resource development and chemical water quality toward a more integrated approach where ecological criteria guided management and policy, and territorial considerations were incorporated into water management.

Up until 2000, water policy in Europe had been fragmented with different Directives dealing with specific challenges (nitrate pollution, urban discharge, swimmable water quality, etc.) but lacking an integrative perspective. The focus had been on chemical water quality, with an emphasis on specific water uses and pollutant control.

As Bouleau and Pont (2015) point out, a first attempt at providing uniform and legally binding standards for all European waters was the 1994 Proposal for a Council Directive on the Ecological Quality of Water (EQW) (COM 93(680)Final). The EQW proposal focused on water quality—primarily pollution prevention—to maintain and improve ecological quality of surface waters. It already included some of the innovations of the WFD—covering all surface waters, evaluation and monitoring networks, action programs, flexibility in the determination of good quality and development of restoration measures, possible exceptions for noncompliance, public participation—but also incorporated aesthetic and natural heritage considerations into restoration objectives. The European Council eventually rejected the proposed EQW Directive because of its inadequate consideration of socio-economic impacts (Herring et al., 2010) but "DG Environment went on looking for more quantitative binding ecological standards" which resulted in the ecological components of the WFD (Bouleau and Pont, 2015).

The WFD was therefore the result of the efforts by the European Commission (EC) and EU Member States (MS)[1] to create a coherent approach to water policy at the European scale. It

[1] Member States is the term used to refer to the countries (currently 28) which are comprise the European Union by being party to the founding treaties of the Union and thus subject to the privileges and obligations of membership

requires surface waters (rivers, lakes, wetlands and transitional and coastal waters) to attain good ecological and chemical standards and imposes quantitative and chemical standards for groundwater. By establishing the river basin as the pre-eminent geographical scale for water management it also explicitly recognized that any policy aiming at protecting European waters necessarily had to deal with the policies that guided activities in the surrounding watershed such as: land use, industrial uses, agricultural policy and urban growth.

In some European countries, such as Spain, Portugal or the Eastern bloc, countries that joined the EU in the early 2000s, the change brought about by the WFD was even more significant, because water policy throughout the 20th century had focused primarily on the development of water infrastructures to meet a growing demand for water for different economic uses (Staddon, 2010; Bukowski, 2007; Bakker, 2003; Saurí and Del Moral, 2001). The WFD therefore required a significant shift in priorities, goals and operational procedures by placing the emphasis on ecosystem protection and ecological health as a means to guarantee the availability of sufficient good quality water to meet sustainable needs (De Stefano and Hernández-Mora, 2012; La Roca and Ferrer, 2010; Hernández-Mora *et al*., 2010).

The final text of the WFD also reflects a compromise between two competing approaches to water resources management. On one hand, as Bouleau and Pont (2015, p.35) point out, "the WFD definition of environmental objectives is imbued with (...) the communitarian perspective on environmental objectives which excludes 'the human perspective to build up the reference conditions of water' and gives 'advantage to the pristine model of nature'". They go on to affirm that "ecologists who participated in the writing of the text were overwhelmingly influenced by the concept of ecosystem stability and focused on systematically considering human activities as disturbance" (p.37). This ecological emphasis of the directive imbues Annex V (status of surface and groundwater water bodies, indicators and monitoring networks). On the other hand, the WFD also introduces flexibility for MS regarding the establishment of reference conditions, status assessment, management goals and monitoring networks. Most importantly it aligns itself with new governance approaches that emphasize the use of economic criteria to encourage efficiency in water use and determine the best course of action (cost effectiveness of alternative measures), and incorporate public participation and transparency requirements into policy making.

In fact, as Kaika and Page (2003) and Page and Kaika (2003) so well describe in their discussion of the WFD negotiation process in the European institutions between 1998 and 2000, these

competing perspectives were defended by different players (European Commission (DG Environment), European Council and the European Parliament) at different times throughout the process. In their view, the Commission evolved toward a more pragmatic approach of the Directive that took into account the socio-economic implications and technical viability of the measures, supporting the use of economic instruments to achieve policy goals, but maintaining the ecological ambitions of the WFD. On its part, the European Council was very responsive to the interests of stakeholder groups that would be heavily impacted by the new regulation (agriculture, inland navigation, industry, municipalities), and pushed for longer implementation time-frames, lower legal requirements and more flexibility. Finally, the European Parliament was particularly responsive to the environmental lobby. The result is a Directive that recognizes that "[w]ater is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such" (Statement 1, WFD). But at the same time it allows a large amount of flexibility for MS in the implementation phase, relies on economic instruments for decision-making, and allows for discretionary (albeit adequately justified) exceptions in the establishment and achievement of goals, as for instance in the case of hydromorphological alterations in surface water bodies that cannot be reversed.

Table 1.1 presents a summary of the evolution of European Union (EU) water policy starting with the 1975 Surface Drinking Water Abstractions Directive (75/440/EEC) (columns 1-3). For comparative purposes, columns 4 and 5 present a similar evolution of federal water legislation in the United States. Some authors (Hering et al. 2010; Bouleau and Pont, 2015) argue that the 1972 US Clean Water Act (CWA) was a precedent to the WFD, in terms of objectives, implementation and ecological approaches, and also because of the use of a supposed 'natural state' of ecosystems as the reference point to establish management goals. However, the CWA refers only to navigable continental waters, whereas the WFD encompasses all European waters, including surface continental waters, groundwater and transitional and coastal waters. It is noteworthy that major developments of federal water-specific legislation in the US have not happened since the 1970s[2], whereas the EU has continued to expand its regulatory efforts to cover an increasing number of water-related issues in an integrative fashion—for instance the 2006 Groundwater Directive which complements the WFD by establishing locally specific

[2] As Table 1.1 shows existing legislation has been reformed, amended or updated over the years. Additionally, other legislative initiatives, trade agreements or international bilateral treaties covering transboundary water resources management affect water policies at the federal level. However no innovative water-specific major legislation has been approved at the federal level.

groundwater quality standards and measures to prevent or limit inputs of pollutants into groundwater; or the 2007 Floods Directive (FD) that aims to reduce and manage flood risks for human health, economic activity, the environment and cultural heritage.

Table 1.1. Comparative Evolution of European Union and United States Federal water legislation

EU	Year	USA – Federal level	Year
Surface Drinking Water Abstractions Directive (75/440/EEC)	1975 (reforms in 1979 and 1991)	Flood Control Acts [1]	1917/1928/1936/ 1939/1944/1948/ 1965/1968/1972
Bathing Waters Directive (76/160/EEC)	1976 (reform in 2006)	Federal Water Pollution Control Act (precursor of the CWA)	1948
Drinking Water Directive (98/83/EC)	1980 (reforms in 1991 and 1998)	Water Resources Planning Act	1965
Dangerous Substances Directive (76/464/EEC)	1976	National Water Commission Act	1968
Groundwater Directive (80/68/EEC)	1980	National Environmental Policy Act	1968
Urban Wastewater Treatment Directive (91/271/EEC)	1991	National Wild and Scenic Rivers Act	1968
Nitrates Directive (91/676/EEC)	1991/1996	Coastal Zone Management Act	1972
Integrated Pollution Prevention and Control (IPPC) Directive (96/61/EC)	1996/2008	Endangered Species Act	1973
Water Framework Directive (2000/60/EC)	2000	Safe Drinking Water Act	1974
Groundwater Directive (2006/118/EEC)	2006	Water Resources Development Acts	1974/76/86/88/ 90/92/96/99/ 2000/07/13/14
Floods Directive (2007/60/EC)	2007	Clean Water Act	1972 (Amended in 1977, 1981 and 1987)

[1] Different Flood Control Acts have been approved starting in 1927. In this table we only mention the years when Flood Control Acts introduced significant innovations, such as the 1965 Act that gave the Army Corps of Engineers greater authority to implement Flood Control Projects.

The highly technical character of the ecological-economic approach or rationality of the WFD discussed above is complemented by an emphasis on public involvement in decision-making that constitutes the third pillar of the WFD architecture. The WFD emphasizes information, consultation and public participation requirements in an effort to improve its effectiveness and facilitate its implementation and compliance (Newig and Fritsch, 2009; Pares, 2010). The different planning stages of the WFD require the involvement of users, interested parties and general public through an *active participatory* dynamic, in line with wider efforts undertaken by the EC at the time to "open up the policy-making process to get more people and organizations involved in shaping and delivering EU policy" (EC, 2001: 2). The evaluation of the success (or lack thereof) of these efforts is the subject of one of the papers included in this report (Hernández-Mora et al., 2015).

1.2. THE CONCEPTUAL BACKGROUND FOR THE ANALYSIS OF THE WATER FRAMEWORK DIRECTIVE

The discussion and approval of the WFD, specially its economic and participatory governance approach, coincided with a growing debate about, and advocacy for, a paradigm shift in water management. As Pahl-Wostl *et al.* (2011) and Del Moral et al. (2014) argue, we are undergoing a paradigm shift in the way we understand, define and approach natural resources management, and, consequently, water management. This new approach results from a reorientation in objectives, methodologies, evaluation criteria, agents involved and institutional frameworks that has evolved since the 1990s. The shift is the expression, in the field of water resources management, of a transformation in the way we understand the relationship between society and nature, reflecting changes in other realms of our socioeconomic environment: the 'neoliberal globalization' and changes in the logics and mechanisms of capital reproduction and accumulation. The implications of these changes for natural resources management, and for the field of water resources in particular, have been systematically analyzed in recent literature (Hernández-Mora and Del Moral, 2015: March, 2013; Edwards, 2013; Swyngedouw, 2013; Furlong, 2010; Castree, 2010; Castree, 2008a and 2008b; Heynen et al., 2007; Mansfield, 2007; Bakker, 2005; Bakker, 2002).

Following authors such as Funtowicz and Ravetz (1993) and Giampietro *et al.* (2006), among others, we can argue that the new approach to natural resources management results from a need to acknowledge "the unavoidable existence of non-equivalent perceptions and

representations of reality; contrasting but legitimate perspectives found among social actors; and heavy levels of uncertainty." Aquatic ecosystems are complex, non-linear systems, with emergent properties and unpredictable responses to interventions. They are intertwined with social subsystems, which make them reflexive. This hybrid nature of water ("at once real, like nature, narrated like discourse, and collective, like society" (Latour, 1993, p.6)) results in the increasingly frequent use of the term *waterscapes* to refer to socio-hydrological ecosystems. The term aims to more deeply explore the concept of socio-ecological systems, emphasizing the complexity of the ecological, cultural and institutional processes that are intertwined in discourses and understandings of water. In this sense, and following Swyngedouw (1999 and 2007), Budds and Hinojosa (2012) use the term *waterscapes* to speak of material and energy flows, but also of discourses, visions, balances of power and social values. "This perspective requires attention to a range of 'moments' such as physical flows, patterns of access, technologies, institutions, practices, legislative reforms, governance frameworks and discourses around water, which are mediated by social and political processes and collectively constitute the *waterscape* of a given context" (Budds and Hinojosa, 2012, p. 120).

If we accept this reality, then it follows that the evolving approach to water resources management must recognize that water resources management challenges deal with *waterscapes* and are therefore determined by:

- Complexity, because the human dimension introduces reflexivity into the managed system, and ecological systems respond to pressures and interventions in non-linear and unpredictable ways. It is, therefore, necessary to approach management in an adaptive and experimental fashion.

- Uncertainty, because scientists' technical abilities and tools cannot hope to accurately represent the system and its interactions in all their complexity, "no matter how sophisticated are the models, modelers and computers used to do that" (Giampetro *et al*., 2006). If we recognize the various processes and flows that are incorporated in the concept of *waterscapes* we must necessarily accept different levels of uncertainty that must be addressed. There is a basic *technical uncertainty* related to a lack of data and background information of the system under study (incomplete or unreliable data series, poor monitoring networks, insufficient data, etc.). To overcome this first level of uncertainty scientists design models—always conditioned by the cultural, political and ideological frameworks within which

they are developed and that are most often not explicitly recognized—that aim to represent reality, necessarily simplifying the complexity of the system being represented. Overlaying this basic level is the uncertainty understood as *indetermination*, where the complexity of the system makes its parameters and interrelationships unknown, so that modeling becomes completely arbitrary. A third level of uncertainty is outright *ignorance*, the situation in which 'we do not know what we ignore' (Wynne, 1993).

- Incommensurability which can be *technical*, since it is impossible to represent in a single model heterogeneous information that is ascribed to non-equivalent descriptive domains. It is therefore necessary to integrate different disciplines, types of knowledge and descriptions of reality in the definition of the problem ("problem structuring" in Giampietro *et al.'s* (2006), terms), and in the development of alternative solutions. Attempts to reduce this incommensurability to a single dimension (for instance by monetizing all aspects of existing alternatives) are necessarily flawed. The concept of incommensurability also has a *socialdimension* that results from the fact that there are different and equally legitimate definitions of the problem and understandings of reality. Different actors rely on different values, perceptions and interests that are in conflict but still nevertheless legitimate (Funtowizc and Ravetz, 1994). This characteristic adds a new dimension to the problem of uncertainty and results in recognition of the necessity to co-produce knowledge. The participatory governance approach attempts to overcome this challenge by involving stakeholders throughout the management process—defining the problem, the range of options, the range of acceptable solutions, and the indicators used to monitor and guide the process—given that scientists and experts can no longer hope to produce the best possible answer to management challenges through technical expertise alone.

Applying these ideas to the field of water resources management specifically, Pahl-Wostl *et al.* (2011) maintain that we are currently in the transition process from the old to a new water management paradigm. The 'old' water management paradigm aims at directing the behavior of the water system to achieve a desired goal. It focuses on finding technical solutions to well-defined problems. Management is centrally controlled and based on rigid and detailed plans that assume that interventions can be optimized and their impacts calculated and predicted. Uncertainties are typically ignored, or simplified and quantified, and thus incorporated into the management parameters. Scientists, managers and experts assume to be able to define the problem, the alternative solutions and therefore the optimal course of action.

However, when dealing with complex socio-ecological[3] systems such as water, new management approaches are required that recognize that the systems to be managed are "complex, non-predictable and characterized by unexpected responses" Pahl-Wostl *et al.* (2011). Furthermore, and in line with the concept of *waterscapes* discussed above,these authors argue that "in systems with human components, the importance of meaning cannot be ignored (...). Claims about the legitimacy of intervention and change no longer reside exclusively in the realms of authority and privileged knowledge. Legitimacy now depends on shared visions of both problem and equitable solution set. (...) The evolution in water management discourses from speaking of “government” to speaking of “governance” evidences this radical change in thinking. The evolving water management paradigm thus results from the fact that "diverse world views generate varying interpretations of a common physical reality and the same base of factual knowledge may be used by different actors to derive entirely different but equally plausible meanings and thus conclusions for interacting with the world surrounding them" Pahl-Wostl *et al.* (2011). Therefore new management approaches require an evolution along different axis:

- From central control to poly-centric governance, where the definition of the problems, the alternatives and the solutions are the result of a cooperative process between different actors and management centers (co-production of knowledge);

- From prescriptive solutions to adaptive management approaches that facilitate learning and adaptation to a changing reality and to evolving (and often non-commensurable) understandings of the problem;

- From separate approaches to discrete environmental problems toward an integrated approach that transcends disciplines, geographical and professional boundaries and areas of expertise.

Over the past few decades different natural resources management approaches have been theoretically developed that deal with some of the issues discussed above although, as we will see in the articles included in this work, their practical implementation falls short of effectively

[3] Pahl-Wostl *et al.* (2011) introduce the concept of human-technology-environment systems to talk about water resources. Obviously the technical component is essential when dealing with water management because the boundaries of the system are largely technologically-defined.

dealing with the more challenging aspects. Some of the most influential ones have been Integrated Water Resources Management (IWRM) and Adaptive Management (AM).

IWRM is defined as "a process which promotes the coordinated development and management of water, land and related resources in order to maximize economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems and the environment" (GWP, 2000). While this definition may appear ambitious, some argue it is full of uncertainties and 'in'-definitions, and thus un-implementable in operational terms (Biswas, 2004).

Adaptive Management, on the other hand, is based on the idea that "understanding how natural systems respond to human disturbance is essential to living with the unexpected" (Holling et al., 1978, as cited by K. Lee, 1993). The AM approach emphasizes applying "the concept of experimentation to the design and implementation of natural resource and environmental policies" (Lee, 1993). That is, policies must be designed from the outset to monitor and test how ecosystems respond to human intervention, given that these responses are largely unpredictable. Failures in management interventions are therefore opportunities to learn and modify action. While AM has been interpreted and applied in different ways to manage natural resources, the form of AM discussed by Huitema *et al.* (2009) is particularly relevant for our discussion. These authors highlight certain institutional prescriptions (some of which coincide with IWRM's proposals): collaboration, experimentation, and a bioregional approach to resource management. AM is conceptually suited to the demands of the currently evolving water management paradigm because it promotes "flexible planning, knowledge sharing, and enhanced capacity to respond reflexively to multiple and uncertain processes of change" (Scott *et al,* 2013).Both IWRM and AM can offer management prescriptions to deal with some of the difficulties described above. However, as many authors have argued (Biswas, 2004; Giordano, 2013; Pahl-Wostl, 2007; Huitema *et al,* 2009, Scott *et al.* 2013; among others) their potential has not always been realized, as the transition from theory to practice has not been a smooth one. These authors defend the need for a more critical evaluation of the experiences with the practical implementation of these proposals, which too often have been uncritically promoted throughout the world as the 'panaceas' to resolve water management challenges (Meinzen-Dick, 2007).

The promotion of these management models (particularly IWRM) by national and international agencies and lending institutions has resulted in the approval and implementation of ambitious national legislations in different parts of the world that incorporate the principles of integration,

participation and cooperative management approaches, use of economic instruments, flexibility and adaptation to water policy making. Pahl-Wostl *et al.* (2011) briefly discuss the examples of the South African National Water Act (NWA) that came into force in 1998, which is built on IWRM as a guiding principle, or the 2004 Australian Intergovernmental Agreement on a National Water Initiative (NWI), approved by the Council of Australian Governments. Giordano and Shah (2013) discuss several examples in Asia and Africa where international lending institutions pushed for the approval of water policies aligned with IWRM, with mixed results.

Perhaps the most comprehensive and far reaching attempt to align water management policy and practice along these principles is the EU WFD. The WFD incorporates the principles of IWRM (river basin management, public participation, economic incentives for sustainable water management) and the iterative and adaptive approach to planning and management proposed by AM. The Directive is considered by many to be the most ambitious attempt by the EU to incorporate a governance approach to natural resources management, which results in a shifting geography of players, scales of action, and means of influencing decisions and outcomes (Kaika, 2003). The WFD requires multi-level coordinated planning and management, development of indicators to determine ecological and chemical quality of all EU waters, establishment of monitoring to evaluate status and impact of interventions, economic assessment of water services and alternative measures, periodic review and adaptation of management plans and intervention measures, and public participation that aims to increase the efficacy of the Directive. An evaluation of its implementation can therefore throw some light on the potential for these management prescriptions to successfully deal with the challenges that are inherent to problems of complex socio-ecological systems.

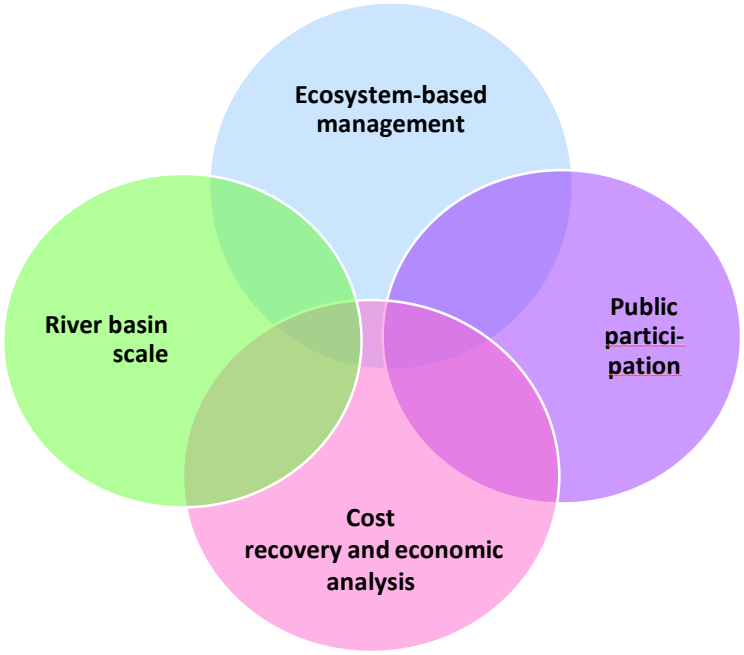
1.3. THE WATER FRAMEWORK DIRECTIVE IN OPERATION

The goal of the WFD is to "establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater" which will: (1) prevent the deterioration and enhance the status[4] of aquatic ecosystems and water-dependent terrestrial ecosystems, (2) promote sustainable water use, (3) progressively reduce and eliminate emissions of hazardous

[4]The term "status" in the WFD is used to determine environmental objectives. For surface waters the goal is to achieve good status, determined by the achievement of both ecological and chemical quality goals (or status). For groundwater, good status is achieved when both chemical and quantitative standards are obtained. Indicators for the definition of status (ecological, chemical or quantitative) are defined in Annex V of the Directive.

substances, (4) progressively reduce groundwater pollution, and (5) mitigate the impacts of floods and droughts, in order to guarantee the "provision of the sufficient supply of good quality" water for a "sustainable, balanced and equitable water use" (Article 1).

Figure 1.1. The building blocks of the Water Framework Directive

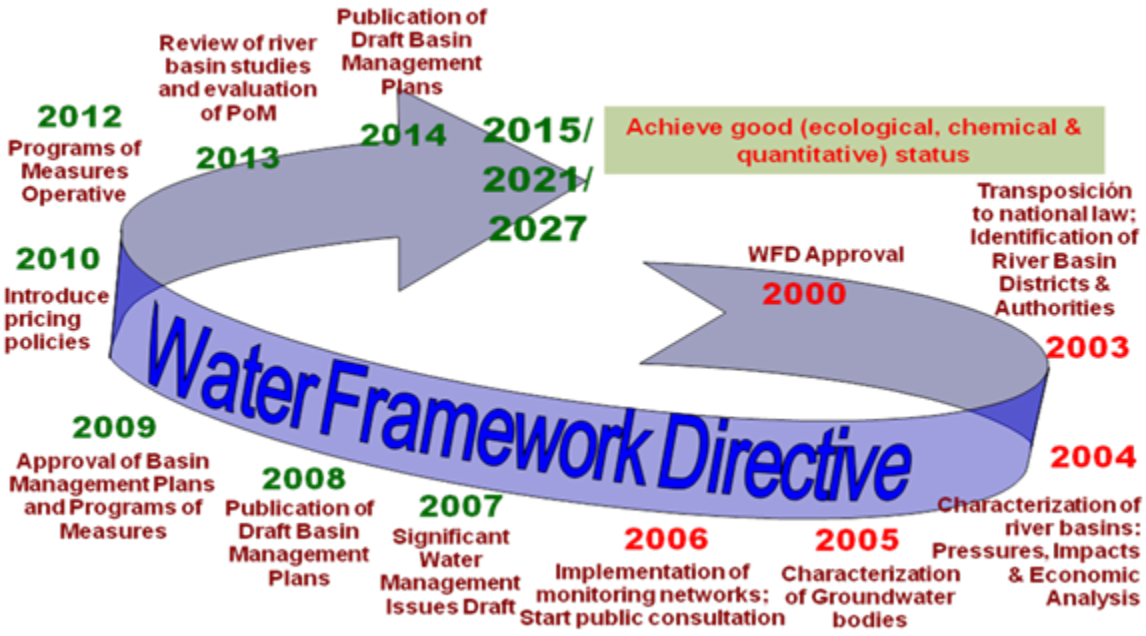


The architecture of the WFD is constructed around four major building blocks—which to a large extent coincide with the Dublin Principles on integrated water resources management (Solanes and González-Villarreal, 1999) (see Figure 1.1):

- administrative coordination and water resources management at the scale of the river basin (Article 3);
- establishment of environmental objectives based on reference criteria and quantitatively measurable biological and chemical ecosystem quality indicators for surface waters, and chemical and quantitative indicators for groundwater (Article 4 and Annex V);
- economic analysis of water uses (Article 5 and Annex III), establishment of water pricing policies that encourage efficient use and an adequate contribution of water uses to water service costs including environmental costs (Article 9), and analysis of the most cost-effective combination of measures to achieve the Directive's goals (Annex III);

- public information, consultation and participation requirements to ensure the success of the Directive (Article 14).

Figure 1.2. Water Framework Directive implementation process and calendar



The WFD proposes an iterative and adaptive water planning process that had its first deadline in 2015 (achieve good ecological and chemical status for surface waters and quantitative and chemical status for groundwater) and must be repeated every 6 years (see Figure 1.2). It establishes a strict timeline when the different benchmarks of the Directive have to be achieved by MS: transposition to national law[5] (Article 24) and identification of river basin districts and competent authorities (Article 3) by 2003; characterization of river basin districts (description, analysis of pressures and impacts and socioeconomic analysis of water uses, Article 5) by 2004 and of groundwater bodies by 2005; implementation of monitoring networks (Article 8) and launching of a public consultation process (Article 14) by 2006; identification of significant water management issues (Article 13) by 2007; and approval of River Basin Management Plans (RBMPs) and Programme of Measures (PoM) by 2009 (with a 6 year implementation period) (Articles 11 and 13).

[5]In European Union law, transposition is the process by which EU Member States give effect to the terms of a Directive (a form of EU legislation that sets out objectives or policies for Member States) by passing appropriate domestic legislation within the time frame set in the Directive.

The first wave of RBMPs was approved by most MS in December 2009 (there were significant delays in Spain, Portugal, Denmark and Greece). Currently (July 2015) the second wave of RBMPs (2015-2021) and revised PoMs have completed their public consultation process, and are expected to be approved by December 2015.

In order to establish management goals and achieve good status for all water bodies by 2015 (or later deadlines if objectives are deferred) in a manner that is equitable and comparable across Europe, the WFD establishes several steps:

- Identify water bodies as the basic units for management (surface, groundwater and transition and coastal waters).

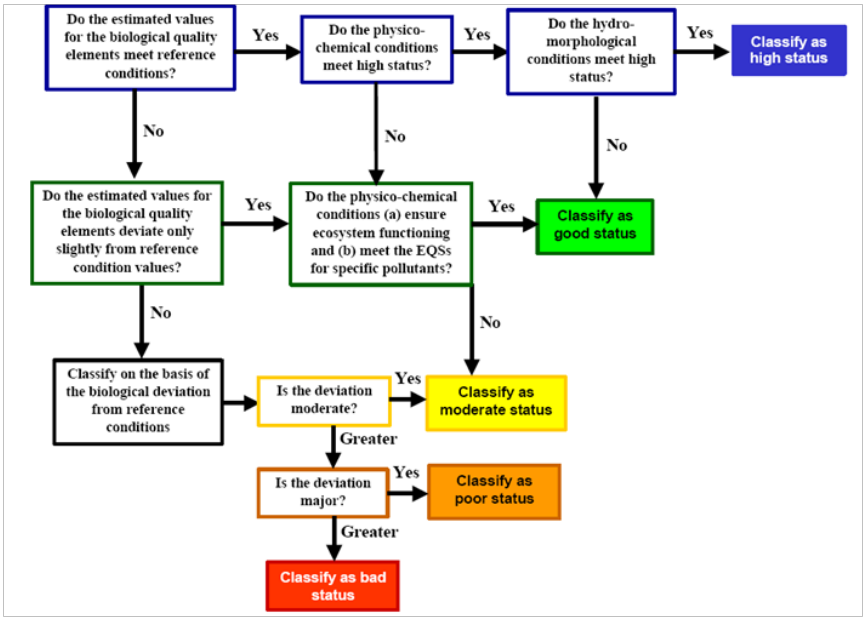
- Characterize typology of water bodies[6] and identify the most appropriate water quality indicators (biological, hydromorphological and chemical) that serve to measure status and progress toward goal achievement.

- Establish reference conditions as the benchmark against which good status objectives are measured. The concept of reference conditions is based on the idea of a pristine nature, that is, the identification of water bodies for each typology that are in (or as close as possible to) 'natural' conditions and have had minimum human impact (Bouleau and Pont, 2015).

- Identify suitable status indicators. The fact that the WFD measures water quality using a range of biological communities instead of focusing exclusively on chemical water quality as previous directives had done, was a significant advancement (Herring et al., 2010, Moss, 2008) but it also presented important challenges. In order to guarantee a homogeneous and comparable approach across EU MS, the EC set up a process of intercalibration of indicators for different water body types so that different indicators measure pressures, impacts and “good status” goals comparably across river types.

[6]The typologies try to reflect the diversity of aquatic ecosystems. For instance, Annex VI identifies 25 ecoregions for rivers and lakes: 1. Iberic-Macaronesian region 2. Pyrenees 3. Italy, Corsica and Malta 4. Alps 5. Dinaric western Balkan 6. Hellenic western Balkan 7. Eastern Balkan 8. Western highlands 9. Central highlands 10. The Carpathians 11. Hungarian lowlands 12. Pontic province 13. Western plains 14. Central plains 15. Baltic province 16. Eastern plains 17. Ireland and Northern Ireland 18. Great Britain 19. Iceland 20. Borealic uplands 21. Tundra 22. Fenno-Scandian shield 23. Taiga 24. The Caucasus 25. Caspic depression.

Figure 1.3. Process to determine status of surface water bodies



Source: Common Implementation Strategy report (2005)

- Determine status of water bodies (Figure 1.3). The WFD uses a "one-out, all-out" approach to determine status. In order for a surface water body to be classified in high status (pristine condition) all three biological, chemical and hydro-morphological indicators have to be in good status. One negative result bumps the water body to the next lower category. The "one-out, all-out" approach has been criticized by some academics and practitioners as an excessively rigid approach that prevents progress and improvements from being adequately recognized (Phillips, 2014; discussions in the 4th European Water Conference, 2015). Nevertheless, the Commission has argued that the final category should be interpreted as a synthetic achievement indicator, whereas the different indicators determining the status show the partial improvements, and should be published along with the synthetic one (discussions in the 4th European Water Conference, 2015).

When a water body is classified in less than good status, the RBMP and the PoM have to define a strategy and the best combination of measures that will allow that water body to reach good status by 2015, 2021 or 2027. In line with the flexible approach of the WFD and the consideration of technical and socioeconomic issues mentioned above, there are certain exceptions where the goal of good status can be lowered, deferred or not achieved and the MS will not be in breach of the directive:

- MS can designate specific water bodies as Artificial or Heavily Modified Water Bodies if changes in the hydromorphological characteristics of the water body to achieve good ecological status would have significant socioeconomic impacts, or the beneficial objectives served by the alteration cannot be achieved through environmentally better options because of technical feasibility or disproportionate costs (Article 4.3). These water bodies can aim to achieve good ecological potential (a lower objective than good ecological status).

- The achievement of the good status goal can be deferred to 2021 or 2027 because of technical infeasibility or disproportionate costs and if MS provide adequate justification (Article 4.4).

- Less stringent environmental objectives can also be set for water bodies if there are overriding socioeconomic interests or natural conditions preventing achievement of good status and if MS provide adequate justification (Article 4.5).

- MS can fail to achieve good groundwater or ecological status or potential or prevent deterioration of the status of a water body because of modifications to the water body if these modifications are adequately justified, all corrective measures are implemented, there is overriding public interest and the goal cannot be satisfied in other ways because of technical infeasibility or disproportionate costs (Article 4.7).

The innovations introduced by the WFD along the four main pillars identified in Figure 1.1 (ecosystem-based management, economic analysis, public involvement and river-basin based management) have brought about significant changes in water management practices in EU MS and resulted in important scientific and technical challenges. Additionally, much of Europe´s territory is part of shared river basins that require a common understanding and approach to WFD implementation by the different MS within the basin. To "allow a coherent and harmonious implementation of the framework directive" (CIS, 2001) the EC developed a Common Implementation Strategy (CIS) with a focus on "methodological questions related to a common understanding of the technical and scientific implications of the Water Framework Directive". The CIS consists of work programs approved for two year periods (the first one was approved for 2001-2002) that identify key issues that need to be developed and agreed upon for that specific period with respect to implementation timeline. The CIS sets up Working Groups led by MS or EU

institutions as well as Expert Advisory Groups on specific topics. The key activities of the working groups are to share information and develop guidance on technical issues that are needed at each point in the implementation phase. There have been 29 guidance documents published to date[7].

The last work program was approved for 2013-2015, after the 2012 publication of the evaluation of EU Water policy by the Blueprint to Safeguard Europe's Waters (EC, 2012) and the approval of the first wave of RBMPs. It aims to improve WFD implementation and coordination with implementation of other water-related directives; increase the integration of water and other environmental and sectoral policy objectives; and fill in the remaining gaps in the EU legislative and policy framework on water (CIS 2013). It has set up 9 Working Groups organized within three clusters (CIS 2013):

- Water Status Cluster: includes the Working Groups Ecostat, Groundwater, Chemicals and Ecological Flows.
- Water Management Cluster: includes the Working Groups Programme of Measures, Agriculture, and Floods.
- Knowledge Integration & Dissemination Cluster: includes the Working Groups Economics and Data and information sharing,

The biannual revision of the CIS process allows the EC and MS Water Directors[8] to generate new scientific and technical knowledge and understanding as new needs are identified through the experience of the implementation process. The operation and outputs of the Working Groups and the Expert Advisory Groups also point to the highly complex and technical nature of the WFD.

The European Commission convenes bi-annual meetings of the MS Water Directors, hosted by the MS that holds the EU rotating presidency. These meetings serve to analyze the progress in the implementation of the different EU directives, international conventions on water where the EU and MS participate and the general status of European water policy. The last meetings were held in November 2014 in Rome and May 2015 in Riga.

[7] To access these publications and more information on the Common Implementation Strategy go to: http://ec.europa.eu/environment/water/water-framework/objectives/implementation_en.htm

[8]The term Water Director is used to refer to the authority responsible for water policy in each MS.

The EC has additional tools at its disposal to encourage MS to comply with the WFD requirements and ensure a harmonious implementation throughout the EU. After the approval of the first round of RBMPs, the EC held bilateral meetings with each MS to evaluate the content of the approved RBMPs and made recommendations for improvement to be incorporated into the second round of plans. Additionally, the EC can start infringement procedures against MS for violation of EU law (lack of compliance with existing Directives and regulations). The procedure has several steps[9]—letter of formal notice, reasoned opinion, and referral to the European Court of Justice that can sanction the MS and impose a penalty payment. In each step of the procedure the MS has the opportunity to make modifications and comply with EU law. The final step is often not reached because negotiations between MS and the EC often result in compliance. In the case of the WFD, the Commission has undertaken infringement proceedings against several MS for different non-conforming issues. The procedures have only reached the European Court of Justice on 23 occasions. Some examples of these proceedings are listed below:

- In 2011 the Commission took five Member States (Belgium, Denmark, Greece, Portugal and Spain) to Court for failing to adopt their river basin management plans;
- in 2012 it referred Germany to court over incomplete implementation of the cost recovery requirement for water services;
- in 2013 it took Poland to court for failing to transpose European water legislation correctly;
- in 2014 it took Austria to court for failure to protect water quality in a river that had been classified as having a “high” ecological status in the 2009 RBMP and where a permit was granted to construct a power plant without adequately justifying this new impact in accordance with WFD article 4(7) requirements.

In many of these cases the Court issued a ruling against a MS for infringement of EU Law. In some cases —as for instance in the 2012 case against Germany— is has ruled against the interpretation that motivated the EC to start infringements procedures against the MS. If a MS fails to implement a Court judgement, financial penalties can be imposed, although this is seldom done (Selin and Van Deever, 2015). In any case, the Court's rulings contribute to define the development of the WFD in future implementation cycles. There is an emerging body of case law that is applicable to both EU and MS judicial interpretation of the WFD implementation.

[9] For more information on infringement procedures see: http://ec.europa.eu/atwork/applying-eu-law/infringements-proceedings/index_en.htm

Finally, non-state groups and individuals can also file complaints before the EC or submit petitions to the European Parliament regarding insufficient domestic implementation of EU policy. If implementation problems persist, these complaints can also lead the Commission to launch an infringement procedure (Selin and Van Deever, 2015).

1.4. EVALUATING THE IMPLEMENTATION OF THE WATER FRAMEWORK DIRECTIVE

1.4.1. Evaluation from Member States and European Union Institutions

Hundreds of reports, websites, blogs and other means of electronic communication have appeared in all EU MS dealing with some aspect of the WFD implementation process. Thousands more academic and non-academic publications have been published. Given the iterative and adaptive nature of the WFD, it requires periodic reporting from MS to the Commission (Article 15 requires reporting on RBMPs, Article on 5 economic analysis of water uses and Article 8 on monitoring programs). Article 18 requires the Commission to report on the implementation of the WFD at least 12 years after its approval (2012) and every 6 years thereafter. It also requires interim reports between the reporting periods (2015, 2021, and 2027).

In compliance with these reporting requirements, the European Commission (EC) has published four WFD Implementation evaluation reports, which are typically based on and accompanied by Commission Staff and consultant evaluation reports[10]:

- 1st implementation report on the first stage of implementation (22 March 2007), [COM(2007) 128 final]
- 2nd implementation report on monitoring networks (1 April 2009) [COM(2009) 156 final]
- 3rd implementation report on the River Basin Management Plans (November 2012) [COM(2012) 670 final]
- 4th implementation report on the Programmes of Measures and the Floods Directive (FD) (March 2015) [COM(2015) 120 final]

[10] European Commission Implementation reports are available at: http://ec.europa.eu/environment/water/water-framework/impl_reports.htm

In 2012 it issued a comprehensive evaluation of the status of European water policy, the *Blueprint to Safeguard Europe's Water Resources*[11], setting the stage for its future direction. The *Blueprint* works from the conclusions and recommendations of three building blocks: the 3rd Implementation report; the review of the EU Policy on Water Scarcity and Droughts—Communication "Addressing the challenge of water scarcity and droughts" [COM(2007)414]—; and reports issued by the European Environment Agency (encompassed under the "Water assessment 2012" initiative) and the Fitness Check of EU Freshwater Policy. The Blueprint validated the strategic approach of the WFD and identified gaps and policy areas where improvement was needed. Specifically it emphasized the need to:

(1) Improve water policy implementation in particularly problematic areas such as pollution prevention and mitigating the impacts of hydromorphological alterations of surface water bodies by implementing cross-cutting measures such as encouraging the uptake of green infrastructure and natural water retention measures to achieve multiple benefits (pollution prevention, flood prevention, improving river connectivity and functionality, etc.), and implementing the polluter pays and cost recovery principles to improve water use efficiency.

(2) Improve integration with other EU sectoral policies with important water related impacts (agriculture, fisheries, renewable energy, transportation etc.) to achieve mutually beneficial goals; and align EU funding and sectoral policies with the needs identified in the Blueprint (e.g., Common Agricultural Policy, Cohesion and Structural Funds).

(3) Fill in the gaps in the current water policy framework, particularly in what pertains to reducing water stress due to over-abstraction through measures designed to increase water use efficiency, such as efficiency targets in the agricultural and urban sectors, and implementing environmental flows in surface water bodies.

The Blueprint used the CIS system as the primary means to implement its recommendations, and the 2013-2015 CIS period has created working groups to work on many of the items identified in it.

[11] The Blueprint and supporting reports and documentation are available at: http://ec.europa.eu/environment/water/blueprint/index_en.htm

Additionally, the Commission has organized four European Water Conferences[12] in Brussels (2007, 2009, 2012 and 2015) which are open to representatives and managers from MS, stakeholders, and EC personnel and policy makers working on water policy. A fifth conference was organized in 2012 specifically to discuss the contents and recommendations of the Blueprint. These conferences have served to present the evolution and challenges of the WFD implementation process.

The most recent Water Conference was held in Brussels in March 2015. It focused on the experience with the first WFD planning cycle (2009-2015) including an evaluation of the PoMs that became operative in 2012; an evaluation of the second round of RBMPs (2015-2021) that were in public consultation and set to be approved in December 2015); the experience with the implementation of the FD[13]; integration with other policy areas; and financing opportunities for water policy-related areas in the 2014-2021 financing period, particularly through the Rural Development Programs, Operational Programs, etc. Some of the key conclusions from the Conference are[14]:

- There have been improvements in achieving water policy objectives, but more efforts are needed. The first cycle of RBMPs have resulted in the number of surface water bodies expected to reach good status increasing from 43% in 2009 to 53% in 2015. However, more determined action is needed in areas identified in the Blueprint such as control of abstractions and establishment of environmental flows; control of diffuse pollution particularly through more effective (non-voluntary) measures in agriculture; and improved application of pricing mechanisms and cost recovery.

- The use of exemptions under Article 4 of the WFD has increased in the 2nd round of RBMPs without being adequately justified.

[12] To access the program, proceedings and outcomes of these conference see: http://ec.europa.eu/environment/water/conferences.html

[13] The Floods Directive (Directive 2007/60/EC on the assessment and management of flood risks) requires MS to identify and map water courses and coastal areas and human assets at risk of flooding, and take measures to reduce this risk through flood risk management plans. These plans have to be coordinated with RBMPs in terms of their measures and goals, their calendar (first flood risk management plans will be approved in December 2015 coinciding with the approval of the second round of RBMPs) and the public consultation processes.

[14] For a full Conference Report see: http://ec.europa.eu/environment/water/2015conference/pdf/report.pdf

- In order to obtain public and stakeholder support for water policy goals it is necessary to improve public consultation and participation efforts. It is also necessary to better communicate progress. In this sense the "one-out, all-out" principle of the WFD may hide progress in certain areas. New indicators may be necessary.

- The tools to improve implementation and compliance were identified in the Blueprint and funding is available from Cohesion and Rural Development funds for WFD and FD-consistent water measures. MS must take advantage of these funding opportunities to achieve water policy goals by aligning investment priorities with these goals.

- There is significant synergy potential between RBMPs and Flood Risk Management Plans (FRMPs) as some countries have already demonstrated. MS must emphasize the use of natural water retention measures to achieve multiple goals (enhancing ecosystem services, increasing resilience to flood and drought risks, etc.)

Climate change will increase hydrological variability and pressures on water ecosystems. It needs to be better accounted for in future RBMPs and FRMPs.

1.4.2. Evaluation from academia and practitioners

In addition to official evaluations, a significant volume of academic literature has also been published over the past 15 years dealing with the WFD: its goals, aspirations, potential, challenges and implementation processes. According to Moss (2008) between 2001 and 2008 about 1000 papers were published in ISI listed journals that have “Water Framework Directive” in their title or key words. Following his analysis, we note that most of that literature has focused on the more technical aspects of the Directive: setting the background conditions, inter-calibration processes for the different indicators, results of the evaluation processes, etc. However, only a few papers deal with the policy implications of the WFD. [15] Hering et al. (2010) identify over 1900 papers that have been published as a result of research projects associated with the implementation of the WFD, also in their view mostly focused on improving our understanding of the ecology of Europe's surface waters aquatic ecosystem function. On their part, Bourblanc et

[15] This observation coincides with the conclusions Pahl-Wostl (2011) derives from a bibliometric analysis of scientific publications on water management, which "highlights the continued dominance of technical over social perspectives in scientific writings on water management" and a lack of integrative analysis of water management challenges, despite the wide-spread acceptance that water management problems are fundamentally problems of management and governance and calls for integrated approaches to water management.

al. (2013) observe that most WFD implementation studies look at the formal implementation aspects (transposition, statistical analysis of evaluation results, etc.) and few deal with actual practical implementation "on the ground", an aspect which in their view remains largely under-researched and therefore unclear. Existing institutional and policy studies of WFD implementation tend to focus on a particular country (La Roca and Ferrer, 2010 for Spain; Hammer *et al*., 2011 for Sweden; Allen, 2012 for Scotland; De Stefano and Hernández-Mora, 2012 also for Spain; Richter *et al*. 2013 for Germany; Kanakoudis et al., 2015 for Greece; or Hakstege, 2011 and van der Heijden, 2015 for the Netherlands, to cite just a few examples); or on a more comparative analysis of implementation strategies between different MS (Moss, 2008; Pahl-Wostl *et al.*, 2010; Leifferink *et al*., 2011; Bourblac et al., 2013; to cite some that focus on the institutional and policy aspects).

This Deliverable contributes to this significant body of work by critically analyzing the experience with the implementation of the WFD from the theoretical perspective that was outlined in section 1.2 above. It will critically analyze the experience with the WFD implementation process regarding three of the four pillars of the WFD and using the geographically specific case of Spain. The analysis is presented through three articles that have been published in peer reviewed academic journals in the context of the SWAN project. In the next section we present a brief description of the contents of each paper. The Deliverable is complemented with a summary of the Dutch experience with the implementation of the WFD from the perspective of a practitioner with WFD-implementation responsibilities in the Dutch Rijkswaterstaat (Annex 1). The different hydrogeographical, institutional and sociopolitical characteristics of the Dutch context complements nicely the largely Iberian perspective presented in the contents of this Deliverable.

1.4.3. The problem of boundary setting, spatial fit and institutional design for managing water resources: The river basin as eco-region (Paper 1)

Defining system boundaries is a key starting point to approaching system management. This is particularly the case when managing complex social-ecological systems, such as water, where there is a need to deal with the uncertainty of ecosystem dynamics and the complexity of social systems (van Meerkeert *et al.,* 2013). Boundaries can be understood in a geographical sense, but also in a political, social or conceptual sense. The definition of the problem to be addressed, the range of acceptable solutions, the indicators selected to monitor the evolution of the system,

the actors that will be considered relevant to participate in the decision-making process, and the geographical delimitation of the system are all boundary decisions that cannot be determined exclusively on technical or scientific grounds. They are, in essence, political decisions, and they fundamentally affect power relations and the outcome of policy decisions about water (Swyngedouw, 2006).

According to Mostert *et al.* (2008), there is widespread agreement among the water community about the "central importance of boundaries in water management". These boundaries can be physical, administrative, technological, social or cognitive, and the central question remains on how to define and manage these boundaries. In their view, the debate about the suitability and viability of IWRM for resolving water management issues is, in fact, a debate about how to deal with the definition and management of boundaries. Van Meerkeert *et al.* (2013) argue that water managers make four kinds of boundary judgments: substantive, participatory, structural and contextual. The first deals with questions such as: What is the issue about? What are the values included? The second judgment deals with what actors to involve in the process, at what point and in what form. Structural boundary judgments refer to determining who is responsible for the different parts of the policy process and how to relate/integrate the different parts. Finally, contextual boundary judgments refer to the determination of factors external to the system to take into consideration in the decision making process (for instance, climate change).

In line with one of the basic elements of the IWRM principles, the WFD establishes the river basin district as the basis for water planning, management, integration and policy making. The WFD therefore utilizes a physical characteristic of surface waters, the river basin or watershed, as the defining element for boundary setting. It is through the watershed that integration takes place of: different 'waters' (surface, groundwater and coastal waters); different administrative boundaries (international, national, regional and local); social and economic groups (stakeholders and the public) and areas of expertise. However, as Moss (2012) points out, the water-shed is often different from the problem-shed, the policy-shed, etc. When dealing with complex social-ecological systems, why should physical characteristics determine the definition of boundaries? Is this necessarily the best approach? What are different institutional designs for integrated management at the river basin (or other) scales? How effective are they? What are the resulting advantages and challenges from these boundary choices?

The article by Del Moral and D'O (2014) deals precisely with these issues. It critically explores the election of boundaries that result from taking the watershed approach as a basis for water policy

making. In order to do this, it comparatively reviews two diverse cases in Europe (Portugal and Spain), each of which came from different political and water management traditions and have therefore taken different approaches to the boundary aspects of WFD implementation.

While in Portugal the river basin governance structure is rather centralised, with a national water authority retaining planning and decision-making power, in Spain such structure is shared between the central administration, its dependent river basin organizations (*Confederaciones Hidrográficas*), the autonomous regions, and local water users' organizations. Regional administrations have never been autonomous in Portugal (except for the islands of Madeira and Azores), and the administrative map of the country has always been reorganised from the centre (i.e. the capital, Lisbon), partially as a defensive response to the presence and threat of its dominant neighbour, Spain. Only more recently, after the fall of dictatorship and the approval of a democratic constitution in 1976, the prospect of moving towards autonomous and directly elected regional governments was officially recognised. Responding to the requisites of the European WFD, Portugal approved a new Water Law in 2005 that transposed the WFD into the national jurisdiction, and designated river basins ('Hydrographic Region Administrations') as the key unit for water management. However, the implementation of this new model of river governance based on river basin districts was rather ephemeral. Soon the re-scaling and reorganizational efforts were significantly limited, officially due to the current economic crisis, with the central government regaining control of the newly created water districts (ARH's - Hydrographic Region Administrations) in 2011, only two years after their constitution.

In contrast, in Spain the central power has historically faced decentralising forces from peripheral regions. As early as 1865, attempts were made to establish river basin based organizations, and formal River Basin Authorities were gradually established between 1926 and 1961. Under Franco's dictatorship (1939-1975), these were kept as mere peripheral tools for implementing the central policy of water resources exploitation. After the democratic transition, Spain evolved to a quasi-federal political structure, with major competences being delegated to the regional governments or *Comunidades Autónomas*. These processes have entailed the inclusion of new actors in the water policy arena, but the power structure remained based on former socio-political networks and on instrumental river basin authorities as part of the central administration. In parallel, the reinforcement of new emerging regional powers resulted in mounting conflicts over water management competences.

Until recently, the river basin scale has seemingly been widely accepted as the sole territorial unit enabling the implementation of integrated and participative governance. While political action has tried, with little success, to integrate these concepts, theoretical analysis and empirical research have shown the limitations of such approach, and the need to integrate several scales that take into account not only the 'realm of nature' but also that of history and politics. The Iberian case study shows this phenomenon at both the international (Spain-Portugal) and the intra-state level. Throughout the process of WFD implementation, significant resistance to river basin governance scale has been encountered—mainly from the central government in Portugal, and from regional administrations in Spain. Consistently with the current literature, the research summarised in this first article does not suggest discarding the concept of spatial fit and the merit of the hydrographical domain, but rather accepting the existence of multiple geographies of water, with overlapping social, economic, political, cultural, and physical spaces, and the importance of developing collaborative and flexible ways of working across the boundaries they entail. It also shows that the spatial reconfiguration of water management can substantially reorder power constellations, and that research on spatial fit needs to pay greater attention to issues of power and politics in processes of institutional adaptation.

1.4.4. The use of economic instruments as an alternative to political/public sector processes in achieving water policy goals: Is it really working? (Paper 2)

One of the key aspects and innovations of the WFD is the emphasis on the use of price incentives through the application of an effective cost recovery policy to encourage sustainable water use (Preamble 38 and Art. 9, WFD). The use of economic incentives to achieve water policy goals is not unique to the WFD. Water fees, levies or tariffs are commonly used to recover part of the financial cost of water services and associated infrastructures in the case of public utilities, and also to provide return on investments in the case of private water companies.

As was pointed out earlier in this document, some authors (Bouleau and Pont, 2015;La-Roca, 2011; Kaika and Page, 2003; and Page and Kaika, 2003) point out that the final text of the WFD is the result of the tension between different and opposing approaches to environmental governance. According to La Roca (2011) the economic component of the WFD could be described as an ecological economics inspired building eroded by neoliberal forces. The WFD final text remains open to interpretations and further evolution, which in recent years has favoured

marketization and commodification. The emphasis on the consideration of environmental costs (not only monetary) has steadily lost momentum, since the CIS economic guidance document WATECO was published in 2003 (CIS, 2003).

However, it can also be considered that the emphasis of the WFD on economic instruments is part of a wider context of *ecological modernization* that emerged in the 1970s in response to the more radical environmental movement in Europe and the US (Bakker, 2003; Hajer, 1995; March, 2013). As these authors point out, the ecological modernization or market environmentalism approach to environmental governance, assumes that environmental protection and economic growth are not incompatible and therefore does not seek to undermine or transform existing patterns of production. Rather, it proposes that the solutions to environmental degradation that results from the capitalist process of production and accumulation can be resolved within the existing institutional system through technocratic and apolitical solutions: technological innovation, efficiency gains, and management based on scientific knowledge and technical expertise. Market mechanisms and other economic instruments thus become tools for attaining environmental goals.

These currently dominating paradigms of environmental governance can be analyzed within a growing body of literature that critically analyzes examples of the wider hegemonic project of "neoliberalizing nature" (March, 2013; Castree, 2008a and 2008b; Heynen *et al*., 2007; Mansfield, 2007; Bakker, 2005; among others), a process by which human interactions with the biophysical world are increasingly being governed by neoliberal approaches. This process is expressed differently in different socio-geographical contexts, but shares some common traits (Castree, 2008a): privatization of environmental (and natural) goods and services; marketization (or commodification) of natural resources, that is assignment of prices and market mechanisms for the allocation and management of natural resources; *de*regulation, that is the rollback of the state from previous areas of social or environmental intervention; *re*regulation, that implies the set-up of institutional structures to favor the neoliberal project; corporatization of the public sector, emphasizing efficiency and competitiveness over social equity goals (Bakker, 2003); and the promotion of civil society to fill the gaps left by the roll-back of the state.

Focusing on water, Castro (2009) emphasizes that it is important to distinguish processes of *commodification* or *marketization* of water from the application of economic principles to water management, which is in essence what the WFD proposes. However, the recently published

Blueprint and other EU policy documents, as well as several recently EU-funded research projects (EPI-Water or CAP and Trade) are increasingly emphasizing the role of market mechanisms and other economic instruments to allocate and manage scarce water resources. Some of the characteristics or external manifestations of this process are:

- Changes in the relative value assigned to market versus political deliberation for the management and allocation of water resources:
- Application of the full cost recovery principle (originally introduced in the Dublin principles: "Water has an economic value …and should be recognized as an economic good") in order to encourage efficiency gains through scarcity price incentives.
- Creation and promotion of water markets to more efficiently allocate scarce resources.
- Increasing private sector involvement in service provision and infrastructure development.
- Monetizing ecosystem services, that is, putting a value on ecosystem services in order to more effectively protect them.

Castree (2010, and previously 2008a and 2008b) reviewed research that analyzes examples of nature's neoliberalization in different socio-geographical contexts—what Brenner and Theodore (2007) and Peck et al. (2009) call 'actually existing neoliberalisms'—in an attempt to identify the main components and draw some conclusions on its environmental and social implications. The paper by Hernández-Mora and Del Moral (2015) included in this Deliverable aims to contribute to this effort by revisiting and expanding on the analysis of the process of water *mercantilización*in Spain. *Mercantilización,* applied to the specific hydro-political context of Spain, was first described by Bakker as the "introduction of markets or market simulating techniques" to water resources management, and "the participation of private companies and private capital in resource development, water supply and wastewater treatment" (2002, p.767). Throughout the twentieth century Spain was dominated by the hydraulic paradigm (Saurí and Del Moral, 2001), an approach to water management characterized by public control of resource development and allocation of public water resources to strategic sectors at highly subsidized rates. Bakker argued that Spain's specificities (the preexisting moral economy, in Castree's terms) resulted in what might be called an incomplete process of neoliberalization, because the state continued to have a preeminent role in water resources administration and provision. In Bakker's terms,

"*mercantilización*, in the Spanish case is not necessarily synonymous with liberalization or commodification of water" (ibid, p.787) but, rather, a "technical facilitator of the continuation of the traditional hydraulic paradigm" (ibid, p.781). However, we will argue in this paper that the process of neoliberalization of water in Spain has continued and intensified over the past decade through a series of regulatory reforms that have progressively shifted the management and allocation of water resources away from state control and political[16]deliberation and toward a growing role of the market.

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

The paper attempts to answer these questions by focusing on the experience with the development of water markets in Spain. The emphasis on this aspect is justified by the specific attention paid to water trading schemes among other economic instruments in the context of the Blueprint and the Review of the EC Communication on Water Scarcity and Droughts, and the fact that Spain is the only country in the European Union with operating water markets and therefore from which some lessons might be learned. Hernández-Mora and Del Moral (2015) analyze the evolution of water policy with respect to the regulation of water markets, highlighting the process of institutional build-up that has been necessary to facilitate them. It focuses on the water trades that took place between users in the Tajo and Segura river basins during the 2005-2008 drought using the Tajo-Segura transfer infrastructure—the most significant in terms of volume of water sold and that have driven further institutional reforms at the national level, creating an opportunity for more extensive water trading.

The paper shows that water trading, while presented as a more flexible and efficient alternative to public allocation decisions, in fact requires a significant process of institutional build up, through

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

both *de*regulation and *re*regulation processes, and decisive public intervention to facilitate these exchanges. The process is heavily influenced by the pressures of powerful regional elites—based on the competitive advantage of Mediterranean intensive agriculture and a strong tourism industry and their significance in Spain's role within the larger European and global economic system—so that the regulatory outcomes are consistent with their interests. The experience with the Tajo-Segura water sales shows that in cases of unequal access to power and information, water markets serve to heighten the lack of transparency and accountability and intensify unequal power relations. Furthermore, it illustrates how markets work to provide a win-win situation for the contracting parties at the expense of the public interest, which both subsidized the operations and suffered the environmental impacts. Thus it shows how the potential advantages that water markets can provide in specific and local situations (increased flexibility in allocation decisions, mitigation of drought impacts, make the economic value of the resource explicit) are heavily dependent on the institutional context in which they are implemented.

The paper uses the example of an "actually existing neoliberalism", an actual *mercantilización* process, to illustrate how the development of the regulatory framework for water markets in Spain was really driven by and targeted to the resolution of a territorial challenge that has been historically deemed as a key political and economic priority by all governments and political parties: the transfer of subsidized water resources to the Iberian southeast. The powerful economic and political interests that underlie this historical claim have influenced (and benefited from) the process of institutional design. The use of supposedly unquestionable arguments of efficiency and competition serve to impose management alternatives that are neither impartial nor equitable in their outcomes. Using economic instruments for water resources management serves to remove significant management decisions from the political arena, allowing for the presentation of conflicting and contested allocation decisions as supposedly technically and economically sound and thus not subject to political debate. Administrative and political decisions are substituted by market instruments facilitated and enhanced by a constructed institutional framework that changes the rules of the game in favor of the most powerful players.

1.4.5. Politics, policy and society: Questioning participatory governance approaches to water resources management (Paper 3)

The final paper included in this Deliverable (Hernández-Mora et al., 2015) contributes to a growing body of research that has critically reviewed the effectiveness of the participatory governance approaches that inspire IWRM and is a key component of the WFD. The WFD introduces information, consultation and public participation requirements in an effort to improve its effectiveness and facilitate its implementation and compliance. When the WFD was approved in 2000 this approach was part of a wider effort by the European Commission to "open up the policy-making process to get more people and organizations involved in shaping and delivering EU policy" (EC, 2001: 2).

The transition from government to participatory governance approaches in natural resources management (Page and Kaika, 2003) finds theoretical grounding in the proponents of deliberative democracy. Governance requires a transition toward a networked approach that incorporates different government levels, civil society organizations and private sector actors into decision-making processes. In deliberative democracy (Fishkin, 1991, Gutman and Thompson, 2004), deliberation is central to decision-making. The outcome of decisions over the management and allocation of public resources is reinforced and validated through the involvement of, and open discussion among, all relevant players under conditions of equal access to information and power.

The deliberative democracy theoretical framework purportedly offers an alternative to representative democracy because it promotes legitimacy of collective actions and policy decisions in situations of scarcity and conflicting interests; favors the emergence and defense of the 'greater good'; promotes mutual respect and understanding of different positions in decision-making process, that is, a way to tackling inevitable conflict and different perspectives (incommensurability of environmental problems); and encourages learning and an improved understanding of reality, given the situations of complexity and uncertainty. In a deliberative democracy decision-making process decisions should be adopted through an inclusive exchange of reasons and opinions, based on information that is accessible and comprehensible for the public, not only experts. The outcome of deliberation processes are theoretically effective and binding to all parties, and the process is dynamic, that is, decisions can be revisited and revised as circumstances and collective understandings or definitions of the problems evolve.

However, practical experience has shown that, even under governance and deliberative democracy processes, final decisions are often “outside” the public/political sphere and result from other power dynamics that are not often explicit. In fact, some authors (Kaika, 2003; Kaika and Page, 2003; Swyngedouw, 2005) have argued that the emphasis on governance arrangements has resulted in a progressive 'depolitization' of water resources management decisions. This has happened through the incorporation of previously politically contentious actors into staged and formalized participatory decision-making processes, and through the progressive dominance of purportedly impartial (apolitical) allocation mechanisms (economic instruments, technical and scientific expertise) over truly political decision-making.In their view, this process of 'depolitization' is an attempt to hide or veil the intrinsically political nature of the decisions concerning environmental policy. Thus, according to this perspective, while powerful actors continue to dominate and control water-related decisions, those outside the centers of power are disoriented and demobilized, with the consequence that their arguments and interests lose presence and strength.

In this general context, over the past few years the burgeoning use of Information and Communication Technologies (ICTs) has enabled the appearance and consolidation of new forms of social action. TICs have opened new possibilities for previously powerless stakeholders to share information and improve the effectiveness of their political activism in different realms of the public domain, thus counterbalancing, to some extent, the strong depolitizicing forces described above. This emerging networked citizen politics are characterized by the appropriation of ICTs for political action. The extent to which the emergence of these technologies is actually providing new avenues for participated decision-making and contributing to alter the dominating power balance is now the center of debate and research (Della Porta and Mosca, 2005; Iosifidis, 2011; Subirats, 2011; Castells, 2012; Fuster Morell and Subirats, 2013; Calderaro and Kavada, 2013; Taylor, 2014; Earl et al., 2014; Argawal et al., 2014). In spite of its relevance, however, this analysis has not been extensively applied to the domain of water resources management, where participatory governance was first institutionalized in the EU.

In order to explore these questions Hernández-Mora et al. (2015) analyze the experience of water-related socio-environmental networked citizen organizations (citizen water networks or CWN) that operate in Spain at the river-basin, regional and national scale. These networks are coalitions of environmental groups, citizen organizations, activists, scholars, local municipalities,

and other actors organized to defend the patrimonial[17] values of water. They started emerging in the early 2000s and use ICTs in different ways for organizational and communication purposes. The paper tries to discern whether the use of ICTs is improving their ability to organize and influence decision-making processes, particularly in the context of the WFD planning.

Our results, in line with those obtained by other researchers, reveal that ICTs have allowed CWNs to organize and work collaboratively across large geographical areas and facilitated their ability to more easily access, generate and disseminate information. In terms of improving transparency and accountability of water management decisions, our study shows that CWN members actively use and control the quality of official water information on water planning and management.

Our research also confirms results of earlier projects which indicated that, although citizens' knowledge and access to information have increased throughout the WFD implementation process, the governance approach introduced by this legal framework over the last decade has not yielded real changes in terms of access and influence on final decisions by all actors in conditions of equality. Furthermore, while ICTs have enhanced previously underrepresented actors' capacity to develop a shared (and alternative) understanding of the problems they face and empowered them to act collectively, their influence on final decisions continues to be very limited. In fact, it can be argued that by originally trusting the transformative potential of WFD governance approaches, activists have invested tremendous efforts in participating in debates over the managerial aspects of water management (the 'margins' of the debate) but remained excluded from the truly critical and controversial decisions.

Post-democracy reduces water decisions to management, that is, to decisions located at the level of 'policies' and not in the realm of the 'political'. Yet, the following questions remain unanswered: Is there any level of decision that escapes this 'postdemocratic dynamic'? If the answer is positive,

[17] In the Spanish, French and Italian translations of the WFD, the term "heritage" used in the opening statement—"Water is not a commercial product like any other, but, rather, a heritage that must be protected, defended and treated as such"—is translated as "patrimony" (*patrimonio* in Spanish and Italian and *patrimoine* in French). The etymology of the term—"patri", father, and "monium", received— suggests the idea of gift, of that which is received. In its wider meaning, it refers to the rights and goods that someone enjoys as member of a community (Calvo-Mendieta et al., 2014). These authors offer Ollagnon's (1979) definition of patrimony as "the set of tangible and intangible elements that contribute to maintaining and developing the identity and the autonomy of its holder over time and space by adapting to an evolving environment". When applied to water resources, the term allows to develop the complex and multifaceted meaning of water: water as a human right basic for the life of humans and maintenance of ecosystems, water as a source of territorial or local identity, water as an economic input or commercial product, water as a recreational resource, water as a source of cultural, aesthetic or religious asset, etc.

what is the scale and nature of decisions where participatory processes in water management may have some operability? Could a more intensive and effective use of ICTs by CWNs, one that more effectively reaches mass audiences, make a difference in terms of their ability to truly influence decisions?

The study shows that the low democratic profile of current water management institutions in Spain clearly hinders ICTs' potential to democratize decision-making processes. Without a real willingness to open up true spaces of deliberation where all actors can participate in conditions of equality, the role of ICTs will remain one of strengthening CWNs' organizational capabilities and ability to obtain and generate information, but will not alter the basic framework for water policy-making. It could be argued that the potential of ICTs as transformative tools is linked to the possibility of transforming the context within which decisions are made, that is, the democratic process itself.

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2. PAPER 1: WATER GOVERNANCE AND SCALAR POLITICS ACROSS MULTIPLE-BOUNDARY RIVER BASINS: STATES, CATCHMENTS AND REGIONAL POWERS IN THE IBERIAN PENINSULA

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Abstract: In this article, the state of the art of the current debate on scalar politics and water governance is summarized. The Iberian Peninsula case is reviewed in the light of this critical approach to the river basin as the unquestionable unit for water management. It is argued that when discussing 'spatial fit' issues, special attention should be given to changes in governance relationships and power structures. Key questions to be addressed include: when is the river basin an appropriate alternative; what type of decisions are to be taken at the basin scale; and what practices and rights can be endangered.

Keywords: scale, spatial fit, river basin, transboundary, Portugal, Spain

2.1. INTRODUCTION - GOALS

In recent years, although with long lasting precedents in previous decades (see Newson, 1992, and detailed review in Molle, 2006), a lively debate has emerged over the notion of river basin as the unquestionable adequate scale for water management and governance (Budds & Hinojosa, 2012; Cohen & Davidson, 2011; Graefe, 2011; Molle et al., 2010; Norman et al., 2012; Perreault, 2005). This critical discussion develops along with a revision of the ideal concept of Integrated Water Resources Management (IWRM – Biswas, 2004; Blomquist & Schlager, 2005), in the framework of a larger theoretical debate on the politics of scale for managing natural resources (Lovell et al., 2002; Ostrom, 1990; Ostrom et al., 2007).

Over a decade after the approval of the Water Framework Directive (WFD), close to the end of its first cycle of water planning (2009-2015), this article reviews the complex experience of water

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management in the Iberian Peninsula, where river basins, intertwined with national, regional and local borders, have long marked the management of common water resources. The two key research questions that it poses are: a) to what extent could the river basin be confirmed, altered or reinterpreted as the key spatial unit for water management, in the light of the WFD implementing experience; and b) to what extent could the recent critical debate on the 'river basin panacea' (Molle, 2008; Moss, 2012; Pahl-Wostl et al., 2012) be transferred to the Iberian Peninsula case?

By searching the answers to these questions, the article inquiries into two interrelated issues: one is the role of different institutional framings and scalar constructions on the management of river basins spanning across different level (international and interregional) boundaries; the other is the linkage of the debates on scalar politics and cross-border water management, by identifying the factors justifying and criticizing the river basin scale as its normative unit (Fall 2005, 2010; Furlong 2006; Norman 2012; Norman & Bakker 2009).

2.2. SCALAR POLITICS OF WATER MANAGEMENT

2.2.1. Framework – the debate on the 'spatial fit' of natural resources management

The spatial matching between natural resources and the social-political institutions responsible for its management has long been a major concern for contemporary societies. Over two decades ago, Elinor Ostrom (1990) already stated that clearly defined boundaries were the first of eight principles that should guide institutions managing common pool resources. Questioning these boundaries rapidly evolved to a debate on the adjustment between physical and political borders – as Oran Young (2003) affirmed more recently, the effectiveness of a social institution is a function of the adjustment between the institution's own features and those of the bio-geophysical systems with which they interact.

Presently, spatial fit remains a critical issue, but some previous simplifications are questioned: territorial borders, including the 'natural' ones, are often not easy to establish. Defining a management unit based on one criterion may solve some problems, but will likely create others. Rising the management scale to cover larger territories increases the number of stakeholders and interactions, and therefore of transaction costs. Delimitations based exclusively on natural borders underestimate or ignore the multiple geographies (political, social, economic, cultural) of socio-ecological systems (Moss, 2012).

In human geography and regional studies, scale is used in three main senses: the size of a particular unit, the existence of different levels of organisation and the relations between these different levels. The crucial insight of recent debates is that scale is socially constructed through the strategies of various social actors and organisations, challenging the traditional view of scales as natural or pre-given entities. In this sense, the basic dimension of scale in terms of the size of spatial units has moved towards the development of process-based conceptualisations of scale (MacKinnon & Tetzlaff, 2009).

Today it is broadly accepted that the analysis of the politics of scale (where to define the limits of a system management and the relations between physical and jurisdictional limits) requires an approach from the field of political ecology: environmental governance is a reality inherently politicized, therefore its management scale is not neutral, it is political. Rescaling issues result from social-political processes, rather than from predetermined categories arising from the physical-natural reality. Therefore, changing a system's management scale implies modifying the identification, nature and position of social actors, which results in changes on power relations and power geometries. The related concept of the 'politics of scale' refers to how different groups seek to influence and control the different territorial levels of organisation and the relationships between them (Swyngedouw, 2007).

Thus, in the background of the scalar debate over water resources systems, emerges the concept of hydro-social territory. This concept emphasizes the idea of co-producing water, based on water's hybrid nature, as opposed to the idea of water as a simple material resource (Swyngedouw, 1999). The territory is not a context containing water, rather a social-natural produced entity. Even more, stressing the idea of social construction we arrive to the notion of 'waterscapes' - spatial entities configured by water flows, technologies, institutions, discourses and understandings that produce and are produced by power relations, in which the functionality of social discourses, visions and values becomes a central vector. This perspective "requires attention to a range of 'moments' such as physical flows, patterns of access, technologies, institutions, practices, legislative reforms, governance frameworks and discourses around water, which are mediated by social and political processes and collectively constitute the waterscape of a given context" (Budds & Hinojosa, 2012, p. 120).

2.2.2. The case of water management and river basins - a particularly significant forum for debating spatial fit

The river basin is an apparently unquestionable territorial entity, unified by its topography, drainage and surface flows. At first sight, the 'natural' factor and its physical foundations introduces objective criteria, allowing human decisions to get rid of transitory conditioning. The scope of a hydrographic entity carries within the prestige of 'nature', as a hard concept.

On the other hand, over the last couple of decades, the river basin scale has been increasingly identified with the concept of IWRM (Blomquist &Schlager, 2005). The WFD, approved by the European Union in 2000, and has since given a great worldwide impulse to such identification. The experience of water policy has globally highlighted the need to move towards a holistic, integrated and inter-sector approach, overcoming organizational barriers. In this context, the river basin scope in which waters are physically interconnected (at least on the surface), seems to fit perfectly such a purpose, overcoming political-administrative borders. From this perspective, river basins are better governance units than municipalities, regions, states or nations, because the contours of a river basin reflect natural flows and, as such, its boundaries encapsulate the myriad factors that influence water availability and quality (Cohen, 2012).

Furthermore, river basin governance should facilitate the participation of water users at the river basin scale, where uses and conflicts are supposedly grounded. Thus, river basins are seen as more integrative and participatory than their jurisdictional predecessors. From this perspective, they could respond better to clearly hydrological issues, such as upstream-downstream relations, flood regulations, or environmental flow definition. Decision-making on a river basin scale would integrate a greater number and diversity of factors (i.e. point and non-point source pollution, upstream and downstream uses, urban and rural elements, and so on) than decision-making along conventional jurisdictional boundaries (Gleick, 1993; Mitchell, 1990; Sabatier et al., 2005).

However, recent literature has highlighted the limits and restrictions of considering the river basin as a governance unit (Budds & Hinojosa, 2012; Cohen & Davidson, 2011; Molle, 2009; Moss, 2012; Pahl-Wostl et al., 2012). Key arguments are centred on the heterogeneity, complexity and dynamism of hydrologic phenomena upon which river basins are based, but also include the diversity of internal scales (sub-basins, micro-basins) and the mismatch with the aerial and subsurface components of the water cycle.

Adopting river basins as the key unit for water management implies very different scales and processes of adaptation, according to the specific geo-political features of each country. Often, this re-scaling process supposes overlapping structures at the sub-national level, e.g. between regions or states, in the case of federal nations. In Canada, for example, adopting the river basin scale meant decentralising competences from the federated states. Recent studies have shown concern over the uneven institutional capacity of river basin boards, and their ability to maintain similar environmental protection standards (Cohen, 2012).

In other cases, the river basin model is imposed over previous local structures of water management. In Peru, for example, Budds & Hinojosa (2012) describe how new river basin boards have subtracted competences to traditional irrigation communities settled upstream, and paved the way for new stakeholders (mining companies in this case) to take a lead position in this new framework. Critics over the loss of local, well settled water management competences are also expressed in the EU, in spite of significant geographic, political and socio-economic differences. That is particularly the case of Sweden (Andersson et al., 2011) and Germany (Moss, 2012), which are discussed further ahead (section 2.3).

Boundary definition, choices about decision-making arrangements, and issues of accountability will arise in any watershed, and may help to explain why watershed management has more often taken polycentric organizational forms composed of sub-watershed communities of interest (Pahl-Wostl et al., 2012).

2.3. RE-SCALING OF WATER MANAGEMENT IN THE EU - THE SCALAR POLITICS OF THE WFD

The EU provides a good example of efforts to solve the scale issue, but also of how theory can be disentangled with practice.

The EU has reconceptualised itself over time as a heterogeneous political-territorial construction, rather than just a sum of intergovernmental organisations. Thus, regional integration was expected to overcome national sovereignties and pave the way for transboundary governance networks. Nevertheless, these are often halted by sovereign unilateral decisions that tend to make a comeback when stakes are (seen as) high (De Vries, 2008; Warner and Zawahri, 2012).

Johnson (2012) analysed the change of scale in EU environmental governance and the changing character of its sovereignty, and characterises the changes in water management as a form of

"post-sovereign environmental governance" (Karkkainen, 2004). The author argues that the WFD represents "a hybrid form of territoriality that is changing the political geography of the European Union", and that "the redrawing of political-administrative scales along physical geographical lines (those of river basins) provides evidence of the emergence of a new, non-nested scalar politics of governance in Europe".

In practice, although this new model has empowered important stakeholder groups, it emerges from a top-down approach launched at the central EU level, eventually causing fractures between policy-makers and local communities and stakeholders. In fact, this type of advanced implementation of theoretical models of governance has been identified as one of the major threats to the political integrity and the very existence of the Union as such, as a result of the conflict between increasing European integration and poor central legitimacy (De Vries, 2008). Similarly, the establishment of a river basin management unit where it lacks political recognition and legitimacy may undermine the existing governance structure and power relations between stakeholders (Budds & Hinojosa, 2012).

As stipulated on its articles 3 and 13, the WFD clearly defines the river basin as the basic unit for water management across the EU, but gives member states the authority to design the institutional architecture for managing their river basin districts (Directive 2000/60/EC). The Directive calls for increased coordination and cooperation between riparian countries on transboundary river basins, namely obliging its parts to develop their planning efforts either through a common or coordinated river basin management plan. Nevertheless, by leaving to member states the autonomy to create and develop their own governing institutional structures, it may create an institutional gap between neighbouring riparian countries that might be difficult to overcome. The tailored solutions found in most countries have contributed to implement a river basin management unit amidst the different levels of power, but will likely make it more difficult for countries to establish transboundary governance models over shared river basins, with diverse institutional architectures (Macrory & Turner, 2002).

Moss (2012) points to the even greater difficulty of federal states (such as Germany or, in practice, Spain) to overcome the spatial misfit between river basin districts and administrative regions. In Germany the solution was sought according to a cooperative or institutionally 'soft' approach, "with a forum and set of procedures for reaching agreement between the various relevant jurisdictions" (Moss, 2012). Germany's approach allowed the country to avoid constitutional problems, but led to the co-existence of parallel structures with different scopes, forced to

coordinate their action at great financial, political and timely costs: on the one hand, a legislative and executive framework organized, as in the past, along administrative jurisdictions, and on the other a planning and operative framework organized primarily around river basins (Borowski et al., 2008; Moss 2003, 2004).

Many of the present river basin governance systems follow politically constructed demarcations that aim to fix water management to a specific territory (Cohen & Davidson, 2011; Molle 2006, 2009; Norman & Bakker, 2009). As they rely on a new static form and scale of water governance, these systems tend to promote fragmentation rather than interconnection, and do not necessarily facilitate a bottom-up, multi-layered and multi-scalar approach. They also tend to increase complexity, by introducing a new layer on the multiple-level politics of water, which does not contribute positively to a common understanding that facilitates public participation. Another factor that has not contributed to the effectiveness of cross-boundary/unified river basin management, is that behind the spatial fitting of management institutions to the watershed, is often the will and desire for greater political and geographic integration – but one thing does not imply the other. On the contrary, forcing the integrated management of a river basin across multiple boundaries, without considering the diverse nature of institutions, communities and actors present, will likely result on increasing conflictuality and reducing effectiveness.

Moss (2012) summarizes these arguments by arguing that river basin management based on its hydrological unity has three major limitations, namely: i) the difficulty in defining the river basin borders itself (beyond surface waters); ii) although improving spatial fit within the water sector, it often creates new spatial misfits elsewhere (Horlemann & Dombrowsky, 2012; Moss, 2003); iii) it may encourage water managers to focus on biophysical rather than socioeconomic problems of water management (Huitema et al., 2009; Mostert, 1998).

2.4. CASE STUDY - THE MULTIPLE-BOUNDARY GOVERNANCE STRUCTURE OF RIVER BASINS IN THE IBERIAN PENINSULA

Water politics, water culture and water engineering have all played a central role in shaping the Iberian landscape and society. The contemporary water geography and ecology of Spain and Portugal substantially remains the product of centuries of socio-ecological interaction. Neither the history of both Iberian countries nor its present geographical layout can be understood without taking into account radical transformation of the water landscapes. In terms of governance, a central piece in the development of Iberian water policy has been the early constitution of a solid

'policy community' (Pérez Díaz et, 1996), integrated by irrigators, hydroelectric power companies, public hydraulic works Administration and engineering firms. In general terms, these stakeholders have been able, throughout the 20th century, to capture the administrative and regulatory bodies, hindering the adaptation of water policy to evolving European water institutional framework (Bukowski, 2011; Del Moral 2010; Saurí & Del Moral, 2001).

2.4.1. National and regional levels

While in Portugal the river basins governance structure is rather centralised, with a national water authority retaining planning and decision-making power, in Spain such structure is shared between the central administration, its dependent river basin organisations (Confederaciones Hidrográficas), the autonomous regions, and local users' organisations.

Regional administrations have never been autonomous in Portugal (except for the islands of Madeira and Azores), and the administrative map of the country has always been reorganised from the centre (i.e. the capital, Lisbon), partially as a defensive response to the presence and threat of its dominant neighbour. Only recently, after the fall of dictatorship and the approval of a democratic constitution in 1976, the prospect of moving towards autonomous and directly elected regional governments was officially recognised. But resistance has proven harder to overcome than expected by 1976 constitutionalists, and after 36 years of proposing several maps with distinctive regional borders, a national referendum was held in 1998, with more than 50% abstention, and won tangentially by the "No" to regionalisation.

Since its early days in the late 19th century, Portuguese water policy was mostly restricted to hydraulic infrastructures (mainly for urban supply and sewage treatment, hydro-electrical power and irrigation), and always promoted and controlled by the central administration (Pato, 2011).

After entering the EU in 1986 (together with Spain), the challenge of building large urban water infrastructures in order to improve access to safe drinking water and sewage treatment caused a major policy shift. A large public company was created (Águas de Portugal) with a strong participation of municipalities, which were grouped in order to implement and manage local systems of water supply and sanitation.

Also responding to the requisites of the European WFD, Portugal approved a new Water Law in 2005 that transposed the WFD to the national jurisdiction, and elected river basins ('Hydrographic Region Administrations') as the key unit for water management (Thiel, 2009; Thiel and Egerton,

2011) (Figure 2.1). However, the implementation of this new model of river governance based on river basin districts was rather ephemeral. Soon the re-scaling and reorganizational efforts were significantly limited, officially due to the current economic crisis, with the central government regaining control of the newly created Hydrographic Region Administrations in 2011, only two years after their constitution. Despite the financial arguments (Sereno, 2012), given the high dependence of Portugal on shared river basins, and at a moment of mandatory international partition of competences (within the EU), it is reasonable to consider that such a re-centralisation shift might have been pushed rather by the will to retain national control over transboundary (and therefore particularly sensitive) water resources.

Figure 2.1. Portuguese river basin districts

Source: www.inag.pt

Contrarily, in Spain the central power has historically faced decentralising forces from peripheral regions. As early as 1865, attempts were made to establish river basin based organizations, and formal River Basin Authorities were gradually established between 1926 and 1961. Under Franco's dictatorship (1939-1975), these were kept as mere peripheral tools for implementing the central policy of water resources exploitation (Del Moral 2000, 2010; Saurí and Del Moral, 2001, 2012; Swyngedouw 1999, 2007). After the democratic transition, Spain evolved to a quasi-federal political structure, with major competences being delegated to the Comunidades Autónomas.

These processes have entailed the inclusion of new actors in the water policy arena, but the power structure remained based on former socio-political networks and on instrumental river basin authorities controlled by the central administration (Pérez-Díaz et al., 1996). In parallel, the reinforcement of new emerging regional powers resulted in mounting conflicts over water management competences (Hernández-Mora et al., 2011).

Spain has followed an organisational (or institutionally 'harder') approach, building on its long tradition of existing river basin authorities (Confederaciones Hidrográficas) with executive power and some financial capacity, even if closely controlled by the central government. Given the complex power relations between central state / river basin authorities and regional and local administrations, this model was only implemented for inter-regional basins (among them the four major international catchments shared with Portugal (Figures 2.1 and 2.2), leaving intra-regional basins under the authority of the Regional Administrations (Comunidades Autónomas).

Figure 2.2. Comunidades autonomas (green polygons, black labels) and river basins (blue contours) in Spain

Source: Hernández-Mora et al., 2011

Thus, the larger inter-regional river basin authorities are currently a vehicle of the central government policy, while the smaller intra-regional ones are part of some Autonomous Communities (Catalonia, Basque Country, Galicia and Andalusia). Although following a more decentralised model, Spain central administration has always retained jurisdiction over inter-regional river basin authorities, as well as the exclusive negotiating empowerment towards its neighbour countries (Portugal and, with much less importance, France) regarding transboundary river basins.

The ambition to rescale water management competences was pursued in both countries, but significant resistance has been encountered – mainly from the central government in Portugal, and from the central-regional conflict in Spain. As mentioned by Thiel et al. (2011), "we have to consider that it makes a difference if re-scaling is negotiated in a federal or in a unitary state, and whether negotiations are settled as a constitutional matter of distribution of competencies among levels of representative government".

2.4.2. International level

The international transboundary Iberian river basins cover nearly half (46%) of the surface of the Iberian Peninsula, and deliver approximately 45% of its average annual surface water resources, most of it from Spain to Portugal (Figure 3.3).

Figure 2.3. Transboundary river basins shared between Portugal (yellow) and Spain (orange)

Source: www.cadc-albufeira.org

The governance of its major transboundary river basins (Minho, Lima, Douro, Tejo and Guadiana) is framed internationally by two major legal tools: the European WFD, and the bilateral Albufeira Convention. Still, the bulk of water governance and control lies within the national sovereignty of each riparian country.

The Albufeira Convention was signed between Portugal and Spain in 1998, regulating the "cooperation for the protection and sustainable use of shared river basins". It was triggered by political conflict in the 1990s due to increasing needs and demands of both countries, particularly in the drier south, which resulted on a series of high-level political negotiations that were held back to back with the development of the European WFD (Thiel, 2004).

The Convention has been praised as a major diplomatic success between the two Iberian countries, and indeed it has a meaningful role both for bilateral relations and for the management of transboundary river basins. However, its nature remains strictly governmental, without any kind of multilayered governance or effective public participation (Sereno, 2011). Contrary to the international river basin commissions of the Scheldt (France, Belgium, Holland), the Rhine (Switzerland, Germany, France, Holland), or the Danube (the world's most international river basin, shared between 19 different riparian countries), the negotiations and functioning of the Albufeira Convention never provided a seat to the Comunidades Autónomas on its directive boards, despite the quasi-federal condition of Spain.

Furthermore, the Convention management structure is not flexible or effective enough, as it remains strongly driven by the diplomacy agenda of both countries (Do Ó, 2012). Dominated by the sovereignty-focus of both riparian countries (Lopes, 2012), the Convention binds the two national sovereign states strictly at the top political level, without incorporating any participatory (and not just informative) role to the multi-layered decision-making process existing within each country.

Moreover, as Zeitoun and Mirumachi (2008) argue, there is evidence suggesting that uncritical acceptance of such traditional and static forms of 'cooperative' arrangements, as the one conveyed by both riparian countries within the framework of the Albufeira Convention, may in fact sustain and deepen the conflict it was intended to transform.

2.4.3. Multi-scaled power relations in Iberia

When addressing issues of spatial fit, special attention should be drawn to changes and relations between governing power structures, identifying linkages or connections that emerge from both material and discursive power dynamics. In the case of the Iberian Peninsula, several scales of water governance overlap and create conflictive borders with other scales and affected stakeholders (Table 1).

Table 2.1. Characterization of the spatial scale of water allocation decisions in the Iberian Peninsula

Spatial scale	Scope	Legal/administrative instrument	Dominant allocation criteria
International	Transboundary river basins	Albufeira Convention	Hydroelectricity, water supply, environmental flows, flood mitigation
National	Water management rules, inter-sectorial linkages	Water Act System of National Hydrologic Equilibrium (*Spain*) for basin transfers	"National hydrological balance" (*Spain*) National economic and territorial strategies
Regional *(Spain only)*	Social and economic development	Regional (Autonomic) Water Acts	Regional (Autonomic) development strategies
River Basin Districts	Management of internal water resources	River Basin Management Plans (RBMP's)	Priority ranking, supply/demand balance, risk mitigation
'Exploitation Systems'	Zones within a river basin supplied by a common distribution network	RBMP's: water balance	Sectorial/Territorial (sub-basin)
Demand Unit *(Spain only)*	Cluster of users grouped by activity/use	RBMP's: existing uses and demand scenarios	
User	Water use legal rights	Water use permits	Existing rights

Source: adapted from Hernández-Mora et al. (2011)

These levels are not a pyramid, but rather a constellation in which each scale interacts with all others, and different stakeholders act on several scales simultaneously. The governmental instinct is to define clear competences and responsibilities for each level, based on the assessment of what decisions are better taken at what scale, and on its legal enforcement – but this static approach fails to incorporate the power dynamics that emerge from conflictive uses and positions of different stakeholders.

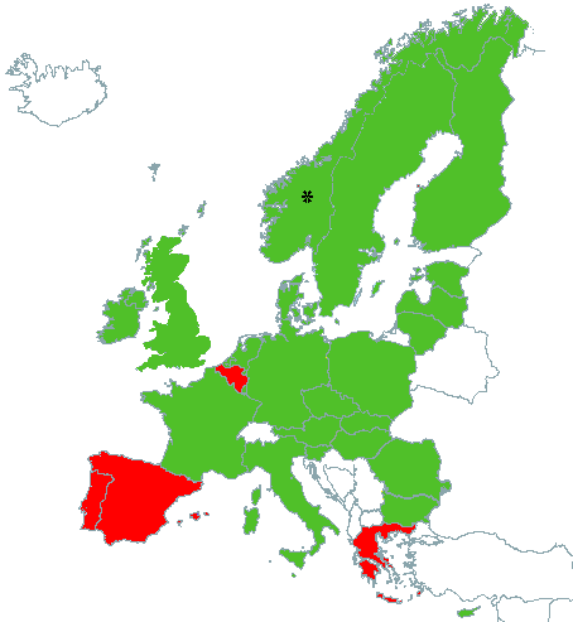
In the case of the Iberian Peninsula, this is evident from the increasingly opposed interests of the autonomous regions and the national government in Spain, but also from the abandonment of a

more decentralized model of water management in Portugal. Finally, the international cross-border nature of some of the largest Iberian river basins adds even more complexity on top of this power relational chessboard.

Hitherto, the myth of the river basin as the territorial unit fit for managing water resources contributed not only to forge international cooperation between the two states, but even to define the terms of agreement for such cooperation (the Albufeira Convention itself). Over the past few years though, the internal conflicts and hardships in both countries have resulted on cooperative numbness at the international level, which is expected to be redefined according to the results of such internal power changes. Whatever the results, the debate should now incorporate the critical approach to the scalar politics of water that is presented in this paper.

Overall, the territorial conflicts over water rights and competences seem to clog the implementation of the WFD in both Iberian countries (Figure 2.4). Both the more centralised Portuguese model and the controversial river basin based Spanish one have represented examples of the techno managerial approaches by which water management would be oriented towards satisfying the needs of large water users, and especially of hydroelectric power and irrigators interests.

Figure 2.4. WFD implementation status in the European Union, August 2013



Green – River basin management plans approved and submitted to the EU
Red – Plans in various stages of consultation or approval
(Official deadline for submitting: December 2009)

Source: http://ec.europa.eu/environment/water/water-framework/

For different reasons, the river basin districts have failed both as units for 'sustainable and integrated' water resources planning and governance. If in Spain this has occurred partly because of the rigidity of river basin authorities, historical executors of the traditional hydraulic policy, subject to national authority and currently conflicting severely with other jurisdictional scales, in Portugal it failed mainly due to poor political and stakeholder empowerment.

2.5. CONCLUSIONS

Until recently, the river basin scale has been widely accepted as the sole territorial unit enabling to implement IWRM and participative governance. Closely tied together, these concepts have progressively gained worldwide acceptance throughout the last three decades as the panacea for managing water resources. While political action has tried, with little success, to integrate these concepts, theoretical analysis and empirical research have been showing the limitations of such approach, and the need to integrate several scales that take into account not only the 'realm of nature' but also that of history and politics (Moss, 2012).

The Iberian case-study shows this phenomenon at both the international (Spain-Portugal) and the intra-state level. In coherence with the current literature, the research summarised in this pages does not suggest discarding the concept of spatial fit and the merit of hydrographical domain, but rather accepting the existence of multiple geographies of water, with overlapping social, economic, political, cultural, and physical spaces, and the importance of collaborative and flexible ways of working across the boundaries they entail. It also shows that the spatial reconfiguration of water management can substantially reorder power constellations, and that research on spatial fit needs to pay greater attention to issues of power and politics in processes of institutional adaptation.

Spatial fit, like river basin management in general, should not be seen as a panacea to environmental problems (Ostrom et al., 2007), but as a practice of adaptive (co-) management, involving a wide range of relevant stakeholders operating in different spatial contexts and scales. Recent ways of conceptualizing, institutionalizing, and practicing spatial fit via river basin management (and through the implementation of the WFD) are all pointing in the same direction: that the value of the concept of spatial fit lies less as a normative category for institutional design, than as an analytical frame for revealing the multiple geographies of resource management, the problems that these may generate, and the options for addressing them.

Transboundary river basins in Iberia have never been empowered to manage its water resources at the international river basin level. Despite the existing political agreement to cooperate, each country retains all the key competences, and both agreed on a rigid and strictly-governmental model of cooperation. This has often resulted in lack of cooperation and increasing conflicts, either between regions, local authorities, water users or other stakeholders, but seldom recognized by national authorities, eager to preserve the diplomatic image of good neighbourhood and full control of internal affairs.

The existence of an international border only seems to further increase the state fears of losing control or even sovereignty, pushing national administrations to reduce the autonomy of regional administrations, and of river basin authorities. Thus, somehow paradoxically, the transboundary (and inherently conflictive) nature of Iberia' river basins is contributing to increase the internal conflict between central national governments and regional administrations.

In line with recent work on polycentric governance of social–ecological systems, negative assumptions about the co-existence of multiple jurisdictions and institutional arrangements should be avoided, and empirical studies on their relative merits as well as their limitations should be carried out (Pahl-Wostl et al., 2012).

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3. PAPER 2: DEVELOPING MARKETS FOR WATER REALLOCATION: REVISITING THE EXPERIENCE OF SPANISH WATER *"MERCANTILIZACIÓN"*

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

Keywords: water, markets, neoliberalization, *mercantilización*, Spain, Tajo-Segura.

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3.1. INTRODUCTION

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

The case of water merits particular attention. As Swyngedouw states, "water has become one of the central testing grounds for the implementation of global and national neoliberal policies" (2007, p.53). One may argue that the process started with the declaration of water as an economic good by the Dublin Statement on Water and Sustainable Development (Dublin Principles) at the 1992 International Conference on Water and Environment. The four Dublin Principles, of which the economic consideration of water is the fourth and most contested, became the basis for the Integrated Water Resources Management (IWRM) approach that has dominated water management over the past thirty years. IWRM promotes the "coordinated development of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems" (GWP, 2000). Nevertheless, as Bauer (2004) points out, there has been an intense debate on what the consideration of water as an economic good actually means, and whether "an economic approach is the same as a free-market approach". Should water, as a basic human right, be managed on the basis of access and equity, or rather as a tradable commodity?

The European Union has not been immune to this conceptual debate. While the Water Framework Directive (WFD), approved in 2000, affirms in its opening statement that "Water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such" (WFD, Preamble 1), it also "asserts the economic value of water" (Kaika, 2003) and promotes the use of "water-pricing policies to provide adequate incentives for users to use water resources efficiently" (art.9.1, DMA). In more recent years, European environmental policy in general, and water policy in particular, are placing increasing emphasis on economic instruments to achieve its goals. Clear illustrations of this trend include the consideration of water

trading as an instrument that "could help to improve water efficiency and overcome water stress" by the Blueprint to Safeguard Europe's Water Resources (p.12, COM 2012/673) and the increasing emphasis of payment for ecosystem services as a means to achieve ecological conservation goals. Additionally some recently EU-funded research projects, such as EPI-Water (Delacamara et al., 2013) or Cap & Trade (Rinaudo et al. 2014), have looked at the potential role of market mechanisms and other economic instruments to manage water resources and achieve EU policy goals.

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

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

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

The paper is structured in five sections. Following this introduction, section 3.2 reviews some of the most significant literature that looks at the use of economic instruments to achieve environmental goals as part of a wider process of neoliberalization of nature. Section 3.3 presents the evolution of the institutional framework for water markets in Spain, discussing the influential role played by the southeastern agro-tourism lobby. Section 3.4 presents three case studies of water trading agreements between users in the Tajo and Segura river basins in Spain during the 2005-2008 drought period, and ties this experience to the broader framework of water neoliberalization. The final section 3.5 presents some concluding remarks.

3.2. NEOLIBERAL APPROACHES TO NATURAL RESOURCES MANAGEMENT: WATER MERCANTILIZACIÓN IN SPAIN

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

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

Castree (2010, and previously 2008a and 2008b) has reviewed research that analyzes examples of nature's neoliberalization in different socio-geographical contexts—what Brenner and Theodore (2007) and Peck et al. (2009) call 'actually existing neoliberalisms'—in an attempt to identify the main components and draw some conclusions on its environmental and social implications. This paper aims to contribute to this effort by revisiting and expanding on the analysis of the process of water *mercantilización* in Spain. *Mercantilización*, applied to the specific hydro-political context of Spain, was first described by Bakker as the "introduction of markets or market simulating techniques" to water resources management, and "the participation of private companies and private capital in resource development, water supply and wastewater treatment" (2002, p.767). Throughout the twentieth century Spain was dominated by the hydraulic paradigm (Saurí and Del Moral, 2001), an approach to water management characterized by public control of resource development and allocation of public water resources to strategic sectors at highly subsidized rates. Bakker argued that Spain's specificities (the preexisting moral economy, in Castree's terms) resulted in what might be called an incomplete process of neoliberalization, since the state continued to have a preeminent role in water resources administration and provision. In

Bakker's terms, "*mercantilización*, in the Spanish case is not necessarily synonymous with liberalization or commodification of water" (ibid, p.787) but, rather, a "technical facilitator of the continuation of the traditional hydraulic paradigm" (ibid, p.781). However, we will argue in this paper that the process of neoliberalization of water in Spain has continued and intensified over the past decade through a series of regulatory reforms that have progressively shifted the management and allocation of water resources away from state control and political[20]deliberation and toward a growing role of the market.

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

3.3. INSTITUTIONAL REFORM TO DEVELOP WATER MARKETS IN SPAIN

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

Starting in the early 1990s, the emergence of three new and competing discourses began to undermine the hegemony of the traditional hydraulic paradigm (Swyngedouw, 2013, p.264): the reassessment of nature's meaning and purpose; the accentuation of the commodification and privatisation of bio-political life through the pursuit of *mercantilización* (Bakker, 2002 and 2010); and the scalar transformation of the geo-political relations around water supply, propelled mainly

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

through the European Union's environmental governance legislation on the one hand and the devolution of state power in Spain on the other, which augmented the hydro-social powers of local and regional governments in a context of intensifying inter-regional conflict (Del Moral et al., 2003). These parallel processes help explain the regulatory development of water markets and their role in Spanish hydro-politics.

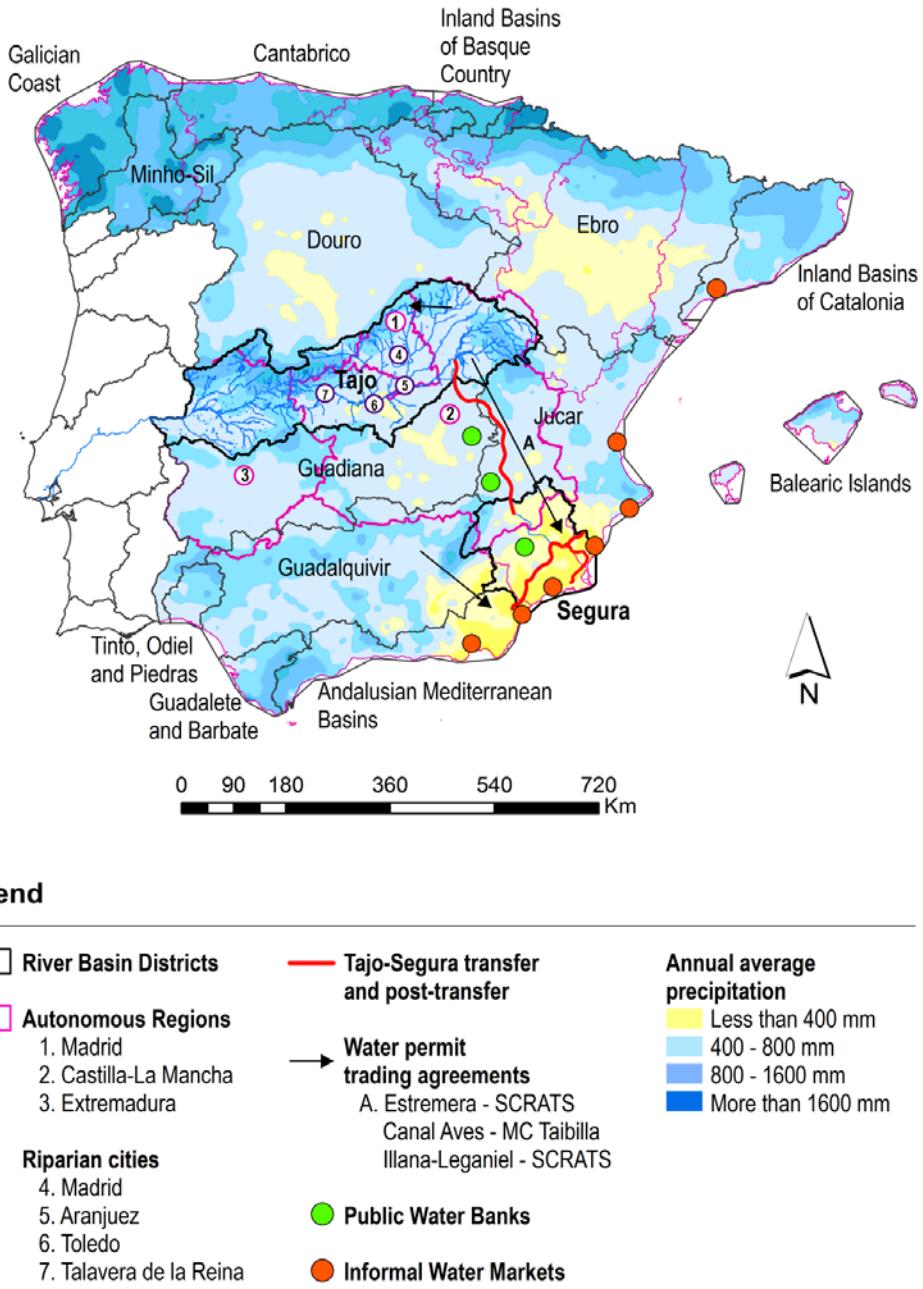
3.3.1. Institutional reform to develop water markets in Spain

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

The Tajo-Segura transfer project (ATS or Acueducto Tajo-Segura) was the first proposal to be approved in 1971. It was designed to transfer 1000 Mm^3 (million cubic meters)—600 in a first phase, and 400 in a second phase that was never realized—, from the Entrepeñas and Buendía (E&B) reservoirs in the headwaters of the Tajo basin to the southeast (Figure 3.1). The infrastructure would transfer 'surplus' Tajo water, that is, resources in excess of existing needs for urban water supply, irrigation and hydroelectric production. At the time, environmental requirements and impacts were neither legally contemplated nor part of water policy debates.

The ATS was presented as the first large hydraulic infrastructure in Spain that did not require significant public subsidies (Melgarejo, 2000 and 2009). The transfer's specific legislation requires users of transferred waters to pay a volumetric tariff with variable and fixed components. The law allocated transferred water (discounting evaporation losses) to irrigation (up to 400 Mm3) and urban water supply (up to 110 Mm^3) in the recipient regions. It also required that a river basin plan determine 'surplus' volumes and that discharges from E&B guarantee a minimum flow of 6 m^3/sec in Aranjuez to cover the needs of the Tajo basin (Figure 3.1). Construction started in 1971 and the infrastructure became operational in 1981.

Figure 3.1. Spanish river basin districts, existing water markets and the Tajo-Segura transfer



Source: Own elaboration. Rainfall data from the Spanish Ministry of Agriculture, Food and the Environment. Database available at: http://www.magrama.gob.es/ide/metadatos/srv/es/metadata.show?uuid=10696290-e0e5-4486-bf1f-e4ad370ce5d5

Transfer volumes are determined by the Central Commission for the Management of the Tajo-Segura Transfer (Comisión Central de Explotación del Trasvase Tajo-Segura), made up of representatives of the Central government, regional governments of donor and recipient Autonomous regions, donor and recipient River Basin Authorities (RBAs)[21], and ATS users—organized in the Mancomunidad de Canales del Taibilla (MCT, urban users) and the Sindicato Central de Regantes del Acueducto Tajo Segura[22] (SCRATS, irrigators). No private users or stakeholders from the Tajo river basin have a seat in the Commission. Decisions are made within the parameters of the ATS operational rules that establish transfer volumes for different storage levels in E&B (Table 3.1). The operational rules were approved in 1998 in an attempt to minimize political conflicts surrounding transfer decisions. Before that time, transfer volumes were determined by the Commission without specific guidelines. When storage levels fall below level 3, transfer decisions have to be made on a national governmental level by the Council of Ministers. No transfers are allowed when combined storage falls below level 4 (240 Mm^3 in the 1998 rules). As we will discuss is Section 3.3.4, these rules were revised in 2013.

Table 3.1. Operational rules of the Tajo-Segura transfer (1998 and 2013)

	1998 Rules		2013 Rules	
Levels	**Thresholds**	**Monthly transfer volumes (Mm^3/month)**	**Thresholds**	**Monthly transfer volumes (Mm^3/month)**
1	V > 1500 Mm^3 **OR** In12m>1000 Mm^3	68	V > 1500 **OR** In12m >1000 Mm^3	60
2	1500 Mm^3> V > Curve $N3_1$ **AND** In12m<1000 Mm^3	38	1500 Mm^3> V > Curve $N3_2$ **AND** In12m<1000 Mm^3	38
3	Curve $N3_1$ > V > 240 Mm^3	23	Curve $N3_2$ > V > 400 Mm^3	20
4	240 Mm^3	0	400 Mm^3	0

V: Combined storage in E&B reservoirs
In12m: Total inflows to E&B over the past 12 months
Curve N3: Emergency curve determined by monthly storage levels in E&B below which transfer decisions cannot be made by the Transfer Commission. $N3_1$: average monthly storage volume of 502 Mm^3. $N3_2$: average monthly storage volume of 662 Mm^3 (million cubic meters).

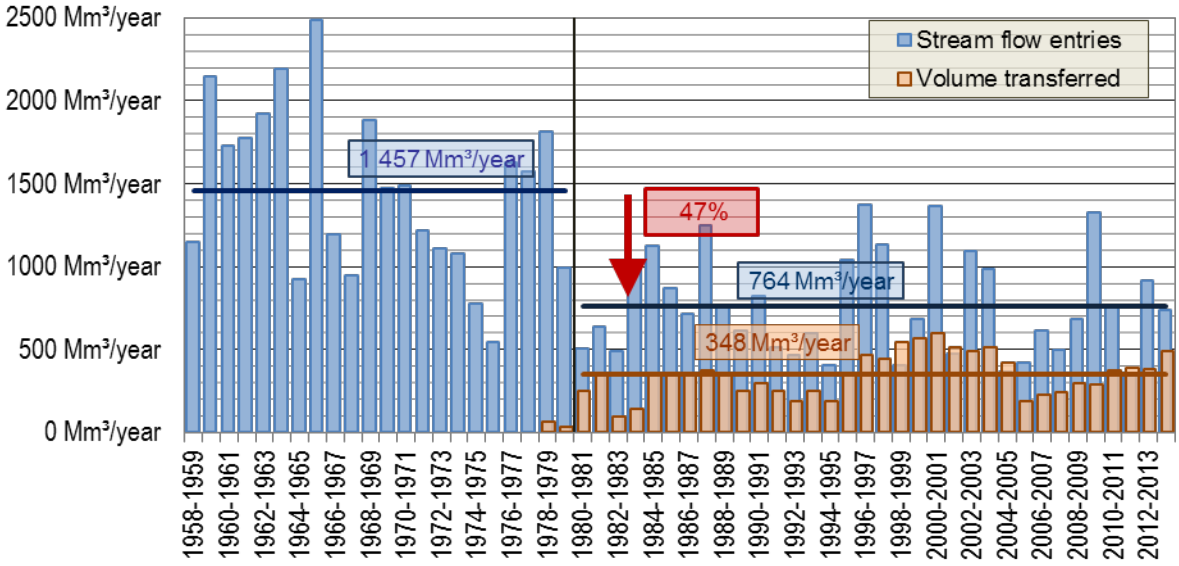
Source: Own elaboration with data from CHT (2012 and 2014)

[21] As Figure 3.1 shows, the Spanish part of the Tajo river basin encompasses the autonomous regions of Madrid, Castilla-La Mancha and Extremadura. The ATS affects primarily water quality and environmental conditions in the riparian cities of Aranjuez (Madrid), Toledo and Talavera de la Reina (Castilla-la Mancha). Recipient regions include Murcia (Segura river basin), Alicante (Júcar River basin) and the province of Almería in Andalucía. An additional 50 Mm^3 are transferred to the Guadiana basin.
[22] Using water from various sources, MCT supplies up to 90% of the Segura river basin population. SCRATS is a major player in Spanish hydro-politics, both at the regional and at the national level. It encompasses over 80,000 irrigators in the Seguraand Andalusian Mediterranean River Basins that receive transfer waters from the Tajo or use the transfer infrastructure to move and use water.

Conflicts surrounding the desire to transfer large volumes of water to the southeast have consistently been at the center of Spanish water policies (Hernández-Mora et al., 2014, López Gunn, 2009). For instance, the socio-political conflicts surrounding the failed attempt to build a second water transfer from the Ebro basin in the 2001 National Hydrologic Plan (Bukowski, 2007; Font and Subirats, 2010) dominated Spanish water management debates in the late 1990s and early 2000s. In the case of the ATS, the conflict has often reached the courts, with the Government of Castilla-La Mancha systematically contesting transfer decisions, and ATS users trying to obtain more secure water rights (FNCA 2013a). These conflicts derive from several factors:

- Overestimation of water availability in the headwaters of the Tajo and decrease in available resources (Figure 3.2). Annual transferred volumes have averaged 348 Mm^3 instead of the projected 600 Mm^3.

Figure 3.2. Water inflows into Tajo headwater reservoirs and transferred volumes (Mm^3)



Source: Adapted and updated from the first draft Tagus Basin Management Plan (CHT, 2011)

- Increased pressure on the Tajo basin to satisfy demands from ATS users. In some years, up to 80% of E&B resources have been transferred (Figure 3.2), thus limiting outflows to the Tajo. This has accentuated the water quality problems that result from the inflow of Madrid's wastewater through the Jarama river near Aranjuez (see Figure 3.3 in section 3.4). The Tajo

RBMP (CHT, 2014) acknowledges that the transfer of clean headwaters makes it difficult to achieve good status in the Tajo downstream from the Jarama.

- Failure to eliminate water scarcity in the Segura river basin, which has persisted over time because of uncontrolled expansion of irrigation and urban water demand (Gómez et al., 2013; IDR-UCLM, 2005; Martínez and Esteve, 2002; Melgarejo, 2000). Unregulated groundwater use makes up for existing water deficits.
- Failure to pay the full cost of water transfers, which continue to be subsidized. Users only pay ATS tariffs for volumes actually received in the Segura, in effect less than 30% of total infrastructure costs. They are also exempted from paying the tariffs in times of drought. Additionally, the tariffs have been periodically reviewed downward so that today they are almost 40% lower than when they were first established in 1981 (in the case of irrigation from 0.1539 €/m^3 in current 2014 prices in 1981 to 0.09731 €/m^3 in 2014). The gap between operating costs and tariffs is made up through budgetary transfers from the central government to the Tajo and Segura RBAs (Mergalejo, 2000).

Far from resolving water allocation problems, the ATS has exacerbated water-related political and social conflicts. Interregional disputes surrounding the ATS were at the core of the delay in the approval of the Tajo and Segura RBMPs in the current WFD planning process, which did not happen until 2014, five years after the 2009 deadline. The failures of the ATS and of the institutional and political context in which it operates have played a significant role in the process of water *mercantilización*, as we will see below.

3.3.2. Introducing water trading in Spain

The first significant reform to the 1985 Water Act came in 1999 following a major drought (1990-1995) that resulted in significant economic losses and large-scale water supply restrictions throughout the country (Estrela and Rodríguez, 2008). In the context of widespread economic liberalization reforms, the conservative Popular Party government altered the rules for water allocation through the introduction of markets in order to provide the system with more flexibility[23](Bakker, 2002; Del Moral et al., 2000). A previous law in 1996 had introduced the

[23] The Canary Islands have a different legal framework for water resources management that accounts for their geographical and hydrologic specificities. Water markets play a significant role for water allocation in some of the Canary Islands (Tenerife primarily) and have been extensively studied by Aguilera Klink and others (Aguilera-Klink and Sánchez-García, 2002 and 2005; Fernández-Bethancourt and Aguilera Klink, 2001). They will not be the focus of discussion in this paper.

possibility of private sector involvement in service provision and infrastructure development.

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

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

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

and De Stefano, 2013).

The 1999 reform introduced limited and strongly regulated market instruments. Two types of water trading mechanisms were introduced: water use permit trading (*contratos de cesión*) and public water banks (*centros de intercambio*) (Table 3.2).

Table 3.2. Characteristics of water trading mechanisms introduced by the 1999 reform

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

Source: Own elaboration

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

private good (Del Moral et al., 2000, Bakker, 2002).

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

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

Table 3.3. Key regulatory reforms for water *mercantilización* in Spain

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

3.3.3. Introducing water trading in Spain

The water trading mechanisms introduced in 1999 were scarcely used until the 2005-2008 drought due to a variety of reasons. On one hand, between 1999 and 2005 no significant droughts occurred. On the other, trades in surface water rights can only occur where there are water transport infrastructures in place and significant profitability differentials between different users. More importantly, perhaps, studies have found that farmers, who represent about 75% of all consumptive water uses in Spain, are reticent to formally give up their rights (Giannoccaro et al., 2013; Hernández-Mora et al., 2013, Del Moral and Silva, 2006). In their view, selling their permits can have several negative consequences: an implicit recognition of an excessive concession volume—thus opening the door to concession revisions and a limitation of volumes allocated—, a weakening of the socioeconomic fabric of the agricultural sector in the selling area, and a resulting loss of power vis-à-vis other water users in the basin.In order to overcome these limitations, several authors have argued for further institutional reforms to help encourage transactions (Garrido et al., 2013a and 2013b; Calatrava and Gómez-Ramos, 2009).

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

The 2005-2009 Drought Decrees therefore temporarily eliminated many of the restrictions and regulatory oversight established in the 1999 reform in a continued process of *de*regulation to facilitate market exchanges while at the same time expanding the reach of the market by incorporating waters not subject to trade. Although total volumes traded during the drought represented less than 1% of total annual national consumptive uses (Garrido et al., 2013a), these reforms were beneficial for ATS users, who bought almost 75% of the water traded, which amounted to 17% of total transfers received from the Tajo (see Table 4). They were thus able to circumvent the limitations established in the ATS operational rules to protect the Tajo environmental and social water needs. The possibility of conducting interbasin water permit sales, regardless of

drought conditions in the donor basins, already signaled an intent to rely on market mechanisms to deal with conditions of scarcity, and avoid the political cost of transfer decisions.

3.3.4. Introducing water trading in Spain

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

A first draft RBMP was briefly published by the Tajo RBA in November 2011. According to the document, given the decrease in available resources WFD environmental requirements in the Tajo basin could only be met through an increase in environmental flows from E&B, which questioned the viability of the ATS. In fact, the decrease in available resources (Figure 3.2) had resulted in the elevation of transfer decisions to the Council of Ministers 21 times between 1998 and 2013 because reserves had fallen below the N3 curve (see Table 1). Given climate predictions, the Tajo RBA estimated this would happen again 25% of the time under the 1998 ATS operational rules (CHT, 2012), with the resulting political conflict. The removal of the transfer decisions from the political arena was thus a major goal of ATS water users. Given the implications of the 2011 proposal for the ATS and in response to pressures from the ATS lobby, the Ministry of the Environment ordered the withdrawal of the proposed plan.

In order to approve the plan while protecting the interests of ATS users a political agreement was necessary. A working group made up of representatives of the recipient regions, the central government and SCRATS started meeting to work out a compromise. Neither the meetings, the make-up of the working group nor its deliberations were made public until an agreement was reached. In March 2013 the *Tajo Memorandum* was signed by the negotiating parties and, shortly thereafter, a revised version of both Tajo and Segura RBMPs were released for public consultation. The new Tajo draft RBMP had removed all references to environmental flow regimes downstream from the transfer diversion, and only included minimum flow requirements. In order to obtain support for the approval of the plans the government yielded to the demands of the ATS lobby and transformed the contents of the *Tajo Memorandum* into law, as last-minute amendments to the Environmental Impact Assessment Law approved in December 2013. The amendments stated that

the new legal framework was needed to facilitate "water use concession trading that is more effective in the future" (Introduction, Law 21/2013). The reform liberalized water trading and at the same time avoided opening a politically and socially contentious debate, since the changes were introduced as last minute amendments, thus avoiding regular parliamentary procedures.

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

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

3.4. THE CASE OF THE TAJO SEGURA WATER MARKETS: THE EXPERIENCE OF WATER SALES DURING THE 2005-2008 DROUGHT

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

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

The impacts of the 2005-2008 drought in the Tajo basin were severe. Environmental flows decreased to the point that the river ceased to flow in Talavera de la Reina for the first time on record in the summer of 2006, an event that sparked social mobilizations basin-wide (Hernández-Mora, 2014). The Tajo RBA also recognized that "some regular demands in the basin (...) have been derived toward the ATS as a result of the permit trading" (Tajo RBA Technical Manager, Unpublished Minutes Dam Release Commission, December 2006). Between 2004 and 2006 inflows to the E&B combined reservoir system fell 50% below historical average (Estrela and Rodríguez, 2008). Storage fell close to the 240 Mm^3 line, and remained below Level 3 until the spring of 2009, so that transfer decisions were made by the Council of Ministers during this time (Level 3 in Table 1). Given the legal priority of urban uses over irrigation, transferred volumes were allocated to MCT, and SCRATS received less than 10% of their maximum allocation (Table 4). The approval of the drought decrees was designed, in part, to meet the demands of the SCRATS and minimize the political cost of contentious transfer decisions. In fact, between 2005 and 2008 SCRATS obtained 29% of their allotment of Tajo waters through water sales, and as much as 45%

in 2005 and 2006 (Table 4). The Director of the Tajo RBA Technical Department explained that the transfers resulting from the sales "do not need the approval of the Council of Ministers" but, rather, "are contracted among individuals that freely agree to certain conditions" (Unpublished Minutes of the Tajo RBA Headwater Management Commission, February 2006). Table 4 presents data on storage in E&B at the end of each hydrologic year, annual volumes transferred and additional volumes sold.

Table 3.4. Annual storage in Entrepeñas and Buendía and volumes transferred and sold through the Tajo-Segura infrastructure (2005-2008) (Mm^3/year)

Hydrologic year	Storage in Entrepeñas & Buendía (Sept 30)	Outflows to Tajo	Ordinary transfers to SCRATS and urban uses			Water sold for irrigation	Water sold for urban supply	TOTAL TRANSFERRED (ordinary + sales)	Volumes sold/ Total transferred (%)
			Irrigation	Urban water	Total ordinary transfer				
2005/2006	329	250.9	38.0	148.50	186.50	31.05		217.55	14%
2006/2007	241	242.1	31.0	147.00	188.00	31.05	8.5	227.55	17%
2007/2008	357	253.6	60.4	118.26	178.66	31.05	36.9	246.65	28%
2008/2009	312	292.1	128.5	116.60	265.00	31.05	-	296.05	10%
TOTAL	**-**	**1,038.7**	**257.9**	**530.36**	**818.16**	**124.20**	**45.4**	**987.80**	**17%**

Source: Own elaboration using unpublished data from the Tajo RBA, SCRATS and Tajo RBA annual reports and the online hydrologic bulletins of the MAGRAMA (http://www.magrama.gob.es/es/agua/temas/evaluacion-de-los-recursos-hidricos/boletin-hidrologico/)

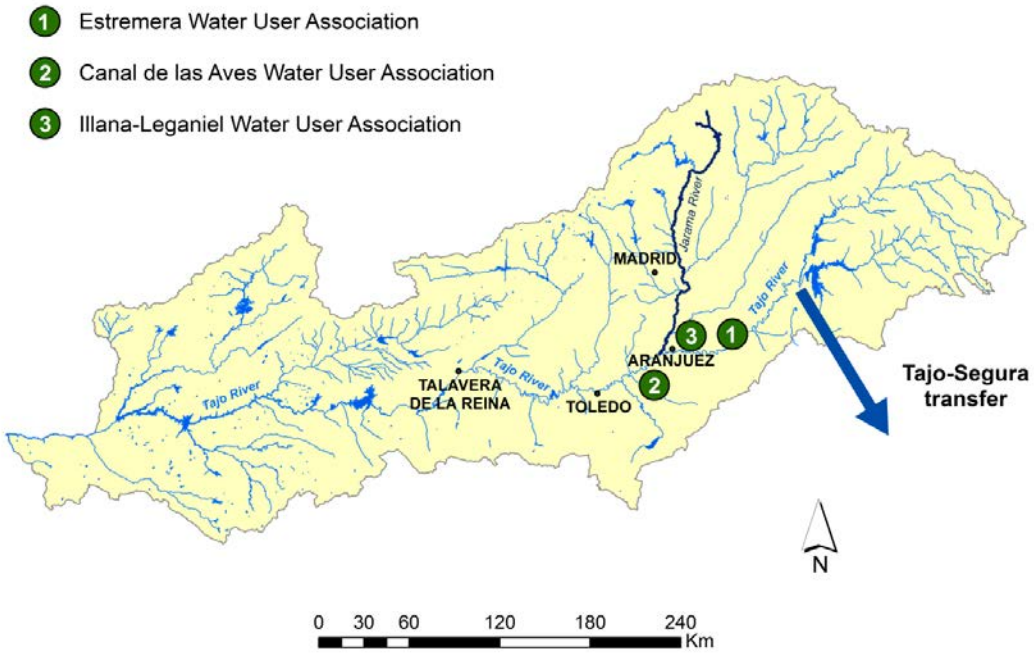
The following three sections present the characteristics of the three permit trading agreements subscribed between Tajo and Segura water users during the 2005-2008 drought. Figure 3.3 shows the location of the selling irrigator communities in the Tajo basin, all of them downstream from the ATS diversion point.

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

The Estremera Irrigation District is located upstream from the city of Aranjuez (Figure 3.3). It is an irrigation district of public initiative created in the 1940s. In 2000 the District obtained a concession to derive 17.5 Mm^3 from the Estremera dam on the Tajo river to irrigate 2,300 ha using flood irrigation with average estimated return flows of 20%. In February 2006 the Tajo RBA granted EWUA a 'provisional concession' for an additional 13,8 Mm^3. This measure enabled EWUA to sell 31.05 Mm^3 to SCRATS, a volume that exceeded their original concession volume. The provisional

concession title stated that it would only be valid as long as the 2005 Drought Decree was in force, essentially meaning, as long as interbasin water sales were allowed. Spanish water law requires beneficial use of permitted waters but in this case, the temporary permit was granted to allow EWUA to increase the volumes sold to SCRATS. Furthermore, the regulatory development of the 1999 reforms (art. 345, *2003 amendment to Hydraulic Public Domain Bylaw*) limited the volumes subject to trade to those effectively used for the previous five years and required return flows to be discounted from volumes sold to avoid environmental impacts. In the case of EWUA this would have implied the ability to sell only 14 Mm^3, not the 31.05 Mm^3 that were actually sold annually.

Figure 3.3. Location of the Tajo basin irrigator communities that negotiated water sales



Source: Own elaboration

The sale agreement was signed in February 2006 and renewed annually through 2009. Table 5 summarizes the basic elements of the contract and the subsidies received by SCRATS through ATS tariff exemptions. The agreement was clearly favorable to the interests of both parties and detrimental to the public interest. At a time when the ATS operational rules limited transfers, SCRATS irrigators were able to significantly increase their allocation through purchase agreements and pay for the water through tariff exemptions, with a net gain of 10 million €.

Irrigators in Estremera also benefited from this process. They obtained 23.5 million € for the sale of 124.2 Mm^3 to SCRATS, well in excess of their original concession volumes. In 2007 the president of the EWUA declared: "the last two years have been the best ones for the farmers in the Estremera Irrigation District", due to the income from the sales of the water (Minutes of the Upper Tajo RBA Management District Meeting, July 25th 2007).

Table 3.5. Cost of water sales to SCRATS and tariff exemptions (2005-2009)

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

Source: Own elaboration with data from the purchase contracts and minutes of the Upper Tajo Management Commission meetings (2005-2009)

A second benefit came from the inclusion of the district in the National Irrigation Modernization Action Plan aimed to improve efficiency in irrigated areas. The Estremera Modernization project was the first (and so far only) plan executed in the Tajo basin. It was designed to reduce water consumption by 12 Mm^3 that could be reassigned to Madrid's water supply (WWF, 2015). However, at the end of the project total concession volume expanded to 18.86 Mm^3.The Tajo RBA argued that the project had achieved the projected 40% reduction by estimating savings over the 31,05 Mm^3 that were sold to SCRATS and not over the original concession (letter of Tajo RBA President to WWF, January 2013). Thus, the modernization project, largely funded with public money, only served to increase the concession. Furthermore, in the summer of 2014 and thanks to the 2013

reforms, SCRATS purchased 5.6 Mm^3 from EWUA to complement approved transfers (*La Verdad* newspaper, August 8, 2014).

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

The CAWUA is an irrigation district of public initiative whose origins date back to the 1930s and is located on the left margin of the Tajo, upstream from the city of Aranjuez. It irrigates 3,571 ha with a permit for 27.57 Mm^3 (CHT, 2014). Like Estremera, it is a traditional irrigation district that uses flood irrigation and is a candidate for agricultural modernization, although the project has not yet been approved. In 2008 CAWUA applied for a concession of 42.85 Mm^3/year, which was approved by the Tajo RBA.

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

Table 3.6. Cost of water sales to MCT and tariff exemptions (2006-2009)

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

Source: Own elaboration with data gathered from: [1]Purchase agreements, [2]Annual Reports of the MCT and [3]unpublished data from the Tajo RBA Dam Release Commission (2006, 2007 and 2008).

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

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

The ILWUA was created in 2003 through a declaration of public interest for the conversion of the agricultural district to irrigation. The project was approved in 2008 and is currently underway. In 2009 it received an administrative concession to irrigate 1,575 ha with 10.19 Mm^3/year, which is included in the 2014 Tajo RBMP. In 2011, when the irrigation district was not yet operational, the SCRATS signed a 10-year option contract with the ILWUA for the right to purchase the full concession volume at a price of 0.06 €/m^3. The agreement would be put into effect in case of drought conditions and if legally allowed. In exchange, SCRATS pays the water tariffs to the Tajo RBA during the 10 years of the agreement, which in 2012 amounted to 8,35 €/ha (SCRATS 2012 Annual Report). The Irrigation District is thus being created with public funds and beneficiaries have signed a potential water sale agreement, thus jeopardizing the legal requirement of beneficial use for permitted waters. Furthermore, this agreement exemplifies the process of water *mercantilización* given that public water rights are being granted with full knowledge of the explicit intention to sell them. Market instruments are being used for the reallocation of water resources outside a situation of drought, something the 2013 Tajo Memorandum legal reforms have made possible.

3.5. DISCUSSION

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

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

It is generally assumed that markets are efficient reallocation mechanisms in situations of shortage or exhaustion of natural resources. Theoretically markets should facilitate the reallocation, with increased productivity, of existing resources, not increase pressure on ecosystems. However, in our case study we expose the paradox that markets function precisely as instruments of increasing pressure on aquatic ecosystems. Water that had never been consumptively used before was sold and diverted from the Tajo basin. Traders derived large benefits from the sale of water they were not using and to which they did not have previous access. From an environmental perspective, headwaters were diverted at a time when the basin was under severe drought conditions and streamflows where low. In fact, while water was being diverted through the sale agreements, some users downstream were suffering significant restrictions. It could be argued that, in Spain, water markets are a new variation of entrenched institutional practices, business as usual with a new face. However, instances of depolitization, misleading representation of decisions as neutral, efficient or economically rational agreements, new actors, new rules, all demonstrate that, in the Spanish case, this “new face" is an instance of water neoliberalization.

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

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

3.6. CONCLUSION

Starting in 1999, successive Spanish governments, both conservative and social-democratic, have progressively constructed a legal framework to facilitate water trading as an alternative to public sector action, with the purported goals of introducing flexibility and improve economic efficiency in water allocation decisions. Two major reforms (in 1999 and 2005-2008) were approved, either immediately following or in the context of nationwide droughts, which acted as catalysts for water policy reforms. After more than a decade of experience in water markets, and in spite of significant public sector support (both financial and political) total volumes sold using formal water trading mechanisms remain small. However, these volumes are significant in specific water-stressed regions where administrative reallocation decisions are too costly. In addition, very few studies have assessed the environmental, social and economic implications of these trades.

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

Water trading, while presented as a more flexible and efficient alternative to public allocation decisions, in fact requires a significant process of institutional build up, through both *de*regulation and *re*regulation processes, and decisive public intervention to facilitate these exchanges. The process is heavily influenced by the pressures of powerful regional elites—based on the competitive advantage of Mediterranean intensive agriculture and a strong tourism industry and their significance in Spain's role within the larger European and global economic system—, so that the regulatory outcomes are coherent with their interests. The experience with the Tajo-Segura water sales shows that in cases of unequal access to power and information water markets serve to heighten the lack of transparency and accountability and intensify unequal power relations.

Furthermore, this case study illustrates how markets work to provide a win-win situation for the contracting parties at the expense of the public interest, which both subsidized the operations and suffered the environmental impacts. Thus it shows how the potential advantages that water markets can provide in specific and local situations (increased flexibility in allocation decisions, mitigation of drought impacts, explicitation of the economic value of the resource) are heavily dependent on the institutional context in which they are implemented.

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

3.7. REFERENCES

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4. PAPER 3: NETWORKED WATER CITIZEN ORGANISATIONS IN SPAIN: POTENTIAL FOR TRANSFORMATION OF EXISTING POWER STRUCTURES IN WATER MANAGEMENT"

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Abstract:The shift from hierarchical-administrative water management toward more transparent, multi-level and participated governance approaches has brought about a shifting geography of players, scales of action, and means of influencing decisions and outcomes. In Spain, where the hydraulic paradigm has dominated since the early 1920s, participation in decisions over water has traditionally been limited to a closed water policy community, made up of economic water users, primarily irrigator associations and hydropower generators, civil engineering corps and large public works companies. The river basin planning process under the Water Framework Directive of the European Union presented a promise of transformation, giving access to non-economic water users, environmental concerns and the wider public to water-related information on planning and decision-making. This process coincided with the consolidation of the use of Information and Communication Technologies (ICTs) by the water administration, with the associated potential for information and data generation and dissemination. ICTs are also increasingly used by citizen groups and other interested parties as a way to communicate, network and challenge existing paradigms and official discourses over water, in the broader context of the emergence of 'technopolitics'. This paper investigates if and in what way ICTs may be providing new avenues for participated water resources management and contributing to alter the dominating power balance. We critically analyse several examples where networking possibilities provided by ICTs have enabled the articulation of interest groups and social agents that have, with different degrees of success, questioned the existing hegemonic view over water. The critical review of these cases sheds light on the opportunities and limitations of ICTs, and their relation with traditional modes of social mobilisation in creating new means of societal involvement in water governance.

Keywords: ICTs, water governance, social networks, public participation, power, Spain

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4.1. INTRODUCTION

Water management is necessarily a political process (Agnew, 2011). In a context of increasing socioeconomic water scarcity and uncertain knowledge, heightened by climate change and rapidly evolving socioeconomic conditions, politics plays an even more crucial role in decisions over how to allocate and manage water. However, some authors (Kaika, 2003; Kaika and Page, 2003; Swyngedouw, 2005) have argued that in the recent past, water management decisions have been progressively 'depoliticised'. In their view, this has happened both through an emphasis on governance arrangements that incorporate previously politically contentious actors into staged and formalised participatory decision-making processes, and through the progressive dominance of purportedly impartial (apolitical) allocation mechanisms (economic instruments, technical and scientific expertise) over truly political decision-making.This process of 'depoliticisation' is an attempt to hide or veil the intrinsically political nature of the decisions concerning environmental policy. Thus, according to this perspective, while powerful actors continue to dominate and control water-related decisions those outside the centres of power are disoriented and demobilised, with the consequence that their arguments and interests lose presence and strength.

The currently dominating Integrated Water Resources Management (IWRM) paradigm emphasises precisely these managerial, economic and governance approaches. The European Union's (EU) Water Framework Directive (WFD, Directive 2000/60/EC) is considered by many an implementation of the IWRM approach in a real-policy context (Del Moral et al., 2014). It is also perhaps the most ambitious attempt by the EU to incorporate a governance approach to natural resources management, which results in a shifting geography of players, scales of action, and means of influencing decisions and outcomes (Kaika, 2003). The WFD requires multi-level coordinated planning and management, economic assessment of water services and public participation that aim to increase the efficacy of the Directive.

In the EU, the process of implementation of the WFD has led to changes in technical procedures and has also served to question existing paradigms and mindsets. In the case of Spain, the elaboration of the WFD River Basin Management Plans (RBMPs) starting in 2004 required significant changes in terms of the information needed, the players involved and the planning process. Under Spanish law prior to the WFD, RBMPs were regulatory instruments that served to allocate water resources among uses and users and to justify the need to undertake additional development of water resources. For this reason, the WFD in Spain triggered a debate around what type of paradigm should guide water-related decisions in the new Plans. While the regulatory and

resource allocation character of the plans remains, early assessments expected the WFD implementation to entail a transition from a hierarchical, supply-centered 'traditional hydraulic paradigm' toward more transparent, multi-level and participatory water planning and management (Sauri and Del Moral, 2001).

Recent research has critically reviewed the effectiveness of the new governance approaches for water resources management in Spain, both in substantive and procedural terms. In relation to information and public participation requirements, these analyses have demonstrated that there has been a substantial increase in information-sharing by water authorities thanks to the availability and use of internet-based information and communication technologies (ICTs) (Hernández-Mora and De Stefano, 2011; De Stefano et al., 2012). Additionally, and in compliance with WFD requirements, public participation processes have been undertaken in most river basins for the development of RBMPs (Espluga et al., 2011; Pedregal et al., 2011; Ballester and Pares, 2013). However, while the increase in information availability and public participation requirements should have involved an opening up of decision processes to all actors, research has shown that critical aspects continue to be decided upon behind closed doors by members of the traditional water policy community (Ballester, 2012; Ballester and Espluga, 2012; Ferrer, 2012; Hernández-Mora, 2012; Hernández-Mora and Ferrer, 2012; FNCA, 2014; Parés et al., 2015). The power balance continues to favour large water users, leaving the interests of underrepresented groups aside. These minority groups (environmental interests, recreational water users, or small rural populations affected by large infrastructural works) had previously resorted to contentious political protest actions with varying degrees of success (Ferrer et al., 2006; Tàbara and Ilhan, 2008; Arrojo et al., 2010; Font and Subirats, 2010; Swyngedouw, 2013). As we will later discuss in more detail, the governance approach promised by the WFD was welcomed by these actors as an opportunity to participate in decisions over water in conditions of equality.

In this general context, over the past few years the burgeoning use of ICTs[25] has enabled the appearance and consolidation of new forms of social action by opening new possibilities to previously powerless stakeholders to share information and improve the effectiveness of their political activism in different realms of the public domain. This emerging networked citizen politics has been conceptualised as 'Technopolitics' (Toret, 2013; Jurado, 2014) to emphasise the key role

[25]In this paper, we use the term ICTs to refer to software and hardware technology that allows users to communicate and generate, store, access, transmit and manipulate information. It therefore includes both computer- and telephone-based telecommunications, the internet and processing applications.

of the appropriation of ICTs for political action. The extent to which the emergence of these technologies is actually providing new avenues for participated decision-making and contributing to alter the dominating power balance is now the centre of debate and research (Della Porta and Mosca, 2005; Iosifidis, 2011; Subirats, 2011; Castells, 2012; Fuster Morell and Subirats, 2013; Calderaro and Kavada, 2013; Taylor, 2014; Earl et al., 2014; Argawal et al., 2014). To our knowledge, however, this analysis has not been extensively applied to the domain of water resources management, where participatory governance was first institutionalised in the EU.

This paper aims to contribute to this body of work by critically analysing the experience of water-related socio-environmental networked citizen organisations (from now on citizen water networks, or CWN) that operate in Spain at the river-basin, regional and national scale. These networks are coalitions of environmental groups, citizen organisations, activists, scholars, local municipalities, and other actors organised to defend the patrimonial values of water. They started emerging in the early 2000s and use ICTs in different ways for organisational and communication purposes. The paper will try to discern whether the use of ICTs is improving their ability to organise and influence decision-making processes, particularly in the context of the WFD planning. For this purpose we assess the role ICTs play in the CWN's collective organisation and ability to access information, the role CWNs have played in recent water-related decisions, and their perception of the usefulness of ICTs as a support tool for their work.

The paper is organised in five sections. Following this introduction, the second section discusses the theoretical framework and academic debate to which this paper aims to contribute: the evolution toward governance approaches to water resources management and the role of ICTs in providing alternative public spaces for influencing public policy decisions. The third section outlines the methodological approach used to conduct the analysis. The fourth section sets the context of the evolution of Spanish hydropolitics and the role played by socio-environmental groups in this evolution. The fifth section presents the results of the evaluation of the use of ICTs by active CWN. The final section presents some concluding remarks and recommendations for future research.

4.2. THEORETICAL FRAMEWORK

One of the building blocks of the WFD is the introduction of information, consultation and public participation requirements in an effort to improve its effectiveness and facilitate its implementation and compliance (Newig and Fritsch, 2009; Pares, 2010). When the WFD was approved in 2000 this approach was part of a wider effort by the European Commission to "open up the policy-making

process to get more people and organizations involved in shaping and delivering EU policy" (EC, 2001: 2).

The shift from hierarchical-administrative management approaches to multi-level and participated governance – what is known as the transition from government to governance in natural resources management (Page and Kaika, 2003) – finds theoretical grounding in the proponents of deliberative democracy. Governance requires a transition toward a networked approach that incorporates different government levels, civil society organisations and private sector actors into decision-making processes. In deliberative democracy or discursive democracy, deliberation is central to decision-making. For a democratic decision to be legitimate, it must be preceded by authentic deliberation, not merely the aggregation of preferences that occurs in voting (Fishkin, 1991; Subirats, 2003; Gutman and Thompson, 2004; Brugué and Vallès, 2005). The outcome of decisions over the management and allocation of public resources is reinforced and validated through the involvement of, and open discussion among, all relevant players under conditions of equal access to information and power.

In the field of natural resources management, this line of thought points out that definition of policy alternatives cannot be a primarily technical-hierarchical process, but that it requires collaboration and participation from interested parties (Coote, 1998; Pahl-Wostl, 2007; Lauber et al., 2008). It is not possible to reach technical and scientific consensus on every question, or to impose solutions on a society that is increasingly critical, active and diverse. According to Anthony Giddens, society has ceased to base its normative order on the accumulation of a body of knowledge neatly accepted, and reproduced and transmitted by successive 'guardians of truth castes', as was the case in the classical industrial society. Today's post-traditional society is faced with a wall of uncertainty, with discordant voices that experts cannot effectively answer (Giddens, 1990).Or as Ulrich Beck argues with respect to decisions relating to complex and risky environmental problems, collective steps may be partially blind, but at least should be the result of agreement and rational prioritisation (Beck, 1996).

Practical experience, however, has shown that, even under deliberative processes such as those encouraged in the context of the WFD, final basic decisions remain outside the public sphere and respond to power dynamics that are not explicit. A recent research project (PART DMA – Deliberative Democracy and Public Policy), evaluated public participation processes in Spain in the context of the WFD (Pedregal et al., 2011; Ballester and Parés, 2013). Researchers conducted extensive interviews with over 100 stakeholders and public officials in six Spanish river basins and

reviewed public documents and meeting minutes (Ballester, 2012; Ballester y Espluga, 2012; Ferrer, 2012; Hernández-Mora and Ferrer, 2012; Hernández-Mora, 2012; Parés et al., 2015). Results showed that, regardless of the quality of the public participation processes from a formal perspective, participants consistently felt that the most contentious issues were not on the table and that powerful stakeholders had parallel access to decision-makers, outside of participatory processes. Furthermore, these processes were organised in a way that did not take into account different capabilities of participants (volunteers versus professional staff, financial resources, access to technical support, etc.) so that participants could not influence decisions equally. Finally, even in those cases where deliberative processes tried to account for these factors, final decisions did not necessarily reflect the outcome of discussions, and key decisions were made behind closed doors by traditional players in Spanish hydro-politics (Ballester and Parés, 2013; FNCA, 2014; Parés et al., 2015).

Some authors argue that 'governance-beyond-the-state' management approaches focused on reaching consensus and the rational establishment of priorities, force actors to collaborate within a given framework that cannot be questioned or altered and that profoundly conditions the terms of the debate and thus the final policy outcome (Peck and Tickell, 2002; Swyngedouw, 2011). It can be argued that by promoting governance approaches to the management of the public sphere, activists are 'de-activated' and compelled to replace acts of contestation and political protest by processes of collaboration with the state (Molle, 2009; Parés,2010).

The emergence of new forms of social networked organisation triggered by the appropriation of ICTs for political action is relevant in this debate. If indeed governance processes may have failed to produce improved outcomes in terms of equity or democratic quality, it can be argued that ICTs can provide new avenues for previously disenfranchised actors to access information, mobilise politically and ultimately increase their presence and weigh in public decisions. This phenomenon has increasingly been the focus of analysis and research (Castells, 2012; Toret et al., 2013; Calderaro and Kavada, 2013; Milan and Hintz, 2013; Jurado, 2014). These authors argue that the outbreak of social movements such as the Arab Spring, the Spanish 15M or Occupy Wall Street, is the result of profound dissatisfaction with democratic systems and political institutions that have turned their back to the real needs and concerns of common citizens and instead serve the interests of a powerful few. According to this line of thought, increasingly active and critical social actors no longer accept a representative democratic system in which participation is limited to periodic elections or the possibility to provide feedback to government proposals that are more responsive

to those with more power and access. Furthermore, when deliberative approaches also fail engaged citizens, ICTs can provide new avenues for political activism and alternative social spheres for information-sharing and extra-representational participation (Fuster Morell and Subirats, 2013).

As we have seen in this section, there is a rising academic and political attention being paid to the role played by civil society in public decision-making as a result of the changing roles and relationships between civil society, the market and the state. Some of this literature has probed the role played by ICTs in the emergence of new forms of networked social action (Della Porta and Mosca, 2005; Kavada, 2010; Bennett and Segerbeg, 2013). Others (Font and Subirats, 2010; Parés, 2010) have looked at the role civil society has played in hydro-politics in this new governance context and within the European Union. However, few have looked at the interface of these different fields of research: governance, civil society activism, ICTs and water resources management. It is to this interface that this paper aims to make a contribution.

4.3. THEORETICAL FRAMEWORK

In designing the research we decided to focus our analysis on well-established CWNs that emerged in Spain starting in 2001. These networks incorporate local or environmental groups that work on specific issues in more traditional ways but find advantages in articulating their work in broader geographical networks. As we will see in the following section in more detail, network members share an understanding of water as a common good, essential for life and the conservation of water-dependent ecosystems. They defend the right of all interested actors to actively participate in the decisions over the management of water resources in conditions of equality. They are, for the most part, long-lasting informal communities (many do not have a legal structure) open to anyone willing to join moderated discussions online. In order to evaluate the role CWNs have played in recent water planning processes and whether the use of ICTs makes them more effective, we have used different sources of data and information:

- Participant observation of the activity of these networked communities (setting up of the network, attendance in physical meetings, participation in e-mail distribution lists). Members of the research team are active participants in two of the CWN analyzed (Tajo and Andalucía networks) and have followed the emergence and evolution of the others, being members of their e-mail distribution lists since their inception. This part of the research is based on participatory methodology, that is, research that argues in favour of the possibility, the

significance, and the usefulness of involving agents as research partners in the knowledge-production process (Cornwall and Jewkes, 1995; Bergold and Thomas, 2012).

- Results of previous research projects and Spanish water-policy evaluation initiatives (PART-DMA,[26] INTRAG,[27] OPPA[28] evaluations) in which some authors of this study participated, that critically evaluated the WFD implementation process in Spain and the accompanying public information and participation processes.
- Information from the CWN websites (see Table 4.2) and literature review from the existing bibliography on the evolution of Spanish hydro-politics.
- Results from an online survey distributed through the CWN e-mail distribution lists in September 2014. The survey had 31 questions divided into five sections: characterisation of the CWNs; use of ICTs as communication and organisational tools; participation of network members in the WFD river basin planning processes and the role played by ICTs in facilitating this participation; CWN influence on decisions over water; and access to information over water. Twenty five questions were multiple choice (with an option of expanding/clarifying responses) and six questions asked for qualitative responses. Fifty-four replies were received between September and October 2014, distributed as follows: Red Tajo (*Red Ciudadana por una Nueva Cultura del Agua en el Tajo/Tejo y sus Ríos,* Tajo Citizen Network for a New Water Culture*)* (19 replies), RANCA (*Red Andaluza por una Nueva Cultura del Agua,* Andalusian Network for a New Water Culture) (14), Red Júcar (*Red por una Nueva Cultura del Agua en el Júcar* or Jucar Network for a New Water Culture) (7), URA-Nueva Cultura del Agua (Network for a New Water Culture in Navarra) (5), XNCA (*Xarxa per una Nova Cultura de l'Aigua,* Catalan Network for a New Water Culture) (3), Cuenca Azul-Ebro (5) and the Red Agua Pública (Public Water Network) (4). Thirty percent of respondents belonged to two or more networks, generally a regional or basin network and the Public Water Network. Thirty respondents (56%) were male, 10 (19%) female and the rest wished to remain anonymous. Of those who disclosed personal information (40 respondents), 78% resided in urban areas of over 20,000 inhabitants and had an average age of 48.

[26] PART-DMA (Deliberative democracy and water policy: An analysis of public participation in the context of the Water Framework Directive in Spain) was A 3-year project (2010-2012) funded by the Spanish Ministry of Science and Innovation (CSO2009-09880).
[27] INTRAG (Transparency Index in Water Management in Spain) is a biannual evaluation of transparency of river basin agencies in Spain. The index is made up of 80 water data indicators that should be included in Agencies' websites (De Stefano et al. 2011).
[28] The Water Policy Observatory (OPPA) of the Foundation for a New Water Culture (www.fnca.eu/oppa), is made up of a network of academics, water professionals and activists who conduct an ongoing evaluation of Spanish water policies.

In-depth phone interviews to one relevant member of six of the seven CWNs analysed, conducted in November 2014, to gain an understanding of their perceptions and insights of the realities under analysis (Fox, 2009) (Table 4.1). Interviewees were chosen amongst survey respondents based on their active participation in and exhaustive knowledge of the origins, goals, and operation of each CWN.

Table 4.1. Characterisation of interviewees.

Network	Interview number	Gender	Education	Age
Red de Agua Pública (RAP)	1	Female	Attorney	43
Red por una Nueva Cultura del Agua en el Júcar (Red Júcar)	2	Female	Economist	41
URA Nueva Cultura del Agua (URA)	3	Female	Environmental agent	48
Xarxa per una Nova Cultura del Agua en Cataluña (XNCA)	4	Female	Agricultural economist	38
Red Ciudadana por una Nueva Cultura del Agua en el Tajo/Tejo y sus ríos (Red Tajo)	5	Female	Environmental attorney	44
Red Andaluza por una Nueva Cultura del Agua (RANCA)	6	Male	Biologist	44

4.4. A NEW WATER GOVERNANCE IN SPAIN: THE EMERGENCE OF CITIZEN WATER NETWORKS

The evolution of Spanish water policy over the past three decades and the resulting shifting geometries of power provide a particularly adequate context within which to apply this analysis. Throughout the twentieth century, Spanish water policy was governed by the 'traditional hydraulic paradigm' (Sauri and Del Moral, 2001; Bukowski, 2007), consisting in the publicly funded development of the country's hydraulic capacity to serve growing irrigation and hydroelectric demands. This approach was based on a strong cultural and socio-political tradition with deep historical roots. Between 1940 and 1980 Spain's hydraulic capacity increased by over 1000 Mm^3 per decade (Bukowski, 2007). Starting in the early 1920s, water management was organised on a river basin scale, through river basin management agencies (RBAs or *Confederaciones Hidrográficas)* that depended organically from the central Government (Del Moral and Do O, 2014). From the outset, economic users of water, primarily irrigators and hydroelectric companies, were part of the RBAs' management boards, actively participating in and influencing decisions over water management and allocation (Varela and Hernández-Mora, 2009). Together with the professional

civil engineering corps, who made up the staff of public RBAs and private companies that undertook development projects, these constituted what has been called the 'traditional water policy community' (Hernández-Mora et al., 2014).

With the advent of democracy in 1975, Spain's institutional structure was profoundly transformed, with significant powers devolved to 17 regional governments (*Comunidades Autónomas)* (Font and Subirats, 2010). These regional governments became an increasingly active player in water policy development, having full planning and management responsibilities for rivers that flow within their boundaries, and participating in the boards of RBAs responsible for interregional river basins. The 1985 Water Act incorporated water quality concerns into water management, and environmental interests and other social groups gained testimonial representation in RBAs' boards (*Consejos del Agua)* (Varela and Hernández-Mora, 2009). In spite of these changes, the hydraulic paradigm continued to predominate. In compliance with the 1985 Act, which mandated river basin planning as the basis for management, a first National Hydrologic Plan (NHP) was drafted in 1993 that proposed several interbasin water transfers and more than a hundred new big dams in order to continue supplying large amounts of water at low cost for the users. In the new institutional context however, the proposal raised significant criticism and opposition from donor regions, environmental groups and academics, and for the first time in Spain's hydro-political history, in response to these protests the plan was withdrawn (Sauri and Del Moral, 2001; Font and Subirats, 2010).

Throughout the 1990s, successive governments worked to complete the hydraulic planning process through the approval of River Basin Hydrologic Plans. The effort culminated in the approval of the 2001 NHP, a more modest version of the 1993 draft Plan, but that still proposed to build a large interbasin water transfer from the Ebro Basin in the northeast to the southeastern Mediterranean regions, in addition to over 200 new large water infrastructures.

The NHP approval process was deeply contentious. While the traditional water policy community together with the regions that would receive transferred waters staunchly supported the project, new actors that had emerged in the early 1990s made their opposition known (Hernández-Mora et al., 2014). Regional governments, environmentalists, social movements representing regions and villages affected by new infrastructural works, academics, and some political parties used the different avenues available to them to oppose the approval of the NHP (Saurí and Del Moral, 2001; Bukowski, 2007; Font and Subirats, 2010; Parés, 2010). The opposition was articulated around the ideas of the New Water Culture movement, a coalition of activists, intellectuals and academics that worked to offer an alternative water management paradigm for Spain (Tábara and Ilhan, 2008), one

that was based on environmental conservation, public participation, economic rationality and demand management.

While these debates were taking place, the rest of the European Union was already immersed in the process of development and approval of the WFD, imposing planning and management goals and processes that had very little in common with what was happening in Spain. In fact, starting in the late 1990s, proponents of the New Water Culture began using the WFD as the superior legal framework to support their arguments and challenge the existing institutional framework and the dominating hydraulic paradigm. When a new government came into office following national elections in 2004, it cancelled the Ebro transfer plan using the New Water Culture as a discursive tool to support their new policy proposals, and launched the WFD implementation process in earnest.

When the new WFD-based water planning cycle started, many social and environmental groups that had previously been excluded from the decision-making table and resorted to contestation and social mobilisations (Parés, 2010) saw the promises of WFD-mandated participatory planning and management as an opportunity to finally take part, in conditions of equality, in decisions over water. The socio-political struggles that had accompanied the approval and eventual cancelation of the Ebro transfer project were seen by many as a sign that things were starting to change, and that new goals of ecosystem restoration, economic rationality, efficiency, transparency and public participation would now come to dominate Spanish water policy.

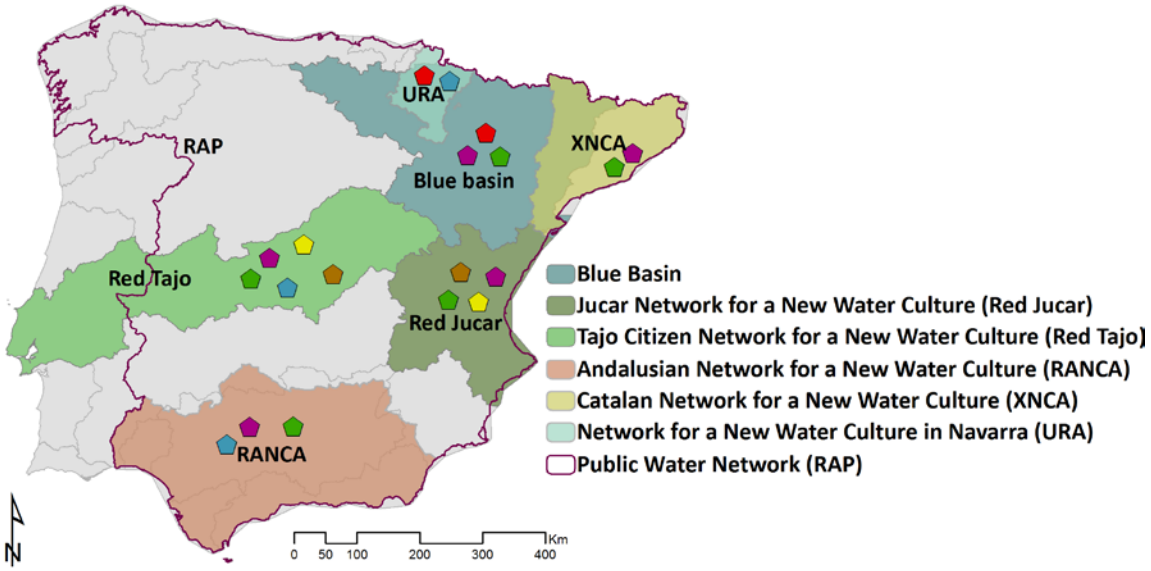
In compliance with the WFD calendar, Spanish RBAs started the elaboration of the new RBMPs and designed the required public information and participation processes (Espluga et al., 2011). These ranged from ambitious plans expressly articulated around the deliberative democracy ideals (Parés et al., 2015), to less ambitious and more perfunctory public information meetings in order to comply with WFD requirements. In any case, the WFD planning introduced significant changes and expectations for those actors that were active in the defence of the New Water Culture ideals.

Based on the experiences of the struggles surrounding the NHP, and in light of these expectations, CWN started organising in different basins and regions. These networks (with the exception of the Public Water Network which focuses exclusively on urban water privatisation and related conflicts) are inspired by the New Water Culture principles and organised at the river basin, regional or national scale (see Figure 4.1 and Table 4.2). Given the geographical dispersion of CWN members, ICTs (primarily email distribution lists) are instrumental in their organisation and operational development. CWN are forms of social organisation based on the free exchange of information and

knowledge, common learning and collaborative and volunteer work of its members (Ferrer and Ballester, 2013). They are online communities that do not have paid staff or a physical office. Membership extends beyond the traditional environmental community to include a wide range of local activists, citizen and heritage organisations, experts, and academics that collaborate to build a common understanding of the problems and propose alternatives to water management challenges with a strong focus on a balanced approach to territorial development. They are umbrella organisations that sometimes serve to legitimise, empower or support the work of individual member organisations, or provide them with a common voice vis-à-vis the water administration. Their membership grows as new local conflicts arise and local groups organise and reach out to these networks for organisational or technical support. These CWNs can be categorised into two main groups: those that have organised with a clear vocation of becoming an actor with its own voice in the hydro-political landscape of a region or basin, and those that aim to serve primarily as a network of information exchange and mutual technical support. Below is a brief characterisation of each of these networks.

- The Catalan Network for a New Water Culture (*Xarxa per una Nova Cultura de l'Aigua* or XNCA) was created in 2001 as a network of environmental and citizen organisations, academics and activists that opposed the Ebro Basin transfer project and aimed to achieve a more equitable and environmentally sustainable water management in Catalonia (Hernández-Mora and Ballester, 2010; www.xnca.org). Its role is one of coordination and support to member organisations. Between 2004 and 2010 the XNCA received funding from the Catalan Water Agency to coordinate the participation of environmental groups in the elaboration of the Catalan internal basins' RBMPs. The disappointment over the outcome of the planning process has led XNCA to work on water politics in a broader sense, focusing on opening up the network to other, but similar, activist realms such as energy, infrastructures and corruption (Interview 4).
- The Andalusian Network for a New Water Culture (*Red Andaluza por una Nueva Cultura del Agua* or RANCA) was created in 2001 as a regional coordinator of social and environmental movements, activists and academics working to defend ecosystem-based and participatory water management and oppose specific hydraulic public works proposals in the region of Andalusia. It includes territory in four river basin districts. They meet once a year to organise and plan the annual *Fiestas del Agua*, hosted by different member organisations each year. The fiestas serve to update members on ongoing water conflicts, present technical reports, and reach a wider community through popular activities (concerts, theatre, etc.).

Figure 4.1. Spanish citizen water networks



- The Tajo Citizen Network for a New Water Culture (*Red Ciudadana por una Nueva Cultura del Agua en el Tajo/Tejo* or Red Tajo) was created in 2007 inspired by the Andalusian and Catalan networks and in order to defend the environmental, territorial and patrimonial value of the Tajo River. Its membership includes individuals and organisations in the Tajo River Basin both in Spain and Portugal. They meet annually in the *Jornadas por un Tajo Vivo,* weekend-long workshops that are open to the public and organised by a different member organisation each year. In addition to their coordinating role, they aim to be an actor with a common voice in the hydro-political arena. Being an informal organisation with no legal structure, it depends on their member organisations or individual members to initiate legal actions or submit comments.
- Blue Basin (*Cuenca Azul*) was created in 2008 based on the experience of Red Tajo to coordinate the advocacy work of environmental and citizen organisations in the Ebro River Basin during the elaboration of the Ebro River basin management plan. They received funding from the Ebro RBA in 2009 and 2010 to actively coordinate the participation of environmental groups during the planning process, organising workshops and providing technical support during the public consultation phases. URA and XNCA are part of the Blue Basin CWN since a portion of the territory of Catalonia and Navarre is included in the Ebro River Basin.

Table 4.2. Characterisation of networked water citizen organisation in Spain

Name	Year created	Membership [1]	Survey responses received (% membership)	Main focus	Geographical distribution	Web page, blog, Facebook or twitter
Xarxa per una Nova Cultura del Agua en Cataluña (XNCA)	2001	35	9%	Defend the patrimonial value and public nature of water and associated ecosystems and landscapes. Advocate for true social participation in decisions over how to manage our common water resources.	Autonomous region of Catalonia	www.xnca.org (updated regularly) Twitter for specific projects
Red Andaluza por una Nueva Cultura del Agua (RANCA)	2001	149	9%		Autonomous region of Andalucía	www.redandaluzagua.org www.facebook.com/redandaluzanueva.culturadelagua
Red Ciudadana por una Nueva Cultura del Agua en el Tajo/Tejo (Red Tajo)	2007	241	8%		Tajo River Basin	www.redtajo.es (updated regularly)
Cuenca Azul	2008	40	5%	Coordinate participation of member organisation in WFD river basin planning process to achieve good status of all waters.	Ebro River Basin	www.cuencaazul.com (last update, July 2014)
Red por una Nueva Cultura del Agua en el Júcar (Red Júcar)	2010	53	13%	Promote ecological, social, cultural and emotional values of water-dependant ecosystems and an ambitious WFD implementation of the Jucar River.	Jucar River Basin	No
URA Nueva Cultura del Agua (URA)	2011	70	7%	Promote the values of the NWC, participated and transparent management of water resources, and a more sustainable approach to land and water resources management.	Autonomous region of Navarra	uranuevacultura.wordpress.com (updated regularly)
Red de Agua Pública (RAP)	2011	56	7%	Defence of public nature of urban water services	Spain	redaguapublica.wordpress.com/about (updated regularly) Twitter: @RedAguaPublica

[1] Membership numbers indicates the number of addresses ascribed to the e-mail distribution lists. They include individuals, environmental groups, citizen organisations, neighbourhood associations, municipalities in some cases like Red Tajo, or regional networks of associations. Therefore, the actual number of individuals that receive information from the network is actually larger. In the case of member organisations, typically a spokesperson will participate in the Network's discussions on behalf of the organisation and report back to the members.

- The Jucar Network for a New Water Culture (*Red por una Nueva Cultura del Aguaen el Júcar* or Red Júcar) was created in 2010 primarily to coordinate the work of environmental and citizen organisations in the two regions that make up the Jucar River Basin. The goal of the network is one of coordination and information exchange, particularly during the WFD planning process. They have two representatives in the Jucar RBA's Water Council from among network members, and they discuss and negotiate comments and joint positions. The Red Júcar enables member organisations to work at the most appropriate scale to defend their interests.
- Network for a New Water Culture in Navarra(URA *Nueva Cultura del Agua*) was formed in 2011 as a network of environmental, civic and agrarian organisations to promote the principles of the New Water Culture for water and land resources in the autonomous region of Navarra. Currently their work focuses on opposing a large publicly funded irrigation scheme (Canal de Navarra) that would transform traditional farming practices in parts of Navarra, and supporting local opposition to new large dam projects. Given the somewhat small area they cover, they meet monthly in a central location to discuss activities and plan strategies.
- Public Water Network (Red de Agua Pública or RAP) was created in 2012 as a common space for social organisations, institutions and individuals that defend the public nature of urban water services and oppose privatisation of water supply and sanitation services in different parts of Spain.

4.5. CITIZEN WATER NETWORKS AND ICTS: AN OPPORTUNITY FOR INCREASED POLITICAL ACTIVISM IN WATER GOVERNANCE?

This section presents the results of the research based on the methodological tools presented above. The results are organised into two main topics: (1) the role ICTs play facilitating organisation, access to information and communication for CWNs; and (2) the incidence of CWNs on decisions about water, with a special focus on the role ICTs play improving the CWN political efficacy.

4.5.1. Use of ICTs for networked activism

We identify two main types of functions that ICTs can perform in terms of supporting networked water activism: improving collective organisation and collaborative work and enhancing access to information. This includes sharing information among activists, generating alternative information

to official discourses over water, disseminating their own information to the public and facilitating decision-making within the network.

Use of ICTs for collective organisation and collaborative work

ICTs have played a pivotal role in the articulation of CWNs in Spain (Table 4.3). According to 87% of survey respondents, ICTs were crucial for the creation of the network as they facilitate communication among geographically distant members, enhancing their ability to share information, generate a common understanding and opinion of the issues they face, and enabling the organisation of collective actions.

> Without the e-mail distribution list it would be very hard, if not impossible, to have a network (Interview 2).

> For us the e-mail distribution list has been a key tool. We meet regularly but that happens because we are in constant contact through the distribution list. Without that daily contact we would rarely meet (Interview 3).

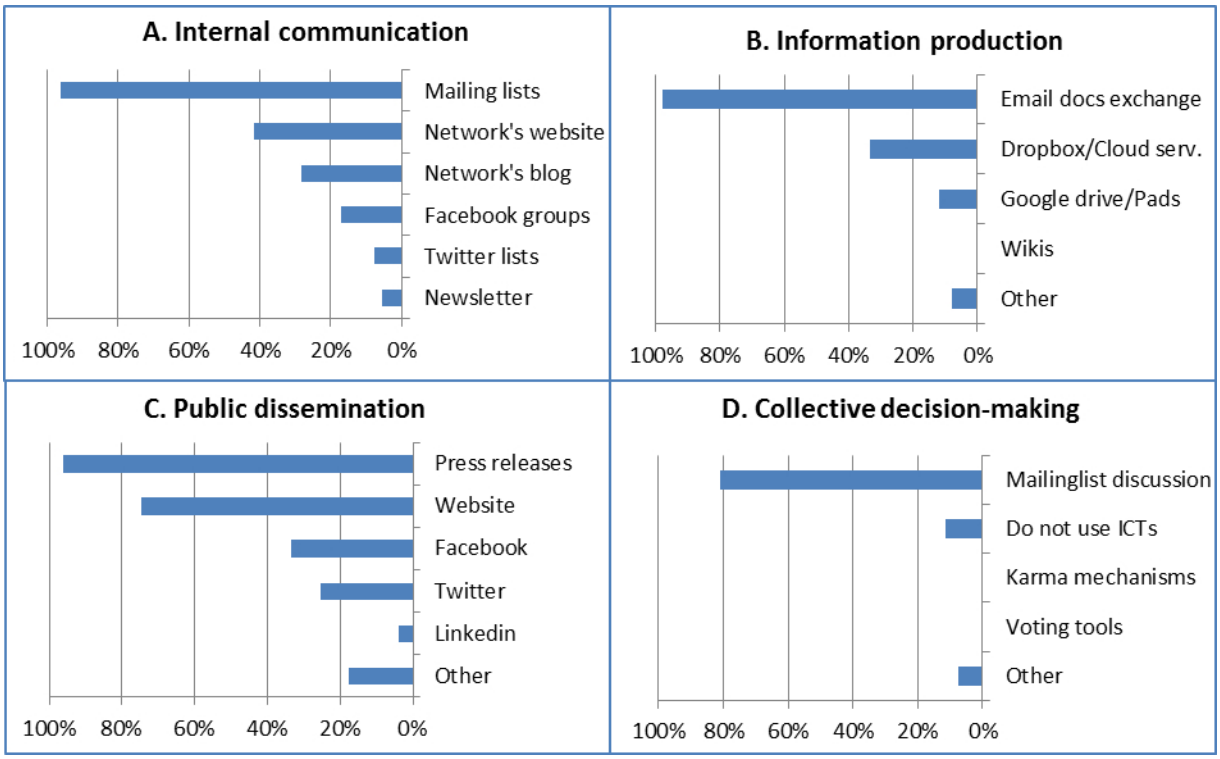
Seventy-three percent of respondents (73%) consider that ICTs complement, but do not replace the need for face-to-face interactions, which continue to be important in order to build relations of trust. These personal interactions can take the form of annual meetings where members participate in technical sessions, social events and field trips, working meetings that can be frequent (e.g. up to once a month) or sporadic meetings for organisational purposes. Some CWN members also point to the role ICTs play facilitating connections with international networks with similar goals (for instance RAP with the European network of public water advocates Aqua Publica Europea, or XNCA with European Water Movement and Mediterranean water networks).

Table 4.3. Advantages of ICT use for collaborative work

Facilitated creation of water network by coordinating geographically dispersed people and organisations	87%
Facilitate the organisation of collective actions	72%
Facilitate exchange of information and opinion generation	94%
Complement personal interactions in periodic meetings that continue to be necessary	74%
Eliminate the need for personal interaction	8%
No specific advantages	2%
Other	9%

Not all CWNs take advantage of the possibilities offered by ICTs equally. E-mail distribution lists are the main tool used for internal communication, generation and dissemination of information, and collective decision-making (Figure 4.2). Unidirectional information tools such as public websites or blogs also play an important role in sharing information with the general public and trying to reach a broader audience.

Figure 4.2. Use of ICTs for communication and decision-making within the networks



The use of virtual social networks (Facebook, Twitter) to disseminate opinions and relevant information among network members and with the broader public is limited, with the exception of RAP and, more recently, RANCA. Collaborative tools for generation of information (Google Drive, Wikis, etc.) are not commonly used, while cloud-sharing of documents and information in Dropbox is more extended. Other tools for generation and sharing of collaborative information are Skype for virtual meetings, WeTransfer, Prezi, and other open source tools. Decisions are mainly made through open discussions in the mailing lists or, in some cases, in group meetings complemented by phone calls and phone messaging systems (WhatsApp) but not through voting or karma virtual systems. The preference for more traditional ICTs such as e-mail may respond to a general lack of familiarity of CWN network members with more complex tools. However, other researchers have

also found that e-mail lists are pivotal social network tools strategically used by social movements to generate discussions and organize collective action because they provide certain advantages, not because of limited knowledge of other ICTs (Barassi and Treré, 2012).

We could use other tools, such as google docs and all that but, at the end, I really can't understand the tool and it is not worth the effort. It is easier to exchange documents and edit and send version 1, version 27, and we can all understand who wrote what (Interview 2).

As observed in Figure 4.2C, communication with the public is mainly carried out through traditional press releases and information posted on the networks' websites or blogs. Active social media campaigns, for instance through Twitter, are not used, even though they usually have a higher viral effect, impact on the media and thus influence on public opinion. The Public Water Network, which operates at a national scale, stands out for a more intensive use of virtual social networks. URA uses the network's blog and Xarxa the group's webpage for internal and external communication. E-mail distribution lists become forums for sharing information, discussion and generating opinion. According to survey respondents, 76% of the messages they send to the lists are responses or comments to messages received. Survey respondents are active information consumers (90% read messages daily or weekly) but less active producers (62% send messages monthly or only occasionally). This indicates that, as is the case in other virtual networks (Fuster Morell and Subirats, 2013) few people are generating most of the information that is consumed by network members.

The use of ICTs by CWN has generally not increased over time. While 94% of survey respondents acknowledge that ICTs are playing a fundamental role in their ability to work collaboratively, these are not used to their full potential. This is partly due to the age of network members (average age of survey respondents and interviewees was 48, which also reflects average age of network membership), and the resulting lack of proficiency in the use of social media.

Our age has not facilitated our fluid use of TICs. In my case I don't have a personal Twitter or Facebook account. I would be afraid to use a tool in which I am not proficient to give publicity to (the CWN), I would be incapable of doing it (Interview 3).

Other reasons can help explain the less intensive use of ICTs by CWNs. On the one hand, different network objectives require different tools. Some CWNs do not have an ambition to have a political presence in public debates, but rather emphasise their role as information clearing houses and

technical support to local members. They therefore do not feel a need to project a public message that is widely distributed. This is the case of Red Jucar, XNCA or RANCA.

Most people do not understand (the CWN) as an actor that wants to send a public message, but rather as a network that allows us to stay in touch, send action alerts, or provide each other with technical support (Interview 6).

Even when there is a desire to be an active actor in a region or basin's hydro-politics, CWNs often find they do not have the expertise or the resources to use these tools. The effective use of social media requires a significant time commitment (something that is challenging in volunteer-based networks) and an ability to send frequent and clear messages (something that is difficult when public statements have to be agreed upon between many member organisations). It is worth noting, however, that in many cases individual organisations that make up the CWNs use social media more intensely to communicate local actions and broadcast their messages, using Twitter of Facebook accounts with thousands of followers.

When asked what were the primary drawbacks of using ICTs for their work, almost 70% of the respondents identified the digital divide as a major inconvenience since it excluded activists who are not active social media users. The digital breach as a source of inequality for political influence is a common source of concern in the literature on social movements and ICTs (Della Porta and Mosca, 2005; Cantijoch, 2014).

Respondents also identified the excessive flow of information as a significant drawback (50%). Many respondents (40%) belong to more than one CWN and it is likely that they receive information from other citizen groups, thus leading to an information overload. A concern for some network activists (30%) is the lack of confidentiality in the exchange of information and opinions, that is, a lack of control over who reads messages and gets information. This has consistently been a struggle in some of the larger networks and sometimes leads to the emergence of smaller working groups that discuss more sensitive issues or political strategies. This option has been used by some CWN to deal with conflicts among network members, devise strategies to influence public decisions, advance in the CWN's discourse, or discuss specific proposals or actions.

Overall the use of ICTs as a tool to facilitate collaborative work of CWN provides three main advantages: the possibility of working collaboratively across large geographical spaces (a river basin, an autonomous region or an entire country); the possibility of maintaining a constant flow of

information and thus build a shared understanding of the issues of concern; and the ability to take decisions quickly and effectively.

> ICTs facilitate contact, exchange of opinions, exchange of information, and allow us to make decisions effectively and quickly, without needing to be physically present in the same place (survey respondent).

Accessing, generating and disseminating information

ICTs are essential tools for accessing, generating and disseminating information. Access to information is a prerequisite for participatory decision-making and a basic need for the work of CWN. According to survey results, the two main sources of information for water activists are the information received from their networks through their use of ICTs and the official information posted on institutional websites (Table 4.4).

Table 4.4. Main sources of water-related information.

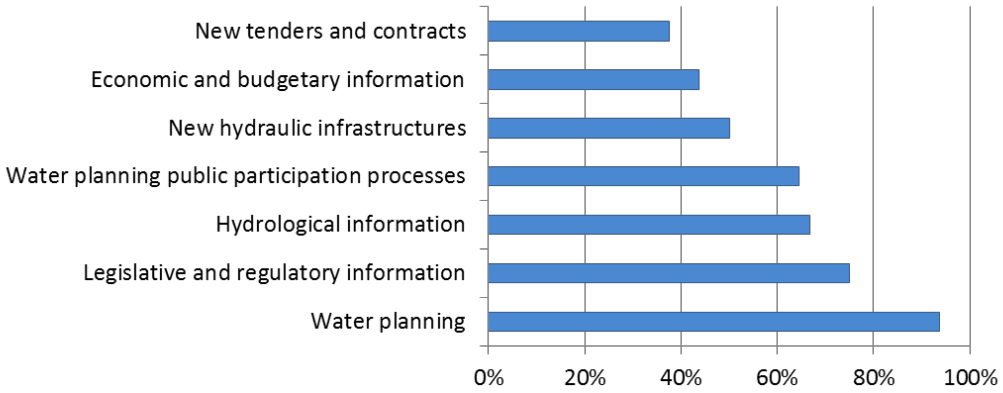
ICTs used for internal communication by citizen water networks	96%
Websites of public institutions	82%
Online newspapers	69%
Mailing lists of other water or environmental networks	59%
Digital newsletters	47%
Printed newspapers	41%
Facebook	33%
Twitter	29%
Specialised blogs	18%
Radio	14%
Linkedin	10%
Television	8%

Other important sources of information are online newspapers, mailing lists from other CWNs, and digital newsletters from water specialized sites like iAgua (www.iagua.es) or the New Water Culture Foundation (www.fnca.eu). Virtual social networks like Twitter, Facebook and Linkedin have less extended use among respondents.

CWN members rely on public institutions' websites for information on WFD planning and related public participation processes (Figure 4.3). They also use these sites for obtaining hydrologic data

and legislative information. Information on other issues, such as new infrastructure projects, tender and contracts and the water administration's budget, is less sought online. This is not due to a lack of interest since the impacts of hydraulic infrastructures or large projects articulate the work of many of these networks. Rather, it is because activists know that this type of information is rarely available and, when requested, not always shared by the authorities. This latter affirmation is in line with the results of an ongoing evaluation of transparency in information of water administrations in Spain (INTRAG Project), which found that official water-related economic and financial information is rarely available online (De Stefano et al., 2012; TI-E, 2014).

Figure 4.3. Information obtained from official websites by water activists.



The information required by water network members for their work that is not available from official sources can be grouped into four major types: real-time hydrological and ecosystem health monitoring; water balances, withdrawals and water rights; socioeconomic assessments of planning scenarios, water services costs and tariffs; and information related to RBA organisation, decision-making justification and accountability. This information is closely related to WFD implementation process, thus highlighting once more that the Directive acts as an overarching umbrella for the CWN activities and information demands.

Members of CWN express frustration about the difficulty of finding the information they require in official websites, which is often not clearly structured and contains no metadata. Research on transparency and open governance emphasises that data and information should be easily accessible and downladable online, in reusable formats (machine readable), with proper metadata and universal reuse licences (see definition of open data at https://okfn.org/opendata/). When survey participants were asked what information format they required, almost all (93%) responded

that they used pdf files, but a large percentage (57%) also required cartographic information (shapefiles, kml, etc.), documents in processable MS Office files (74%) and 19% as relational databases. While the first two are widely available in the websites of public water administrations in Spain, processable data forms are usually not. As a result 58% of respondents said they only sometimes found the information in the format they needed. When asked to specify what information formats they would need to more effectively do their work, they requested updated water data infrastructures, multi-scalar information (local, regional, river basin, etc.) in open formats and visual interactive tools that enable easy access.

Table 4.5. Information shared through the CWN use of ICTs.

Information on the basin, geographic area or conflict of interest from alternative sources	88%
Announcements of actions or demonstrations	88%
News and press reviews	82%
Information on the basin, geographic area or conflict of interest generated by the network	73%
Information on water policy and management from other regions/basins	71%
Information on relevant legislative initiatives	71%
Other	37%

Members of CWN also rely heavily on alternative sources of information (see Table 4.5), primarily information generated within the network (either collaboratively or by individual members) or found through other sources (social media, online newspapers, academic or technical reports, etc.) and shared. For the most part the information exchanged within the network pertains to water-related issues of concern in their basin or region as well as specific action calls.

Relevant official water legislation and planning information is frequently made available to CWN members through their internal communication tools, and actively commented on. For the most part survey respondents agree that the information they get from their networks provides an alternative storyline on water management issues either contesting (78%) or complementing (55%) the official one. It is through online discussions of posted news and events that alternative information and a collective understanding of problems and possible solutions are generated.

4.5.2. Power relations in water governance in Spain and political activism

This section discusses the incidence of CWNs on water-related decisions and whether the use of ICTs is improving their ability to influence decision-making processes and change the power balance in water allocation and management decisions in Spain.

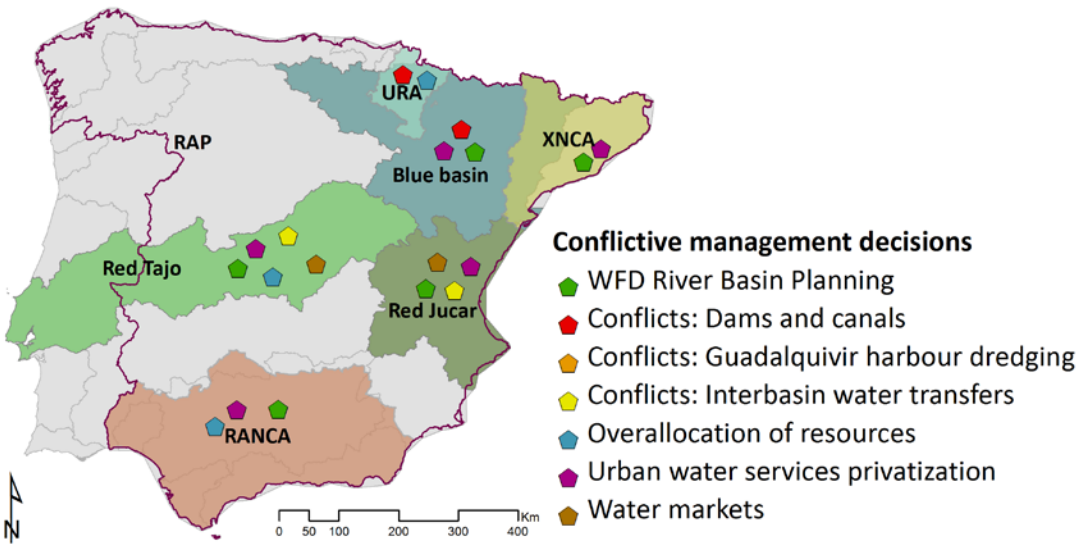
Figure 4.4A depicts key water management decisions that were taken in different regions and river basins in 2014 according to survey respondents. These decisions can be grouped into four major categories: the WFD river basin planning process (plan development and approval, public participation processes, environmental goals, programmes of measures, etc.); conflicts regarding major hydraulic infrastructures where CWNs are active (water transfers, new dam proposals, major dredging operations); conflicts regarding water allocation (overallocation of resources or use of water markets); and urban water services privatisation processes and associated issues (pricing, access to information, public participation, etc.). The issues reflect the themes that currently articulate the work of CWNs.

Figure 4.4B depicts who were the major players in these key water management decisions, also from the perspective of survey respondents. The figure shows the aggregated relations between the different institutions and groups involved. The size and colour intensity of the nodes constitute a function of the number of connections each actor or institution has with other actors/institutions in specific decisions. Thus the darker the colour and the larger the size, the more decisions they have been involved in together with other institutions. The size of the links is a function of the number of times in which the institutions have been involved together in making decisions.

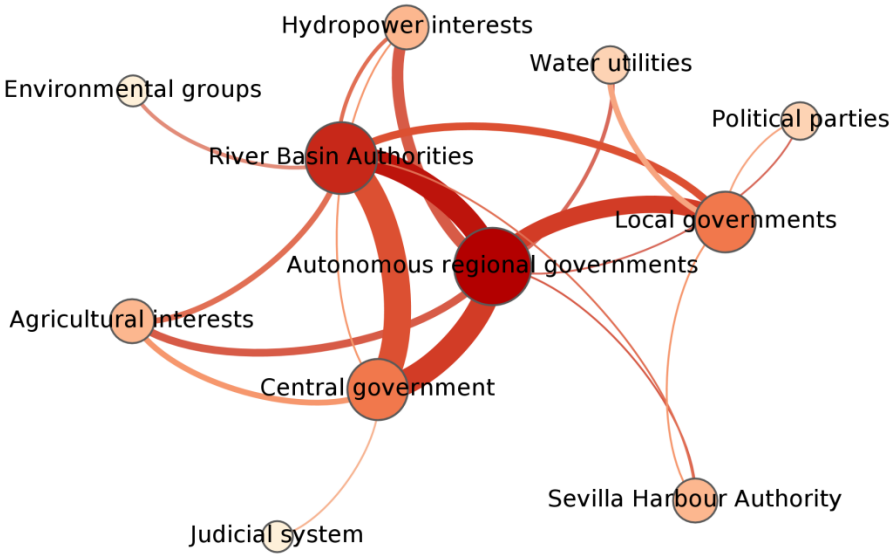
Figure 4.4 clearly shows that, from the perspective of the members of CWNs who participated in this research, the traditional water policy community (agricultural interests and hydroelectric companies) together with public administrations at different levels (river basin authorities, regional governments with significant intensity, national government, and local authorities in the cases of privatisations of urban water services), continues to dominate decision-making processes in Spain. In their view, alternative voices, such as those coming from socio-environmental groups, are marginal and testimonial, and have very limited incidence on final decisions.

Figure 4.4. Key water management decisions in Spain in 2013-2014 (A) and key actors involved (B) according to citizen water networks

A



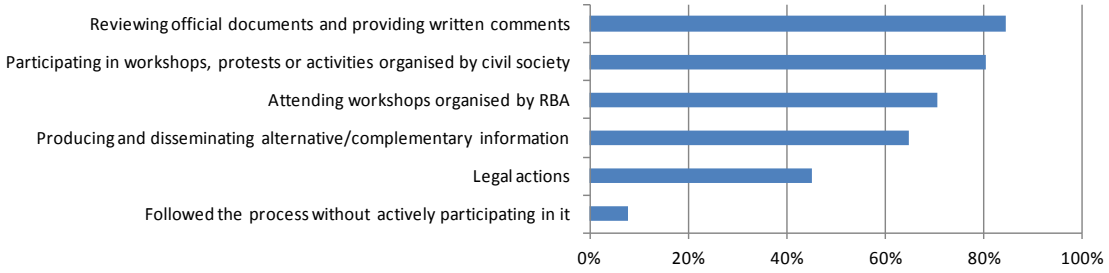
B



Source: Own elaboration with data from the surveys.

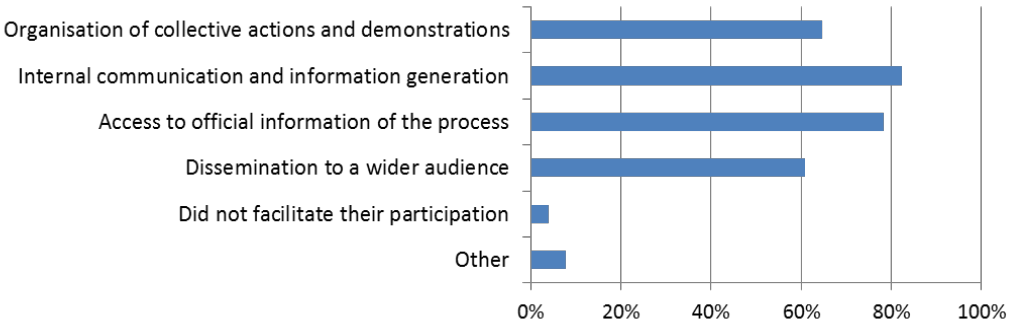
An analysis of Figure 4.5 shows that there was an initial trust in the new governance forms introduced by the WFD and activists participated actively in public participation processes, for instance with 84% of respondents providing written comments to official RBMP planning documents and over 70% attending workshops organised by RBAs.

Figure 4.5. Participation of respondents in water planning/water privatisation debates.



Furthermore, CWNs actively organised workshops and activities to disseminate information on the issues of concern, and generated documentation and technical reports to support the demand for either an ambitious implementation of the WFD from an environmental perspective, or argue against urban service privatisation efforts or new infrastructural proposals. In the view of research participants, ICTs increased the ability of CWN members to participate in water planning or privatisation decision-making processes (Figure 4.6) by enhancing internal communication and access to both official and alternative information, facilitating the organisation of campaigns and demonstrations, and, when this is a goal, disseminating the opinions and positions of the network to a wider audience.

Figure 4.6. Role of ICTs facilitating participation in decision-making processes.



Initial support for the WFD participatory planning process was tempered by the realisation that major decisions continued to be restricted to traditional actors in Spain's hydro-politics, confirming what previous research projects (PART-DMA) had already suggested and was discussed earlier in this paper. As a result, a large proportion of socio-environmental groups have initiated legal actions against the public decisions adopted (over 45% of survey respondents have actively participated in the preparation of these legal actions). That is the case, for instance, in the Tajo, Ebro or Jucar river basins, or in some water privatisation cases. In fact, the perception of members of CWN on the performance of water authorities in terms of opening up truly participatory (deliberative) decision-making processes is very poor. Only 2% of responses consider that there was a real willingness to incorporate new actors in decision-making processes in conditions of equality. A majority (over 60%) consider that participatory processes were a mere formality to fulfil the requirements of the WFD. Even when new players were included, their weak power positions compared to other traditional players were not taken into account in order to provide for a more even playing field.

> In general public participation processes have not demonstrated any interest in the incorporation of the information provided by those actors that have traditionally been underrepresented: social, environmental and cultural organizations, non-consumptive water users, riparian residents, etc. (Survey respondent, Red Tajo).

More critical members of CWN consider that authorities tried to boycott socio-environmental groups' participation in some situations, or only provided spaces for participation as a reaction to public pressure. In the case of XNCA, this disappointment has led them to expand their focus beyond water and the WFD.

> We are fed up (…) we are tired of reading documents. (…) There are people that have been making comments to public documents for over 20 years, and they are tired, because no one pays any attention. We still make comments, but without the least expectation that they will have any effect. (…) We are witnessing the privatization of the state. We are in a post-state, post-democratic, post-everything era. The structure of the state has been completely delegitimized (Interview 4).

In this context of frustrated expectations, there is an overwhelming impression that the networks' positions have not had an impact on the final decision and that their influence over water policies is very limited.

> I think the Network had a testimonial presence in spite of our efforts. Decisions were taken unilaterally by the administration. Other interest groups with greater influence may have had an impact on final planning decisions: irrigators, hydroelectric companies or utility companies (Survey respondent, RANCA).

While major decisions continue to be made by members of the traditional water policy community, the new governance approaches have helped incorporate new players in decisions over less controversial issues where stakes are not so high. In fact, participants in the research acknowledged that comments of CWN members had influenced decisions in some local areas (for instance, local river stretches or environmental flows in less developed areas) or helped improve existing planning information.

> Even if the final results are not what we wanted, we were able to influence the margins of the decisions, avoiding potentially worse outcomes (Survey respondent, RAP).

> The organizations that make up the Network with their comments and suggestions were able to affect some minor part of the final decisions, helping [the water administration] avoid making errors and incorporating some caveats (Survey respondent, RANCA).

They also felt their participation had improved the planning process in procedural terms and served to make their arguments heard in public spaces and fora where they had until now been absent.

> Our comments have not been taken into account because the Plan and the (major decision) had already been negotiated behind citizens' backs. It has been somewhat significant that our arguments have been read and taken into account to some extent (even if only to build stronger counter arguments) throughout the debate (Survey respondent, Red Tajo).

Despite the perception that their effectiveness in altering the power balance is poor, activists greatly valued other reasons for their involvement in CWN. The ability to work in a coordinated fashion throughout the river basin is particularly important. In the case of the Red Tajo, for instance, the articulation of a basin-wide CWN including groups and municipalities from the Portuguese side of the basin had made them more effective in reaching European institutions, where both Spanish and Portuguese Members of the EU Parliament advocated their positions.

Table 4.6 summarises how activists rate their CWN's ability to empower them in terms of access to information and decision-making. In their view, network membership has helped them improve their understanding of problems and decision-making processes. They value improved access to both official information used for decision-making as well as their own alternative information. However, CWNs have not been able to significantly improve their access to people or institutions with decision-making capacity or the possibility of influencing final decisions.

Table 4.6. Evaluation of the advantages of belonging to networked water organisations (1 lowest value and 10 highest value).

Stated advantage	1-4	5-7	8-10	No answer
Knowledge and understanding of decision	8%	26%	65%	0%
Access to official information used in the decision	24%	28%	44%	2%
Access to alternative information regarding the decision	14%	34%	51%	0%
Improving understanding of the problem	4%	26%	69%	0%
Access to persons/institutions with decision-making capacity	50%	36%	12%	0%
Possibility to influence final decision	67%	26%	6%	0%

Finally, participants were asked to assess the potential of ICTs to play a greater role in improving decisions over water. There is recognition that ICTs play a key role in improving access to information as well as providing tools for information on quality control. Research participants also acknowledge that ICTs have served to open up alternative and accessible channels of communication to disseminate information that questions official discourses. In their view, a more effective use of social media that demonstrate public interest in the CWN's positions (through *retweets*, 'I like', etc.) would enable their message to more easily reach traditional media, decision-makers and the general public, increasing their political profile in those cases where this is a goal.

> (In twitter) there are debates about water-related news and people share information in a very immediate and direct way (for instance, with pictures). Some journalists follow these debates, and they can decide to do a story on that issue, a story that, in turn, reaches politicians and the general public (Interview 5).

This alternative flow of information contributes to create a critical opinion, contest official proposals and organise collective actions (letter-writing campaigns, public comments, etc.).

> ICTs can play an important role in the dissemination of information and the generation of public support. They can help improve transparency, information and the emotional identification of citizens with the problems we face. However, decisions over water management depend not so much on the use of ICTs, but rather on the low democratic quality of public institutions, the unequal power relations among actors and interests, and the disregard for basic legal and scientific considerations (Survey respondent, Red Tajo).

In their view, however, the low democratic profile of current water management institutions in Spain clearly hinders ICTs' potential to democratise decision-making processes. Without a real willingness to open up true spaces of deliberation where all actors can participate in conditions of equality, ICTs' role will remain that of useful tools for information-sharing and communication.

> ICTs are conditioned by the framework established by the government (…) that has excluded civil society from decision making processes (…). We increasingly face decisions that (are not taken in the public institutions) but that respond to special interest groups and favouritisms instead of the public interest (Survey respondent, RAP).

4.6. CONCLUSIONS

This paper starts with a critical review of participatory governance by questioning one of its main theoretical arguments: its appropriateness to manage the complexity and uncertainty that characterise major environmental dilemmas, where multiple legitimate actors intervene. This approach is questioned by those who understand it as materialisation of rhetoric tools that actually serve the interests of neoliberal globalisation, as it presents purportedly 'apolitical' mechanisms (market instruments, technical expertise) as 'impartial' responses to allocation disputes, and pursues the deactivation of conflicts through the idealisation of consensus.

Water policy in the EU is an excellent laboratory to test this general dynamic since Europe has pioneered the institutionalisation of participatory governance in the water sector through the implementation of the EU Water Framework Directive. The implementation of the Directive in Spain is of special interest due to the dominance of a water paradigm characterised by the central role of the state in water-related decisions and participatory processes accessible only to a few powerful interest groups.

The emergence of ICTs as an instrument capable of triggering political changes is a recent phenomenon that has shown its potential in different arenas of contentious politics: the Zapatista movement of the 1990s, the global justice movement, the Arab Spring, the indignados movement in Spain, or the Occupy Wall Street movement in the US. This has opened a new and rich debate about the nature of 'technopolitics' and its potential as a rule-changing instrument in decision-making processes. In this context, it is worth analysing the realm of overlap between the frustrated participation of social movements in water policy in Spain and the potentially empowering role that ICTs can play.

In this paper, we have analysed the experience of Citizen Water Networks (CWNs) that have emerged in Spain over the past 15 years at different geographical scales (river basin, regional or national) to participate in and influence debates and decisions over water. While socio-environmental organisations and networks have been active in Spanish hydro-politics for over 35 years, CWNs have emerged, grown and articulated their activities taking advantage of the communication and organisational possibilities provided by ICTs. We have explored in what ways the use of ICTs by these networks may have provided a more effective access to information and political operational involvement in water governance and where the limitations may exist. We also evaluated whether the use of ICTs has improved their ability to influence water management decisions and change the power balance in water policy-making.

Our results coincide with those of other scholars who have studied the role of internet and ICTs in the organisation, operation and effectiveness of other social movements (Della Porta and Mosca, 2005; Kavada, 2010; Barassi and Treré, 2012; Earl et al., 2014; Agarwal et al., 2014). They reveal that ICTs have allowed CWNs to organise and work collaboratively across large geographical areas and facilitated their ability to more easily access, generate and disseminate information. This is particularly important in terms of information that questions the official and hegemonic discourses over water resources management, contributing to create alternative rationalities and opinions. The CWNs analysed in this study use primarily email distribution lists to generate and share information among network members, to make decisions as a network and organise actions. They use web pages and blogs for external communication. The use of virtual social networks like Twitter or Facebook and collaborative editing tools such as Google Drive or wikis is less significant, although local organisations that make up these networks often do use these tools intensively. This is in clear contrast to other social movements in Spain linked to the 15M that have largely relied on these tools for improving the efficacy of their work and for interacting with the wider public and make their messages viral. The potential of virtual social network campaigns to influence public opinion also seems to be largely unexploited by CWN, where the digital divide and the time required to be constantly present in the web appear to be important limitations for more intensive ICT use. However, not all CWNs seek to directly influence public opinion but rather emphasise the coordinating, support and information exchange capabilities of the network. In this sense, e-mail distribution lists are used strategically to reinforce this coordinating role and to produce and share new contents and meanings.

In terms of improving transparency and accountability of water management decisions, our study shows that CWN members actively use and control the quality of official water information on water planning and management. They read, reuse and comment on official documents and demand a wider variety of data and information in open formats than what is currently available in official websites of water authorities.

Our research also confirms results of earlier projects which indicated that, although citizens' knowledge and access to information have increased throughout the WFD implementation process, the governance approach introduced by this legal framework over the last decade has not yielded real changes in terms of access and influence on final decisions by all actors in conditions of equality. Furthermore, while ICTs have enhanced previously underrepresented actors' capacity to develop a shared (and alternative) understanding of the problems they face and empowered them to act collectively, their influence on final decisions continues to be very limited. In fact, it can be argued that by originally trusting the transformative potential of WFD governance approaches, activists have invested tremendous efforts in participating in debates over the managerial aspects of water management (the 'margins' of the debate) but remained excluded from the truly critical and controversial decisions.

Post-democracy reduces water decisions to management, that is, to decisions located at the level of 'policies' and not in the realm of the 'political' as we have illustrated. Yet, the following questions remain unanswered: Is there any level of decision that escapes this 'postdemocratic dynamic'? If the answer is positive, what is the scale and nature of decisions where participatory processes in water management may have some operability? Could a more intensive and effective use of ICTs by CWNs, one that more effectively reaches mass audiences, make a difference in terms of their ability to truly influence decisions?

This study shows that the low democratic profile of current water management institutions in Spain clearly hinders ICTs' potential to democratise decision-making processes. Without a real willingness to open up true spaces of deliberation where all actors can participate in conditions of equality, the role of ICTs will remain one of strengthening CWNs' organisational capabilities and ability to obtain and generate information, but will not alter the basic framework for water policy-making. It could be argued that trust on the potentialities of ICTs as transformative tools is linked to the confidence in the possibility of transforming the context within which decisions are made, that is, the democratic process itself.

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5. ANNEX: SUMMARY OF EXPERIENCES WITH IMPLEMENTATION OF WFD MEASURES IN THE NETHERLANDS

By Pol Hakstege[29], July 2015

5.1. INTRODUCTION

The Netherlands is situated in a delta of 4 rivers, which form trans-boundary river basins. It is lowland with 30% below sea level and 60% flood prone. It is densely populated, highly industrialised and has intensive agriculture and inland shipping sectors. In fact it is a man-made country with specific conditions that put many pressures to the environment including water quality.

The two main pressures on water quality are:

- Diffuse pollution especially from emissions from agriculture, infrastructure and from upstream.
- Hydro-morphology, due to unnatural conditions of most waters. The Netherlands has the highest percentage (90 %) of Heavily Modified Water Bodies (HMWB) and Artificial Water Bodies in the EU.

These specific conditions pose a large challenge to comply with the WFD objectives. The chemical quality has already much improved; the main challenge is to achieve the Good Ecological Potential (GEP).

The two main government institutions that are involved with the WFD are Rijkswaterstaat (RWS), the executive agency of the ministry of Infrastructure and the Environment, responsible for national water systems, and the Regional Water Authorities (RWA) or water boards responsible for regional water systems. Concerning the WFD the RWA have a much larger programme of measures than RWS.

For regional waters the main problems are related to diffuse pollution, as for national waters the main focus is on mitigation of hydro-morphological measures.

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Measures to regulate emissions into surface water by industries both on a national level and by trans-boundary cooperation such as the Rhine Action Plan and international river commissions especially (ICPR) have resulted in a tremendous improvement in water quality.

At the Conference of Rhine Ministers (2013) attention was asked for new micro-pollutants (e.g. pharmaceuticals, hormones, pesticides). It was stated that the migration of the salmon should reach the upper parts of the Rhine (Basel) in 2020.

5.2. APPROACH ON MITIGATION OF HYDRO-MORPHOLOGICAL PRESSURES

Regulation of the rivers for flood protection (construction of dikes) and navigation (groynes) has resulted in a deterioration of ecological conditions (high flow velocities, bank revetments) and loss of habitats. All large rivers are designated as HMWB. These alterations needed for flood protection and navigation cannot be reversed, but where feasible mitigation measures are taken.

Examples of mitigation measures to improve ecological conditions are ecological riverbanks, secondary channels, lowering of floodplains and construction of fish passages. Four species groups are monitored for progress: fish, macro fauna, algae and water plants.

Essential is an integrated, interactive approach taking into account demands from other sectors such as flood management, navigation, Natura 2000 (floodplains) and others, following a participatory approach. Due to sometimes conflicting demands from the different sectors this is a complex and time-consuming process, where compromises for all sectors are needed to arrive at a solution.

Opportunities were used to integrate ecological objectives into flood management measures of the Room for the River programme such as of secondary channels.

An innovative multifunctional solution is the construction of dams alongside the riverbanks creating favourable conditions for ecology (in the zone adjacent to the banks), lowering of flood levels (due to removal of groynes) and better conditions for navigation (higher flow velocities, less maintenance).

A pilot of 10 km of longitudinal dams along the River Waal is now in execution.

At some locations synergy with Natura 2000 goals could be achieved, e.g. creation of shallow reed zones in lakes for WFD is favourable for specific protected birds (Great Reed Warbler).

An example of a technical challenge is morphological effects resulting from the WFD measure, such as a secondary channel. At the inflow there is less discharge in the main channel, leading to a lowering of flow velocities and sedimentation. At the outflow the reverse process takes place resulting in erosion. These shoals and erosion pits create bottlenecks for navigation and mean extra costs for maintenance dredging.

Adverse affects need to be minimized by optimisation of the design based on location studies and morphological model studies.

Planning challenges were the tight timeframe and budget cuts in 2012, due to the economic crisis: one third of the measures for national waters had to be postponed to the second cycle.

5.3. EXPECTED IMPROVEMENT IN ECOLOGICAL POTENTIAL OF WATER BODIES FROM 2009 TO 2015

In general, the standards agreed under the Water Framework Directive (WFD) for water quality of regional surface waters are not likely be met in 2015. Water quality of the national surface waters is, in general, sufficient or approaching sufficient water quality (except for the Meuse River).

Despite significant progress on a number of agri-environmental indicators, emissions from agricultural practices inside the Netherlands also contribute to insufficient water quality, in particular related to reaching the biological objectives of the WFD.

Transboundary flows of insufficient water quality are an issue for some water bodies (e.g. the Meuse).

It was found that the improvement in ecological potential of water bodies is less than expected. This not only due to the causes mentioned above but also to the method of assessment based on the principle of one-out-all-out for dozens of parameters. This approach provides an overly negative picture compared to observations of many water users that report spectacular improvements in water quality and is insensitive to show progress.

It is recommended that some substances should be regarded separately and that additional indicators are used to arrive at a more representative outcome both for chemical and ecological parameters (van der Molen, in Conference report Brussels 2015).

5.4. LESSONS LEARNED FROM THE FIRST CYCLE FOR NATIONAL WATERS (TECHNICAL ASPECTS)

The most striking lessons are:

- An integrated approach with other sectors is essential;
- The optimum situation for ecology is often not feasible because of requirements for flood protection, navigation and cost-efficiency;
- Much progress has been made in water quality, which is underestimated by the assessment based on one-out-all-out;
- Source control remains crucial; diffuse sources have become more important, especially from agriculture;
- International cooperation is essential to reduce the pollution load from upstream.

5.5. EVALUATION OF PROGRESS OF WFD IN THE NETHERLANDS

The EC has evaluated the RBMP 2009 of the NL in 2012 and was quite positive about the contents of the approach, but had some critical notes as well.

Quote from OECD Report 2014: “The Netherlands is up-to-date with enforcing the WFD and has correctly transposed the WFD provisions. Nevertheless, one cannot ignore the rather low level of ambition in achieving the ecological status objectives as 86% of water bodies in the Netherlands are subject to an exemption at present. In the future this may be challenged by the European Commission.

Justifications for the application of the exemptions (in particular in the Rhine River Basin District) relate to technical feasibility, the disproportionate costs that the necessary measures would entail, as well as natural conditions (historic pollution) and the long time need for recovery in an antropocene environment. Hence, the government has phased the timeline for improving water quality until 2027 (European Commission, 2009). It was argued that the full achievement of all chemical and ecological objectives with the necessary measures would not be possible, and that the objectives should be lowered in some cases. However, given the high level of uncertainty, it was decided that objectives would not be lowered in the 1st cycle but rather that a step-wise

approach would be implemented up to 2027. In 2021, a decision will be taken as to which parameters require a lowered objective."

One of the messages of the Blueprint report (2012), better implementation and integration of legislation is being realised in the Netherlands. First integration of water legislation in the Water Act of 2009 and for integration of legislation on water, spatial planning and the environment the Environmental Planning Act will be implemented in 2018.

Chemical monitoring is an ongoing process implementing the revised Priority Substances Directive (2013) and attention for new micro-pollutants (watch list).

Concerning Climate change adaptation a check was done on vulnerability of WFD measures for climate change.

A more structured data approach is used for the update of RBMP in 2015, such as: Water Information House (national and regional authorities), Factsheets for each water body indicating remaining targets and measures and Reporting sheets for each river sub-basin.

5.6. THE WAY FORWARD FOR THE WFD IN THE NETHERLANDS

Diffuse pollution for regional water and hydro-morphology for national waters remain the main pressures to be addressed.

Already 100 M€ was funded for the second cycle. WFD measures will be coordinated with the Delta programme in order to achieve synergy with measures for climate adaptation and fresh water supply.

Planning, information and public participation will also be coordinated between programmes for the WFD and Flood Directive in the second planning cycle of WFD (2015-2021).

Further reduction of diffuse sources is essential to comply with the objectives of the WFD. A Delta plan for agricultural water management is implemented for this purpose. Another aspect is to further reduce emissions from upstream in international cooperation.

The ambition is definitely to reach the objectives of the WFD in 2027. This time span is needed to further reduce diffuse sources and achieve maximum synergy with other policies.

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