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Bringing Water Regulation into the 21st Century: The Implementation of the Water Framework Directive in the Iberian Peninsula

Antonio A. R. Ioris
University of Aberdeen
United Kingdom

1. Introduction

Water is anything, but trivial. That observation is easily demonstrated by the intricate, often contested, nature of water use and conservation in Europe, which normally encapsulates operational challenges, intersector disputes and multi-level political expectations. If the traditional forms of water use were typically based on cooperation and mutual understanding (*vis-à-vis* subsistence irrigation and community water supply), the recent history of water development is more closely associated with large-scale interventions and growing rates of water demand. Mounting environmental pressures make the reconciliation of antagonistic interests even more difficult, especially in areas with relatively low stocks of water and an inadequate institutional organisation. Throughout the 20th century, both the Keynesian and the post-Keynesian phases of water management have tried to develop rational approaches to restore and maintain the integrity of freshwater systems.¹ If the Keynesian period was marked by large infrastructure projects and centralised planning, the post-Keynesian blueprint is now characterised by non-structural and more flexible responses. In that context, a succession of plans and regulatory efforts launched by the European Union in the last two decades have attempted to improve the institutional mechanisms for dealing with old and new water management problems. To a great extent, the end result of that salient water policy has been an 'organised anarchy' characterised by problematic preferences, unclear technology and fluid participation, whilst the overall trend of resource overuse and the uneven sharing of the environmental impacts remained mostly unchanged (Richardson, 1994). That is why the approval of the Water Framework Directive (WFD) in 2000 – currently in its first cycle of implementation – has been perceived as a promising opportunity to enhance the regulatory capacity of national governments and public agencies, as well as a central tool in the reform of the collective basis of social learning and bring water management in Europe to the 21st century (see Hedelin & Lindh, 2008).

¹ The post-Keynesian phase of water management began with the United Nations Mar del Plata conference in 1977 and, not by chance, coincided with the aftermath of the crash of the Bretton Woods monetary order, the oil crisis, and the declining role of the state. The connection between water management reforms and the larger politico-economic reorganisation has had major consequences for the assessment of problems and formulation of solutions, as discussed below.

The broad range of activities related to the implementation of the new Directive represents a very special episode in the history of environmental regulation in Europe. Likewise, the introduction of the WFD constitutes an important element of an affirmation of the political legitimacy and administrative authority of the evolving European Union statehood system. Because of its large-scale consequences, the complex reorganisation that follows the WFD epitomises a distinctive case in the sociology of water management, what van der Brugge & Rotmans (2007) describe as a transition from the previous focus on hydraulic infra-structure works to a new phase based on the adaptive, co-evolutionary coordination of improved responses. The new Directive is not only associated with technical and administrative expedients, but also relies on the affirmation of 'protonorms', such as watershed democracy, water marketisation, international river diplomacy and the notion of integrated management, that all compete to normalise the contemporary forms of water governance (Conca, 2006). The multiple components of the new European regulation related to the implementation of the new water directive certainly constitute one of the most comprehensive examples of a programme of environmental conservation around the world. Notwithstanding the ambitious nature of the WFD regime, the bulk of the official measures seem yet to be too centred on technical and bureaucratic procedures with limited consideration of the also important political and ideological dimensions of water management. That can represent a major implementation problem, because at the same time that the Directive encourages a more efficient allocation and use of scarce water resources, the success of the WFD also depends on dealing with some thorny social issues that influence the allocation and management of water, such as stakeholder inequality and environmental injustices (SurrIDGE & Harris, 2007).

Our aim in this chapter is to investigate the introduction of new water management institutions and how it has influenced intersector and interspatial relations, particularly in terms of public water and sanitation services. More than a decade after the approval of WFD, it is the appropriate time now to discuss achievements and constraints of specific catchments and countries in order to assess the overall European progress. It needs to be examined whether the WFD agenda - essentially, the range of public and private activities related to implementation of institutional reforms around the allocation, use and conservation of water that have followed the approval of the new European Directive - provides a coherent set of guidelines to revert structural shortcomings and pave the road for more sustainable forms of water management. We will consider here some of the key dilemmas involved in the management of water in the Douro catchment (called Duero in Spain) with an emphasis on the Portuguese context (which is unusual, as most analysis of the catchment focus on the Spanish side). The study was initially inspired by the observation of Dominguez et al. (2004) that conflicts and problems in the Douro have been many times hidden from the public debate and, therefore, deserve to be properly examined. The empirical results show the socionatural complexity of the catchment and a situation of growing problems and evident regulatory shortcomings. In effect, because of its size and geographical complexity, the Douro represents one of the most challenging areas for the achievement of WFD objectives in southern Europe.

The Douro (Figure 1) is the largest Iberian river basin (97,290 km²) with 78,954 km² in Spain and 18,336 km² in Portugal (respectively 15.6% and 19.8% of each national territory), which corresponds to 17% of the peninsular area. According to Sabater et al. (2009), the main river channel is 572 km long. The first 72 km flows through steep valleys and the remaining 500

km of the river meanders through an open valley over soft tertiary sediments. The mean water temperature ranges from 11.2 °C in the headwaters to 14.0°C in the lower reaches. Mean precipitation in the Portuguese section is 1,016 mm/year and in the Spanish section is 625 mm/year (Maia, 2000, quoted in Dominguez et al., 2004). The catchment has a strong relationship between rainfall and river flow, with the maximal discharges occurring in the spring and minimum in the summer. High discharge periods are usually correlated with peaks in suspended solids. The mean flow at the river mouth is 903 m³/s.

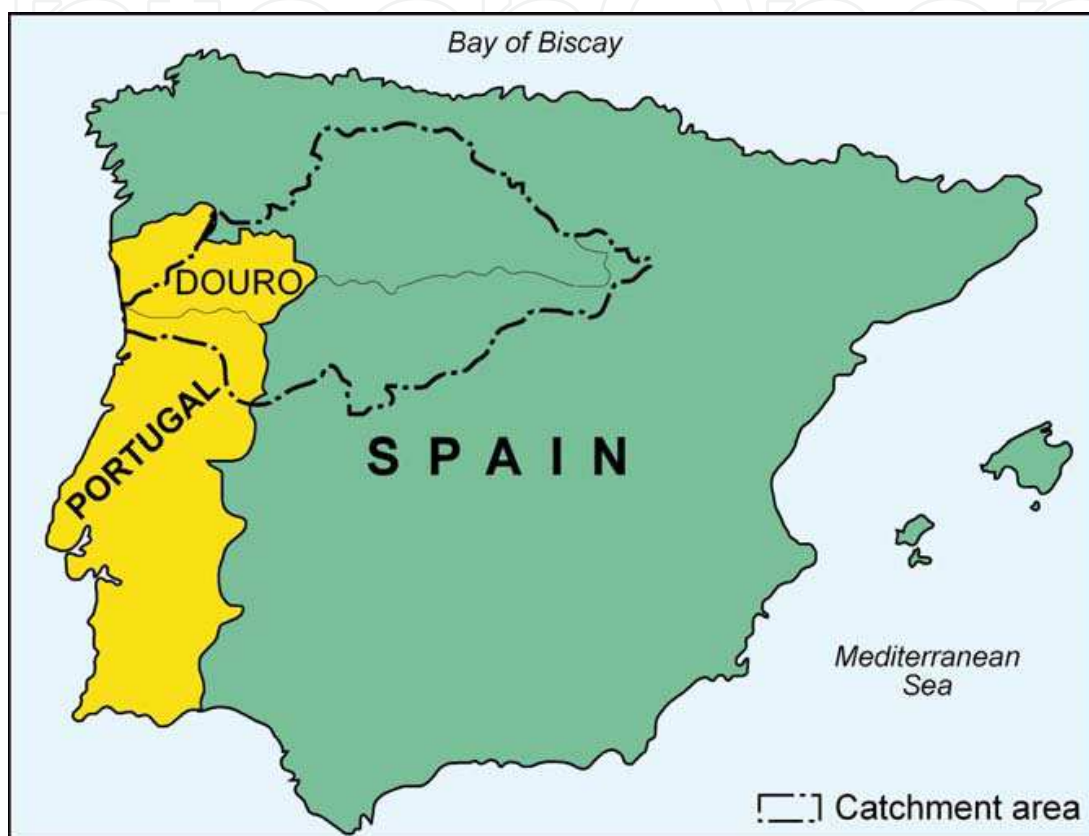


Fig. 1. The Douro Catchment in the Iberian Peninsula

Water use in the catchment is dominated by agriculture and, secondly, by hydroelectricity (one quarter of Spanish and more than half of Portuguese generation are located in the Douro), although industries, cities, navigation and mines are also important user sectors. Total water usage is between 26-31% of the natural mean flow and the storage capacity corresponds to 8.8% of the natural mean flow (7.7% in Spain and 1.1% in Portugal), according to Maia (2000, in Dominguez et al., 2004). In terms of the ratio between abstraction and availability, the level of water stress the Douro is not much different than the River Guadiana in the south of the Peninsula and with much lower rates of rainfall (European Commission, 2007). There exist more than 50 large dams built for hydropower and irrigation, with a particular concentration in the last 350 km of the river channel (Bordalo et al., 2006; Sabater et al., 2009), which has caused the extinction of ¾ of the local fish species (Azevedo, 1998). Because of untreated effluents coming from Spain, at the point of entry of the Douro in Portugal the level of pollution is considerably high (particularly in term of nitrate). Around 50% of the water bodies in the river basin in Portugal have chemical and biological standards at levels that are below the legal requirements (National Water Institute

[INAG], 2001), whilst the majority of the river stretches in Portugal and Spain present a less than good ecological condition due to irrigation abstraction, urban effluents, impoundments and riparian deforestation (Commission for the Coordination and Regional Development of the North [CCDR-N], 2000).

Following the holistic goals of new water regulation, both Portugal and Spain are now required to improve the scope of the responses and broaden the agenda of water management more in line with the expectations of those social groups not previously involved in the decision-making process. That should occur not only within national borders, but also between the two neighbouring countries. Nonetheless, if the two nations are profoundly connected by many cultural, economic and social ties – to a large extent, these are associated with the common dependence upon the main rivers –, there also exists a permanent dialectic of integration and repulsion, sometimes reaching a level of dispute that prevents genuine collaboration. Portugal is not only physically located in the downstream section of the Douro catchment, but the history shows the reluctance of Spain to consider the full extent of the Portuguese demands. In 1927 both countries signed an agreement to discipline hydroelectric developments in the international section of the Douro (later ratified by other treaties in 1964 and 1998), which split the river into segments instead of allowing a joint construction of hydropower dams. It was not by chance that the treaty coincided with the initial stage of the highly centralized dictatorship in Portugal (since the 1926 coup), which in the subsequent decades led the country to an isolationist, authoritarian model of economic development.² With the joint entry into the European Union in 1986, bi-lateral negotiations led to the signature of the Albufeira Convention in 1998, which determined that Spain had to guarantee a minimal annual volume of water at several points along the river. However, Spain has breached the Convention in several occasions, such as during the droughts of 2001-2002 and 2004-2005 when the thresholds were not respected. Further discussions produced an amendment of the Albufeira Convention in 2008, which has now quarterly and weekly flow thresholds, but still not put to the test.

Despite institutional developments at the national, Iberian and European levels (directly or indirectly related to the new Directive), the crux of the matter, not often grasped by the majority of existing assessments and discussion papers, is the myriad of political clashes and regulatory shortfalls that hinder the adoption of more effective and fairer management of water in the Douro. To overcome those limitations and fully understand the complexity of WFD, it is necessary to employ a multispatial and multisector analysis that articulates the higher (i.e. European) and lower (i.e. locality level) geographical scales, as well as situates the discussion beyond the technocratic parlance that still permeates most official documents and academic assessments. The following pages will offer a critical reflection about changes related to WFD by primarily focusing on the Portuguese section with some insights into the Spanish side of the catchment. That aims to provide a representative example of the controversies that characterise the current implementation of the new Directive. It will be

² Also in 1927, the river basin authority was created in Spain, which is called Duero Hydrographical Confederation (CHD) with responsibilities for water planning, water quality, flood prevention, and environmental protection. An advisory board (the River Basin Council) was established in Portugal in 1994, but it was only in 2007, with the creation of the Northern Hydrographical Region Administration (ARH-N), that an executive authority equivalent to CHD was formed in the downstream country.

necessary to consider the repercussion of official policies on different water users and the interchanges between the lower Douro (around the city of Porto) and what we generically define here as the upper Douro (the area around and upstream the demarcated area of port wine production).

The empirical part of the study consisted of two research fieldtrips to the Douro in the year 2008 (March-April and October-November) as visiting researcher at the University of Porto. The overall research strategy was the 'embedded case study', as described by Yin (1994), which starts with the consideration of embedded sub-units of social action and then scaled them up to identify common patterns at higher scales. The study explored interests and behavioural patterns of various geographical locations and stakeholder sectors, as well as about the institutional framework in which they operate. The research effort initially consisted of contacts with key informants, academics and policy-makers. Based on this preliminary information, we developed a database of public and non-governmental sectors that guided further interviews, the analysis of documentation and the collection of background information. By mapping the various organisations, their discourse and stated aims, it was possible to compare intra- and inter-group differences and the range of alliances or disputes. A total of 43 in-depth interviews were conducted with water users, regulators, and NGO and campaign activists. Interview respondents were identified from an array of organisations that represented multiple interests in the water management sector. Additional information was obtained in the libraries of the universities of Porto, Coimbra, Lisbon, Valladolid and Salamanca, in libraries of Vila Real, Miranda do Douro and Peso da Régua, and at the information centre of the National Water Institute (INAG) in Lisbon. Also public events sponsored by both governmental and non-governmental entities were also attended during the period of work in Portugal and Spain.

The chapter is organised as follows: the next section presents the institutional evolution of water management and regulation in Portugal and in the Douro, which will serve to inform the assessment of the implementation of WFD. The subsequent section deals with the achievements and constraints of the WFD regime, exploring evidences of innovation and continuity. The final parts summarise the analysis and offer some general conclusions.

2. Economic and institutional evolution: Portugal and the Douro

The attempts to reform the management of water in the Douro embody some of the most emblematic difficulties to translate the WFD regulation into practical improvement measures. The debate about the decentralization of water management – one of the tenets of the WFD regulatory regime – happens in tandem with a growing discussion about the transference of state duties to the regional spheres of public administration, as well as with broader claims for local autonomy, social inclusion and even economic development (vis-à-vis, for example, the series of conferences organised by the City Council of Porto in 2008). First of all, it is important to recognise that the use of water in the catchment had and still continues to play a strategic role in terms of regional development. The upper reaches have been the electric powerhouse of Portugal, due to the construction of large hydropower schemes since the 1950s, whilst the lower section of the catchment became associated with light-industrial production and the export of port wine. Until the early 20th century, wine was transported to the city of Porto in small boats (called 'rabelo'), but fluvial navigation started to decline with the inauguration of a railway line in 1887 and, more importantly,

road transport in the early 20th century (Pereira & Barros, 2001).³ At the same time, the transformations of the mechanisms of water use are closely related to the socioeconomic processes of change in the northern region of Portugal. Efforts to recover the regional economy have included actions related to increasing the use of freshwater resources, particularly in terms of new hydropower dams, fluvial tourism and the expansion of the water supply and sanitation network (CCDR-N, 2006).

The above points illustrate how the social and physical transformations around the use of water in the Douro reflect the broader 'choreography' of regional, national and international demands. Portugal started to intensify its economic and monetary integration with the rest of the continent in the 1960s, when joined the group of countries that founded the European Free Trade Association. That culminated in the full membership of the European Union (in 1986) and the adoption of the euro as the national currency (in 1999). The industrialisation and economic development of Portugal has been historically led by the national state, but such a condition has been increasingly criticised by national and international political forces. Crucially, the style of the WFD regulation is closely consistent with the neoliberal direction of European economic policies (see below), but neoliberalising reforms have neither guaranteed economic growth nor avoided the persistence of macroeconomic imbalances (Amador, 2003). It is important to emphasise that the evolution of environmental regulation in Portugal has followed the broader adjustments of public policies and the reconfiguration of the state according to a perspective of economic liberalisation and pro-market incentives. According to Queirós (2002), Portugal has made much progress in establishing a revised environmental legislative framework (largely but not solely in response to European Union directives), strengthening its environmental institutions (including the Ministry of Environment, Spatial Planning and Regional Development), developing national environmental planning (e.g. its first national environmental plan, in 1995) that covers the entire country (e.g. national coastal area protection plans, national nature protection plan, municipal land use plans). The introduction of the WFD in Portugal is an integral part of this institutional reorganisation and, in the words of a senior authority, the complexity is situated in the tension between the centenary tradition of the Portuguese law system and the formal requirements of the European legislation (see Ambiente Online, 2005). Considering the changes that took place in the last century, it is possible to schematically describe five successive phases of water use and development in the Douro, which echo national and international transformations (see Box 1). Note the transition from Keynesian forms of state intervention until around 1986 and the prevalence of post-Keynesian and neoliberal approaches ever since.

The impact of human activities on the water bodies in the Portuguese section of the Douro is evident one considering the trend of water quality classification. Different than other rivers in the south of the Iberian Peninsula, quantitative water impact does not represent the main management problem, but the pollution of the Douro and its lower tributaries. Water quality is seriously affected by household and industrial effluents (due to the lack of sewage collection and treatment), as well as diffuse pollution from agriculture that is mainly originated in Spain. The activity that consumes the largest volume of water in the Douro is

³ According to the navigation authority (IPTM), the transportation of commodities in the Douro still remains a viable means of transportation and reached 140,000 tons in 2004 (94% of that total related to the export of granite to northern European countries).

<p>Precursory period (till early 20th century)</p>	<p>Navigation in the Douro increased significantly in the early 18th century with the transportation of port wine from the Peso da Régua region to the Porto docks (Pereira, 2008). The first hydropower generation site in the country was installed in a Douro tributary in 1894. Since the 1880s, water supply to the metropolitan area of Porto passed to rely on a treatment plant in the Sousa River, a tributary of the Douro under the operation of a French concessionary company (Amorim & Pinto, 2001).</p>
<p>Hydraulic period (1919-1986)</p>	<p>The Water Law of 1919 established a higher recognition of the importance of water for the socioeconomic development of the country (Cunha et al., 1980). The Law stipulated that water use required a prior authorisation from the state, which was later confirmed by the Decree No. 468 of 1971. It was during this phase that most of the large infrastructure works were built and key technical agencies were created and (the Hydraulic Services General Directory in 1949 and the Basic Sanitation General Directory in 1973). Some of the most strategic hydropower plants were built in the Douro, such as Picote (1958), Miranda do Douro (1960) and Bemposta (1964). The recently established dictatorship cancelled the contract with the French concessionary in 1927 and municipalised the water services in the city of Porto. In 1940, a well field along the Douro (in Zebreiros) increased the supply of water to the metropolitan area.</p>
<p>Transitional period (1986-1993)</p>	<p>The regulatory context started to change after Portugal joined the European Union in 1986. During this period, a growing number of publications (e.g. Miranda, 1986) started to emphasise the need to adopt modern water management, in particular economic instruments based on the polluter-pays principle. A dedicated regulatory agency, the National Water Institute (INAG), was created in 1990. Since 1985, the Crestuma-Lever reservoir, located at 21.6 km from the mouth of the Douro became almost the only suitable source for the production of potable water for approximately two million inhabitants of the Porto region (the same dam had impacted negatively the well field because it reduced the river flow and increased the rate of salinity in Zebreiros). The first tourism navigation ship started to operate in the Douro in 1986 and since then the industry has grown significantly (from 6,440 passengers in 1994 to 180,691 in 2004).</p>
<p>Water service liberalisation and river basin plans (1993-2005)</p>	<p>The approval in 1993 of the Decree No. 379 provided the legal basis for the gradual concentration of water services in the hands of regional companies. There has been a continuous trend towards regional water utilities, which is part of a movement from dispersed to concentrated sources of water supply, a tendency that has increased in recent years (Thiel, 2006). In 1994, a series of decrees reorganised the regulation of water use in Portugal and introduced the recognition of the economic value of water: No. 45 (on river basin plans), No. 46 (water user licence) and No. 47 (a charging scheme that included volumetric bulk water tariffs). Under that national legislation, the National Water Council and various river basin councils, including one for the Douro, were established as advisory boards and largely formed by civil servants. The Douro river basin plan was adopted in 2001, but it was only marginally implemented.</p>

Box 1. (continues on next page) Historical Evolution of Water Use and Water Development in Portugal and in the Douro

WFD regulation (the current phase, since the approval of WFD in 2000)	The WFD was translated into national legislation in 2005 (Portugal, Law No. 58/2005) and attempts to forge improvements in several areas, including technical assessments, decision-making and regulatory enforcement. The WFD promotes the concept of water as an economic commodity and, therefore, the economic principles are main criteria in the determination of cost-effective mitigation measures and in assessing the case for derogation on grounds of disproportionate costs. The translation of the WFD into national legislation also launched the legal basis for the creation of water markets in Portugal (i.e. markets for the transaction of water use licences) that is claimed to allow the reduction of pollution through market transactions and at the minimal cost (D'Alte, 2008). The financial-economic regime, which introduced bulk water charges, was approved in 2008. In the end of that year, the Water Regulatory Agency (ARH) was preparing the production of river basin management plans, but it was expected that the deadline of end of 2009 would not be achieved.
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Box 1. (continued) Historical Evolution of Water Use and Water Development in Portugal and in the Douro

the irrigation (114,000 hectares cf. INAG, 2005). Industrial demand is another main user sector and its main environmental significance is the discharge of effluents into the river system, which aggravates the level of pollution. For the purpose of this analysis, we obtained data from the national surveillance system (available at <http://snirh.pt>), which has been used to inform the implementation of the new water directive. It can be seen in Figure 2 that there is an undefined trend of water quality in recent years (note a recovery of Class A, the best water quality condition, in 2007, together with a decline in Classes B, C and D, and a sudden increase in Class E situations). Environmental impact is, however, not restricted to pollution, by also include the negative influence of dams on native species, sediments and riparian habitats.

Probably the experience that best encapsulates the interface between social, economic and environmental demands in Portugal – before and under the WFD regime – has been the redesign of public water services.⁴ For many years, the water industry had been systematically criticised for its fragmentation into small, localised companies, with high operational costs and limited investment capacity (e.g. Alves, 2005; Martins, 1998). The historical origin of the fragmentation of public water services was the delegation of responsibilities to municipal and sub-municipal administration, which still today are the main providers (among the 278 municipalities in Portugal, it is reported that exist 610 operators cf. Monteiro & Roseta-Palma, 2007).⁵ Another characteristic of the Portuguese water industry is the operational separation between drinking water production (abstraction and treatment), called ‘high services’, and retail water distribution (supply of water to households and commercial customers), called ‘low services’. To facilitate the understanding of the complex water industry currently in operation in Portugal, it is possible

⁴ The country has one of the highest per capita footprints in the world (2,264 m³/year, cf. Malheiro, 2008), which is related not only to cost of water, but also with climatic conditions, technological stands, and patterns of production and consumption.

⁵ Note that these numbers do not match the figures published by the regulator (IRAR, 2008).

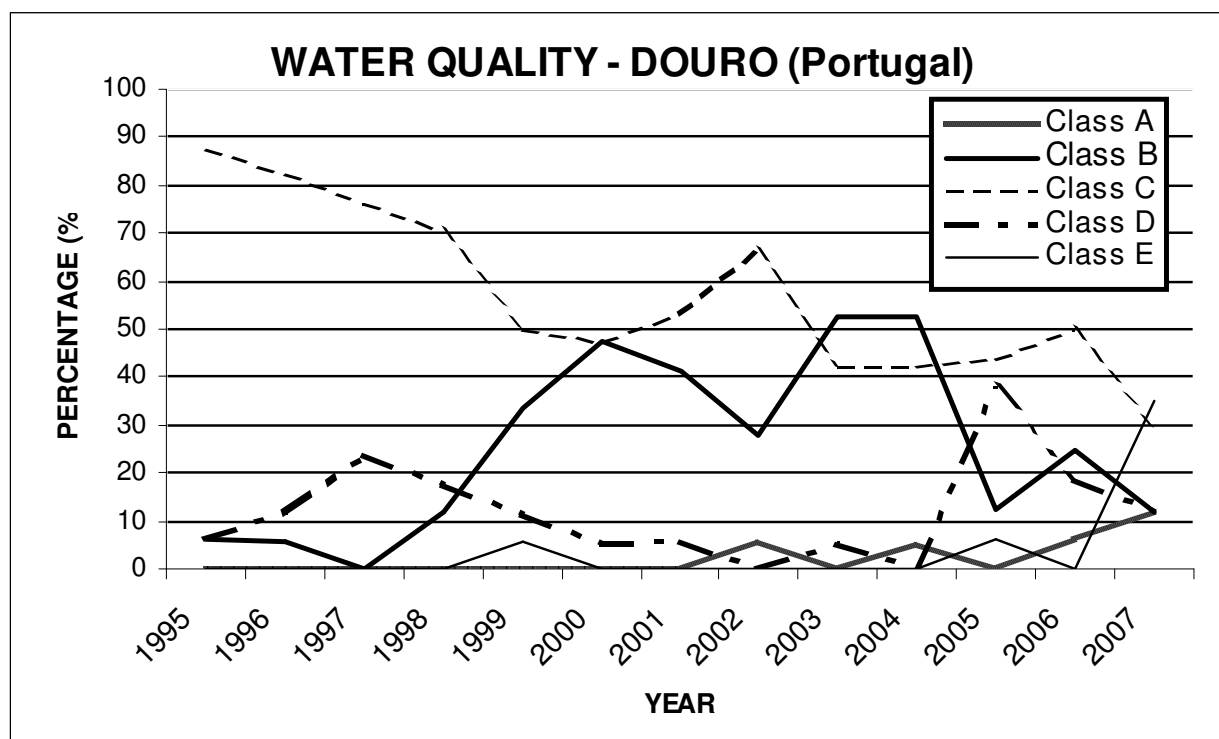


Fig. 2. Water Quality Trend in the Portuguese Section of the Douro Catchment

to classify the sector of water supply and sanitation as: *national state jurisdiction*: direct state management, delegated management (to public companies entirely owned by the national government) and concessions (to companies owned by the national government in partnership with municipal authorities, or between public and private companies); and *local authorities jurisdiction*: direct management (municipal, municipalised or intermunicipal services), delegated management (sub-municipal [‘freguesia’], municipal or intermunicipal services) and concessions (to companies owned by the national government in partnership with municipal authorities, or between public and private companies). The distribution of water supply and sanitation operators is summarised in Table 1.

After the approval of a new legislation in 1993 (Law 379/1993), there has been a gradual movement towards the consolidation of high services in regional entities, which are supposed to provide gains of scale and rationalise water abstraction at the regional level. A national state-owned company was created in 1993 (Águas de Portugal), which has ever since formalised partnerships with local authorities in order to create regional companies (Águas de Portugal typically owns 51% of the regional company and the local authorities together own 49% of shares).⁶ In the Douro, there are two such companies, the Águas do Douro & Paiva (in the Porto metropolitan area) and the Água de Trás-os-Montes & Alto Douro (in the upper river basin). Nonetheless, at the same time that the treatment of water is being transferred to regional utilities, some municipalities have contradictorily created their own companies to operate independently, such as city of Porto, which in 2006 established the Águas do Porto. Coherent with the current macroeconomic policies and the

⁶ Águas de Portugal also became an international player involved in the privatisation of water services in other countries, such as in Brazil.

contemporary model of water governance, the reorganisation of the water industry has created important opportunities for private business, especially through the operation of municipal or multimunicipal concessionaries (in the form of public-private partnerships), whilst also stimulates private sector involvement in terms of outsourcing and operation and maintenance contracts (Water and Waste Regulatory Institute [IRAR], 2008).

National government jurisdiction				
Type	Entity	Regional (high) or local (low)	Water supply (number of operators)	Basic sanitation (number of operators)
Direct state management	national state	High	0	0
		Low	0	0
Delegated management	public company	High	1	0
		Low	1	0
Concessions	multimunicipal concessionary	High	13	16
		Low	1	0
Local authority jurisdiction				
Type	Entity	Regional (high) or local (low)	Water supply (number of operators)	Basic sanitation (number of operators)
	municipal services	High	62	67
		Low	205	217
Direct state management	municipalised services	High	5	5
		Low	25	24
	intermunicipal services	High	2	0
		Low	0	0
Delegated management	municipal/ intermunicipal public company	High	5	7
		Low	16	18
Concessions	sub-municipal public company	high & low	155	0
		Municipal concessionary	High	8
		Low	22	16

Table 1. Classification of Water Service Providers in Portugal (adapted from IRAR, 2008)

Whereas the new paradigm for water supply and sanitation in Portugal is consistent with policies that emphasise efficiency and rational management, the regulatory agency – the Institute of Water and Waste Regulation, IRAR, which was established in 1997 – still remains with a narrow remit and only deals with the concessionary companies, leaving the great majority of the municipal operators to self-regulate themselves.⁷ In addition, the investment capacity and financial health of water utilities have deteriorated rapidly in the

⁷ In 2008, there was a national debate about extending IRAR's duties to the other types of operators, but it was still difficult to see any firm movement in that direction.

last few years, demonstrated by a growing preoccupation with the level of debts, the ineffectiveness of many capital investments and the difficulty to raise money (IRAR, 2008). According to the national plan for the period 2007 to 2013, it will be necessary to invest € 3.8 bi (€1.6 bi in high services and €2.2 bi in low services) to secure 95% of public water supply coverage and 90% of public sanitation coverage (Ministerial Resolution 2339/2007). Different than in the recent past, European funds are expected to pay for only a fraction of that total amount, which means that the sector needs to find additional sources of investment and, probably, continue to increase the charges paid by the customers. Despite a constant effort to recover the costs and the controversy that it creates, between 1998 and 2005 tariffs increased below the rate of inflation and the charging scheme continued to be characterised by high levels of complexity and unfairness (Monteiro & Roseta-Palma, 2007). Furthermore, if it is undeniable that improvements in water services and environmental conservation require capital investments and incur high maintenance costs, the concentration of efforts around cost-recovery measures tends to diminish the attention to environmental and social dimensions of water services. The ongoing experience of the water industry has significant parallels and connections with the introduction of the WFD in the Douro, as discussed next.

3. The contested search for efficiency and the multiple tensions under WFD

As described above, the introduction of the WFD in Portugal has accelerated a process of institutional change initiated in the previous decades, particularly after the entry of the country into the European Union. Since the approval of the 2005 water legislation that translated Directive into national legislation, open events and regular media coverage have helped to broaden the debate about the new water regulatory regime. Nonetheless, underneath an apparent convergence of public opinion, there lays a stream of continuities and uncertainties not yet adequately considered. In several of our interviews it was mentioned that a major shortcoming is the insufficient opportunities available for the public to contribute during the regulatory transition. Historically, stakeholder engagement in water management and environmental issues has been very low in both Portugal and Spain, as much as between Portugal and Spain (Barreira, 2003). After the introduction of the WFD, the involvement of the public has remained restricted to consultations and formalist activities that offer little transparency and produce limited impact on decision-making (Veiga et al., 2008). In particular, the round of meetings organised in 2007-2008 by the government to discuss the new legislation ended up being something like a 'big imbroglio' because it has been limited to a small number of participants and merely ratified decisions made in advance by the government (interview with a NGO activist, 19 Nov 2008). Among the general members of the public, the criticism about the current water reforms has been related to a loose resistance against utility privatisation and in favour of vaguely defined 'water rights'. The superficial understandings of the conceptual underpinnings of the Directive permeate also the discourse of many environmental activists and academics that do not seem entirely aware of the politicised basis of the WFD regime.

Another significant evidence of continuity between past and present approaches is **the top-down assessment of environmental impacts and future scenarios**. A series of reports have been commissioned to estimate environmental pressures and impacts, as required to inform the implementation of the Directive, but by and large these assessments constitute little

more than a compilation of generic data gathered from fragmented sources of information. The analyses tend to maintain the focus on pure hydrological modelling, paying scant attention to ecological conservation (Moura, 2007) or to traditional forms of water use practiced by local communities (Cristovão, 2006). The initial WFD report concluded that the Douro catchment has, among all the Portuguese rivers, the highest proportion (57.1%) of surface water bodies at risk of not achieving WFD targets (for the purpose of WFD, the river basin was classified according to 613 water bodies); there is an additional percentage of 23.4% of water bodies potentially at risk of not complying with the same objectives (INAG, 2005). The main sources of pressure seem to be pollution from agriculture and untreated sewage discharges, but it is not clear whether that proportion of impacted water bodies is reliable or the picture was exaggerated by the superficial nature of the assessment. The irony is that such assessments may affect negatively the resolution of water management problems: an overwhelmingly bad picture may have the perverse effect of diluting the focus away from the real problems and serve as justification for 'doing nothing' (i.e. under the assumption that the task is not feasible, the WFD regime allows an application for 'derogation' [exemption]).

At any rate, the narrow involvement of the public and the precarious scientific understanding of the socio-natural complexity of the Douro catchment have not prevented the policy-makers from concentrating their attention on the aspects of WFD regulation that more directly correspond to the broader political and macroeconomic goals of the Portuguese government. Above all, a great deal of the ongoing regulatory effort has prioritised the achievement of higher levels of operational and economic efficiency, which represents the most emphasised aspect of the WFD regime in Portugal so far. The prevailing discourse claims that efficiency constitutes a 'win-win' game, insofar as the environmental pressure on aquatic systems can be reduced – in theory – by lowering the level of water demand and effluent discharge, which also represents economic savings to the water user (epitomised by Cunha et al., 2007).⁸ That is illustrated by the ideas advocated by Professor Correia – the Secretary of State for the Environment – for whom the WFD regime is essentially a matter of cost reduction and higher efficiency. Although also mentioned in government documents, other dimensions of the new regulatory context are systematically overlooked. For instance, in Jun 2008, at the opening session of the National Association of Portuguese Municipalities, the minister argued that:

“Water demand in Portugal is estimated at 7,5 billion m³/year, of which agriculture is the main user sector, making use of 87% of the total, whilst urban supply demands 8% and the industrial sector, 5%. However, not all the water abstracted is effectively utilised, given that an important proportion is associated to inefficient use and losses. (...) There are various reasons to take the efficient use of water as a strategic goal. First of all, there is a growing consciousness in society that water resources are limited and, thus, it is necessary to protect and conserve (...). [Another reason] is the economic interest at the national level, inasmuch as potential savings related to water correspond to significant figures, estimated at around 0.64% of national GDP (...) The efficient use of water is still important in

⁸ This argument obviously ignores that increases in efficiency can be easily minimised by additional water demand that, in the end, magnify the level of environmental impact.

regarding the rationalisation of investments, to the extent that it allows a better use of existing infra-structures, reducing or even avoiding the need to increase water abstraction systems (...). The efficient use of water corresponds to the economic interest of the citizens, to the extent that makes possible a reduction in the costs of water use.”

The connection between efficiency, private gains and water management should come as no surprise, given that the minister has been himself one of the champions of the water reforms under the new paradigm of efficiency and economic rationality (cf. Correia, 2000). That is coherent with the tenets of environmental economics that underline the implementation of WFD, in particular the requirement to calculate the economic value of environmental impacts and the cost of mitigation measures. In practice, it has been translated into numerous applications of contingent valuation methodologies around Europe (e.g. Del Saz-Salazar et al., 2009) that unnecessarily reduce the complexity of sociocultural water systems to the ‘common ground’ of money value. Although the chief water regulator in the Douro has expressed a more careful handling of the economic element of the new Directive (Brito et al., 2008), national policies constantly reinforce the idea that the main responsibility for improving water management lies in the hands of individual water users who should make their decisions in the light of a utilitarian economic thinking. The colonisation of the public debate by business expressions and the (material and symbolic) commodification of water is not an innocent occurrence, but reinforces the association of the WFD regime with government efforts in other policy areas (e.g. reduction of state enterprise and establishment of public-private partnerships). The emphasis on treating water as a commodity is illustrated in Figure 3 (poster of an event held at the time of our fieldwork).

Another step in the direction of exacerbating the economic dimension of WFD is the persistent claim that water is increasingly scarce and, as a result, should attract a monetary charge equivalent to its level of shortage. The corollary is that the scarcity of water can only be universally discerned by the stakeholders if the resource is quantified in monetary terms (i.e. the economic value). In other words, the access to water should be priced and charged, regardless of the existence of cultural and social expressions of value. The introduction of bulk water charges (Article 9 of the Directive) is the regulatory instrument that more concretely translates this ideological equivalence between water value and money value.⁹ Water charges have represented the main controversy related to the WFD in Portugal, particularly in the period between 2005 and 2008. After three years of debate, it was eventually decided that the charges should be calculated taking into account also the volume of effluent discharge, extraction of inert material, land use area, public water projects and the level of regional water scarcity. It is unfortunate that the regular clashes between stakeholders and public authorities ended up giving the impression to the general public that the regulatory regime under WFD is ultimately about monetary costs and tariffs, rather than about environmental conservation (cf. our interviews with local stakeholders).

⁹ In addition, the imposition of bulk water charges helps to enforce the new regulation: the income of the charges will serve to pay for at least 2/3 of the regional water administrations (ARH) and will feed into a national fund, which will serve to pay for environmental restoration measures. Note that several stakeholders complained during our interviews that the environmental benefits that may arise from the revenues from the charges are doubtful and uncertain.

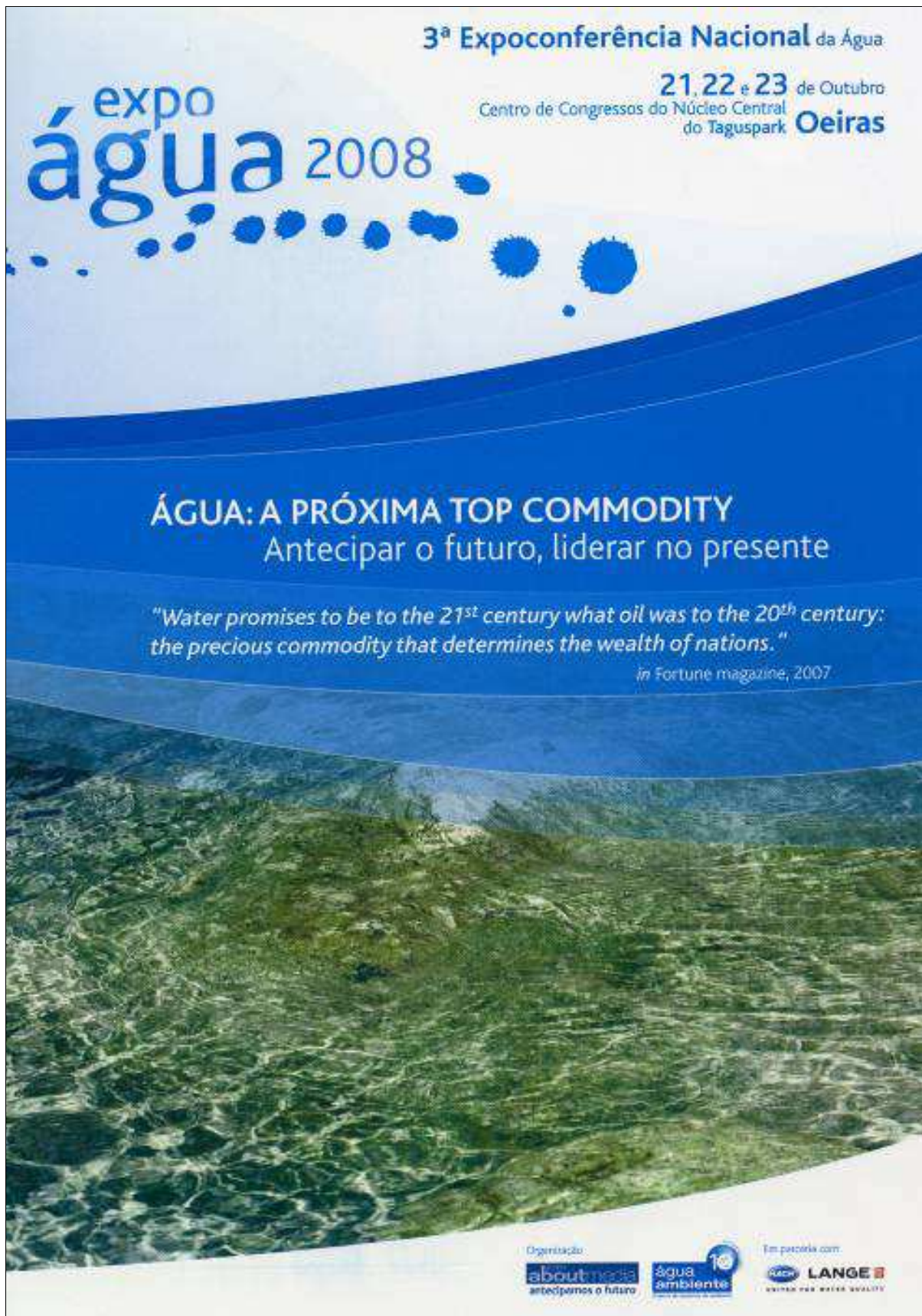


Fig. 3. A Congress Flyer Where Water was Directly Depicted as a Commodity

Agriculture is probably the water user sector that best encapsulates the anxieties in relation to the new water charges and the WFD in general. Farmers are now expected to pay the second higher charges (€ 0.003/m³ plus the other charging factors), but their resistance to the new user charges are not simply proportional to the financial burden. On the contrary, other political and cultural factors also interfere in the disputes, although not normally recognised.

According to the last river basin plan (INAG, 2001), there are 200,000 hectares of irrigation in the Douro catchment, the great majority being small, intensive farming units located between Porto and Vila Real. These farmers have been described in official documents as responsible for the highest rate of water demand and the lowest rates of user efficiency, which imply that investments are needed for the development of backstage technical capabilities and adequate planning procedures (INAG, 2001). That is reaffirmed in the first WFD report (INAG, 2005), which estimates that the tariffs paid by agriculture prior to the new Directive (i.e. which was adopted in some public agriculture projects in the Douro) only used to recover 9% of the total costs of water supply (note that equivalent urban tariffs used to cover 82% of the same costs). It means that the difference was paid in the form of government subsidies to the farming sector and that is now increasingly seen as unpopular and unacceptable by water regulators. In addition to lowering the subsidies, the water Directive introduced the universal payment for bulk water charges as a mechanism to 'steer the behaviour' of the water users (as declared by government representatives in a seminar organised by the Portuguese Farmers Confederation on 08 Jul 2008). It should come as no surprise, then, that the majority of farmers believe that the new environmental regulation is an extra-burden to a sector that is already under serious pressure due to declining governmental support (under the Common Agriculture Policy [CAP]) and the transfer of European funds to the Eastern side of the continent.¹⁰ In our interviews, both enterprise and small farmers were unanimous in criticising the charges and blaming the northern European countries, where irrigation is less critical, for imposing the new water regulation. Four months after the introduction of charges (on 01 Jul 2008), members of the agribusiness argued that water has a huge 'value' for the farmers, but it should not have a monetary 'price'. In an interview on 21 Nov 2008, it was declared that:

"I consider a distortion of competition the application of a new fee on water used by agriculture in the Mediterranean countries. Why? Well, if you live in Scotland, or in Brussels, you have much higher and more often precipitation, whilst in Portugal it rains less and for shorter periods of time. A farmer in Portugal has to invest in water storage and pipelines, pay for the irrigation equipment, energy and in ten years has to replace the equipment. The costs are very high and already restrain water use. In this context, comes the European Union and says 'we all need to pay for water in order to improve efficiency and environmental quality. (...) The farmers don't need to pay for water to use it more efficiently... You know, the farmer already has a deep relation with the water cycle. Now, the main risk is that this charge becomes [merely] a new tax that will not contribute to improve the

¹⁰ Farmers also criticise the delays and mismanagements in other areas of government intervention, such as the protest expressed by the Fruit Association of Armamar about the fact that the Temilobos dam (in the middle section of the Douro), which was planned to provide water for 1,200 hectares of irrigated apple groves, was still not operational in the end of 2008, two years after its completion.

environment. (...) I strongly believe that in situations of water scarcity the user should pay less, not more for water”.

It is evident that such argument subverts the logic of environmental economics, which postulates that scarce resources should attract higher user charges. Farmers in the area also mentioned that there is limited room for improving efficiency (at least at low costs), since they are the first to want to save water and reduced operational costs with electricity and irrigation equipment (which they claim to have done already). That indicates how the economic value of water, instead of a straightforward figure, is in effect a highly contested and contestable concept. By their turn, representatives from the small farmers community complained that the charges were adopted in Portugal before the definition of environmental management targets, which ultimately serves to demonstrate that the new water policies are centred on the ‘commercialisation’ of water and not on the protection of nature. The following passage summarises the feeling among the small, family agriculture:

“[M]any times the farmers and the agriculture sector are seen as reckless users of water. These discussions fail to consider the reality of the Portuguese agriculture, as well as ignore the deep, even passionate, relationship of the farmer with water (...) [T]his law liberates the state from the responsibility to look after the conservation of water, given that it leaves it open to the market. About the social relevance of water, little or nothing is said. (...) [the consequences of the new charges] are inevitably the increase in production costs and, as a result, the elimination of those that don’t have financial means to pay for it” ([National Agriculture Confederation [CNA], 2006).

In addition, sector representatives protested that the bulk water charges in Portugal are three times higher than equivalent figures in France and that it was adopted by the Portuguese government two years earlier than in Spain (i.e. 2008 in Portugal and 2010 in Spain). Nonetheless, in the Spanish side of the Douro the controversy about volumetric charges to agriculture has also dominated the public discussion about the impacts of the new water regulation. The sector is responsible for 93% of the water demand in Spain because of 563,105 hectares under irrigation, specially concentrated along the main river channel and in some of the larger tributaries (Gómez-Limón et al., 2008). The use of water in the river basin is claimed to be one of the least efficient in Spain, which has again become a strong justification for modernization and search for efficiency (Domingues et al., 2004; Gómez-Limón & Gómez-Ramos, 2007). As in Portugal, economic modelling based on multi-criteria objectives suggests that water pricing could exert significant influence on the behaviour of farmers in terms of water use due to shifts to better equipment, less water demanding and rainfed crops (Gómez-Limón & Martínez, 2006), but because of the declining profitability of agriculture only low or very low volumetric charges can be arguably borne by farmers. It seems also that the impact of bulk charges would be mainly on incoming irrigators, because those already established will have major difficulties to adjust their practices and would probably abandon or reduce their activity, with consequent loss of jobs in the region (Gómez-Limón et al., 2008). On the top of that, because of the climatic conditions of Castilla y León, productivity is relatively low and, according to agronomic research in the University of Valladolid changes in irrigation equipment are unlikely to significantly improve economic and technical efficiency (personal communication from university researchers). Nonetheless, the official position of the CDH, the water

regulator, remains firmly in favour of replacing surface irrigation with spray irrigation equipment in order to save water. Contradictorily, there are also plans to build new water storage dams in the headwaters of several Douro tributaries to increase the irrigation area. Both the new dams and the volumetric charges have received some level of opposition from the 400 associations of irrigators in the Spanish Douro. In the case of the community of Bajo Carrión (visited during our research in the Douro), the directors had recently resigned and new elections were called exactly because of disagreement about the modernization targets required by the regulator (i.e. the majority of the members voted against the acceptance of efficiency-centred regulatory demands).

The underlying problem with policies that try to induce higher efficiency through charges and the sudden incorporation of external costs is that it ignores existing social and spatial inequalities, which can be aggravated if not properly considered, as mentioned by Tsakalotos (2004: 29), "...while the expansion of the market, and market-type arrangements, are often defended on the grounds of efficiency, they are also often implemented in a manner that goes well beyond the discourse of efficiency. (...) Such a strategy makes alternative conceptions much more difficult to conceptualize, let alone carry out". If the introduction of bulk water charges has represented a major controversy among small and large farmers, an analogous situation happened among companies responsible for public water supply and sanitation. Despite the fact that a full privatisation (i.e. divestiture) seems out of the political agenda – in large measure, because of fierce public opposition – the association between water and money remains present in the collective imaginary of the population (illustrated in a Portuguese newspaper cartoon in Figure 4). It has been widely stated in official documents, reports and guidance that public water services in Portugal were and continue to be thwarted by inefficiency and that the introduction of WFD should be associated with cost-recovery measures and higher water user charges.¹¹ In particular, local water providers ('low' companies) are blamed for their backward thinking as a "hindrance to the development of water supply sector" (that is exactly the expression used in the cover page of the main magazine of water services in Portugal, *Água & Ambiente*, June 2005). Rather than being politically neutral, those claims for cost recovery have provoked tensions and uneasiness between the various water utilities that operate in the same geographical area (i.e. the 'high' and 'low' companies; see details above). For example, in 2008 the municipal company formed to serve the city of Porto (*Águas do Porto*) was able to reduce the purchase of water from the *Águas do Douro & Paiva* in 80,000 m³/day (out of a total of 280,000 m³ distributed daily), according to its chief-manger (interview on 14 Nov 2008). That corresponds to a net saving of € 216,000/month in terms of payment made to the regional company or around 12% of her income (in 2008). As a result, *Águas do Douro & Paiva* tried unsuccessfully to raise their tariffs by 8% in 2008, but the government allowed an increase of 5.5% (note that the rate of inflation in the year 2008 was 2.7% in Portugal).

If a large company such as *Águas do Porto* was able to confront the regional water authority, other municipal entities are left in a much weaker position to negotiate costs and conditions with the regional water utilities. In our interviews with managers, engineers and politicians responsible for the water services in the cities and towns in the upper Douro, we

¹¹ Nonetheless, as in the case of the low elasticity price-demand of agriculture mentioned above, the increase of user charges in the last few years has had limited influence on the level of water demand (Monteiro & Roseta-Palma, 2007).

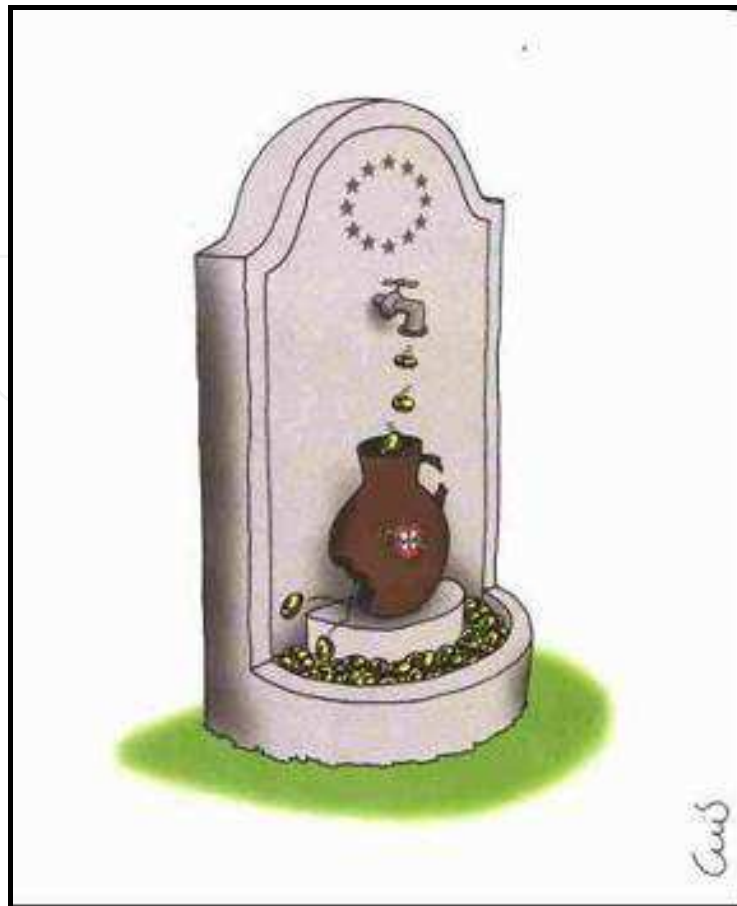


Fig. 4. The Transformation of Water into Money in Portugal and under the Influence of the European Union (by Luís Afonso, "O Público", 22 Feb 2004)

detected a considerable level of resentment about the pressures exerted by the central government in favour of the regionalisation of the service. Some municipalities that passed to buy water from the regional companies are even contemplating a return to local water abstraction and treatment. It was constantly mentioned that the purchase of water from the regional company normally costs more than twice the local costs with abstraction and treatment. Part of this difference can be explained by the investments made by the larger company to comply with drinking water legislation, something that many local authorities fail to observe. Moreover, there is also a clear resentment with the fact that heavy public investments were made by the national government in the Porto metropolitan area in the past, but today's investments are expected to be borne by the local water companies via customer charges (i.e. the cost-recovery policy). More than the regional companies, local water operator face major political barriers to transfer higher charges to the population and that has led to growing protest and some cases of physical violence (as in the invasion of the Peso da Régua Council in 2002). It is therefore not unexpected that a similar criticism took place after the announcement of the WFD bulk water charges in 2008 (vis-à-vis newspaper articles published in the period). As in the agriculture sector, public reaction lacks proportionality with the additional financial burden (i.e. the impact of the WFD charges on each household is relatively low, estimate at around € 0.20 per month, which corresponds to 2.5-3.0% of the average tariff). Interestingly, the cost of the tariff is likely to be relatively low for the majority of urban water users, as much as it is for the farmers,

which suggests that the opposition expressed is not really about the financial levy *per se* but rather a deep antipathy toward the interference in long-established water use practices. It suggests that public opposition is not just about the charge, but it reacts against a vague sense of lost ownership and the disruption of established forms of relation between society and nature.

While the general population reacts – in spontaneous or organised ways – against additional charges in agriculture and urban water supply, other more coordinated protests intensify against the construction of large dams in the Douro (something that the WFD regime has been so far unable to prevent, because of political pressures). The new dams are part of the attempt to secure 60% of electricity from renewable sources by 2020, which has been strongly confirmed by the Prime Minister, as in a public event when he stated that “Portugal is the European country with more hydropower reserves to be exploited” (RTP News, 20 Nov 2008). As mentioned above, the Douro is the main powerhouse of Portugal and is again where six (out of ten) new large hydropower schemes will be built, according to the National Programme of Dams with High Hydroelectric Potential (INAG, 2007). If in the past the dams were erected across the main channel, the focus of the construction of hydropower dams is in the tributaries, such as in the Rivers Tua and Tâmega. The Citizenship Movement for the Development of the Tâmega has challenged the activities of the energy companies responsible for the new dams (the Portuguese EDP and the Spanish Iberdrola). It is still vividly present in the memory of the local residents the controversy about a dam planned in the River Côa in the 1990s and firmly resisted because of the impact on archaeological sites with rupestrian paintings. In the Tâmega, the campaign against the Fridão dam and to protect the town of Amarante started in 1995. Probably the largest mobilisation today is against a dam in the River Sabor, a large structure (123 metres high) that will flood 2,820 hectares and also impacts on archaeological sites (see Figure 5 regarding a protest event in Apr 2008). Despite the likely impact on important conservation reserves, the government gave the go-ahead for the project, which was then appealed to the European Commission. The anti-dam activists lost the appeal in 2007, but were planning to resort to the European Court of Justice on grounds of what they see as ‘serious mistakes’ of the environmental impact assessment (interview with NGO activist, 19 Nov 2008).

Apart from environmental impacts, another source of criticism about dams in the Douro is the general feeling that the hydropower schemes build in the last decades have contributed little to improve the live of the communities of the Upper Douro. After the construction, the operation of the dams only generates a small number of jobs in the region and brings only marginal contribution to local communities (cf. our interviews with residents and city councillors). The fact that electricity is generated in the same area of the dams and then transferred to other parts of the country, reinforces a sense of dual citizenship between the coast and the inland. For long time now, the rural areas of the Upper Douro have been suffering from depopulation, loss of small-scale agriculture, abandonment of cultivable land, and lack of viable economic perspectives (see CCDR-N, 2007). The economic decline of the rural areas has been taking place for decades and recent development initiatives focused on diversification and market integration (most with European Union support) have not reversed that trend. On the contrary, it has resulted in a higher level of dependency, uncertainty and lower self-sufficiency (Moreno, 2003). The economic and cultural transformations taking place in the Douro have largely operated under the influence of foreign investments (Roca & Oliveira-Roca, 2007), but such policies have had little



Fig. 5. Leaflet of the Mobilisation Against the Sabor Dam [i.e. the leaflet says 'In favour of the Sabor River' and invites the population for a protest in April 2008]

effectiveness in promoting the changes require by small and medium-size enterprises (Bateira & Ferreira, 2002). That context of perceived remoteness and misfortune is reflected in socio-economic and interpersonal relations, which includes **a disregard for traditional forms of collective water management**. We had the opportunity to visit a number of sites that where until the recent past (around 30 years ago) used to practice a community form of irrigation. These are areas of family agriculture where, in the past, each day of the week a different farmer used to divert water to his/her piece of land, with full transparency and accountability among the community regarding the amount of water used. That is the case in the rural communities of Vila Real, where the irrigation infrastructure had to be carved in

a hilly landscape, which also involved family and community work. Because of changes in agriculture production and concentration of landed property, such forms of water use are disappearing fast. That is an example of how changes in water management practices intensely encapsulate local and international dynamics, but unfortunately there has been almost no space to consider those issues that fall out of the mainstream ethos of the WFD regime.

4. Discussion: Spatial rigidity and monotonic categorisation

The implementation of the Water Framework Directive represents a decisive moment in the institutional history of water management in Europe, Portugal and the Douro. The WFD regime, including methodological improvements and more stringent targets, constitutes what can be called a 'metarregulation' with wide range impacts and lasting consequences. The higher level of concern for environmental impacts and the wasteful patterns of water use can be identified as positive steps in the direction of resolving lifelong problems. At face value, the detailed timetable of the new Directive seems to offer a robust mechanism for the assessment of ecological trends and the formulation of cost-effective solutions. However, the implementation of the Directive has served to consolidate an interpretation of problems that favours specific political and macroeconomic interests. The prevailing approaches systematically conceal that water reforms are an integral part of broader social transformations in the mechanisms of production and consumption of tradable goods and in the interpersonal relations. Likewise, mainstream procedures tend to ignore that the WFD regulation brings water management further into the sphere of money circulation and power political forces, which happens in important and contingent forms. Under a hegemonic approach informed by such technical and economic translation of problems, an array other important aspects of water management have received almost no attention, such as inter-catchment integration, the delegation of decision power and the balance of power behind the technological fix. WFD creates new opportunities to raise management issues (such as the increasing degradation of surface and ground water bodies) but there remains a tension between continuity and innovation that essentially reflect political clashes. The new Directive is implemented by invoking an apparent consensus about water issues, but under surface remains a series of intricate complexity of intersector and geographical inconsistencies. Making use of a universalising symbolism of 'common' challenges and 'shared' responsibilities, the implementation of the WFD never avoided being itself a locus of disputes and power affirmation.

It can be accepted that the WFD conveys improvements in many areas, such as a holistic approach to catchment issues, the consideration of cumulative impacts and the cyclical (adaptive) response to environmental degradation pressures. Even so, serious controversies persist in relation to the priorities of state action, which operates in favour of certain interests at the expense of broader, and more legitimate, social expectations. It should be remembered that the state includes a range of government bodies, regulatory agencies, parliaments and courts, a large entity that extends from the local to the global with fluid boundaries and exposed to the disputes between groups, classes and geographical areas (Jessop, 2008). The complexity of the state apparatus is even greater in the contemporary world, where a multiplicity of goals and liabilities frequently create significant confusion

among members of the general public. It is not clear to everybody that statehood is being qualitatively reformulated according to a wild interplay between homogenisation and particularisation, which unfolds towards higher levels of business competition, market liberalisation and economic growth (Brenner, 2004). The hegemonic reorganisation of the state according to neoliberal demands constitutes a multifaceted, non-linear and multiscalar process that tends to engulf all areas of social action and, crucially, to reshape socionatural relations according to the political and economic priorities of global markets (see Finlayson et al., 2005). The difficult challenges involved in that progression towards an Europe of interconnected localisms and pervasive market rationality is yet more acute in its semi-peripheral countries, such as Portugal and Spain, which are expected to breach the development gap with northern regions whilst also cope with democracy deficits and growing environmental threats.

Our current assessment of the WFD experience builds upon a previous analysis that identified the overly ambitious goals of the Directive and the (often neglected) need to carefully consider the historico-geographical features of the Douro. The internal contradictions of the new regulatory landscape was then defined as a 'techno-bureaucratic shortcut', which means a tendency to produce superficial adjustments in practices and procedures whilst the overall trend of (bureaucratised and exclusionary) management remains largely unchanged (Ioris, 2008). Based on the points discussed above, it is now possible to further argue here that the 'techno-bureaucratic shortcut' has effectively two main ontological foundations, namely a spatial rigidity and the monotonic categorisation of water management issues. The first source of constraint - spatial rigidity - is related to the static understanding of how ecological and socionatural processes interact and evolve. The Directive has been territorialized (to the catchment scale) by ignoring the constant and perpetual remaking of the catchment's spatial configuration (i.e. the social and socionatural relations that produce space). The new regulation has progressed inflexibly across rigid geographical axes - above all, the nested spheres of governance of the European Union - with limited opportunity for deviating from a priori established management directions. Under the assumption that all Europe requires the same form of water management and regulation, the national state is powerfully inserted in a dialectics of inertia and modernisation that is predetermined by the transnational centres of political power. In that context, the regulatory principles of water management emanate concentrically from the top (the EU apparatus controlled by the stronger groups of interest) to the member states and from that to catchments and locations. The result of this rigid management of water is a pressure for the homogenisation of water management and regulation, which happens, first and foremost, through a narrow set of scientific methodologies typically developed in the northern European countries and reproduced with almost no modifications in Portugal (e.g. Bordalo et al., 2006).

Second, the interpretation of management problems and the formulation of possible solutions have followed the monotonic categories of the new European regulation, in particular the myriad of environmental economics tools that colonise the nucleus of WFD regulation, such as water charges, water markets, and the payment for ecosystem services. Under this quest for technical and operational efficiency local knowledge and the indigenous understanding of the hydrological system are being rapidly lost. The

introduction of new semiotic basis for water management leads to the translation of local water issues into a technical vocabulary that is only shared by a small number of stakeholders (i.e. regulators, professional activities, engineers, and consultants). Because of this monotonic understanding of water problems, the direction of water management is decided upfront, with limited scope for innovation and creativity at the local level. It is true that the erosion of autochthonous wisdom did not start in the period of WFD implementation, on the contrary, it has been the outcome of larger processes of social and economic change, in particular the abandonment of traditional agriculture practices and depopulation. Nonetheless, the new Directive accelerates that process, given that the national states enjoy limited flexibility to decide about technical thresholds and regulatory instruments. Due to the spatial rigidity and monotonic assessments, there is a tendency to bypass the more time consuming steps of the new regulation (in particular, public participation and information sharing) and, unsurprisingly, opt for the aforementioned 'bureaucratic shortcut'. Overall, the shortcut tendency is itself an outcome of the very structure of the new regulation, which allows limited room for the detailed understanding of local circumstances and the genuine engagement of stakeholders.

5. Conclusions

This brief examination of the local experience of water institutional reforms in the Douro demonstrates the persistent mismatch between regulatory objectives and the actual procedures and relations taking place in different parts of the river basin. The process of water regulatory reforms started in the 1990s, following macroeconomic and politico-institutional changes, and was translated into new legislation and increasing calls for an integrated management of catchments. However, it was really the opportunity created by WFD that provided the opportunity to introduce an new, more holistic regulatory rationality. Yet, underneath the new institutions, which include the introduction of water charges, public consultations, preparation of plans and scientific assessments, there is a constant reaffirmation of a centralised and selective basis of dealing with water management questions. Those problems have seriously limited the prospects of the new water institutional framework. Behind the hectic agenda of activities related to the introduction of WFD, it is possible to discover the persistence of old established practices that had marked the history of water management of the European Union in previous decades. Attempts to improve water management in the catchment under the WFD regime have often revived long-established cleavages and the inconsistencies of public policies related to the allocation, use and conservation of shared resources, which have typically privileged certain groups of stakeholders and geographical areas.

It was shown how a rationalistic approach to water problems has prevailed and pervaded most of the recent reforms. The narrow focus on engineering constructions has been replaced by more subtle attempts to manage water through economic incentives and impact mitigation, but without ever addressing the underpinning contradictions of water use and economic development. Although there is a shift from single processes to water regulation, there remains a clear line of continuity between the past and the present of water use and conservation in the Douro. If WFD helps to draw attention to water problems and mobilises private and public resources, at the same time it unravels silent

conflicts, creates competition and not necessarily facilitates the participation of the weaker social groups. This paradox is not resolved within the water regulatory framework only, but requires broader political basis for dealing with shared problems. If in the past, public investments were in water infrastructure, the current top-down approaches to water management basically reproduce this engineering-based model of development and management, without questioning the causes of environmental degradation and the main beneficiaries. Under WFD, water is emerging (or re-emerging) as a locus of political disputes involving a myriad of stakeholder groups and spatial relations. The Douro is an emblematic example of how water management should be understood as not only a technical and economic matter, but also directly related to political questions of social exclusion. What is still lacking is a genuinely innovative way of dealing with water problems, one that resolves the uneven balance of power between spatial areas and social groups, as well as incorporates traditional wisdom and the contribution of local people in the development of innovative solutions to old and new water management challenges. Unless social differences and the reproduction of social inequalities are addressed, water management problems will remain unchanged.

The ultimate result is that, notwithstanding legal and discursive improvements, the long-term causes of water problems – namely, political pressures for maximising the economic outcomes and minimising the investments in social equity and environmental conservation – have been left out of the process of regulatory change. The limited availability of long-term monitoring data and detailed technical studies have contributed to reinforce the two fundamental hindrances of the regulatory regime under WFD (namely, spatial rigidity and monotonic categorisation of problems), leading to an evasion of references about the political origins and the socioeconomic consequences of environmental impacts. In the end, WFD remains a contested experience of environmental regulation that oscillates between attempts to commodify nature (e.g. bulk water charges, valuation of ecosystem services, calculation of disproportionate costs) and the affirmation of techno-bureaucratic mechanisms of law enforcement (i.e. that neglect the demands and needs of large proportion of water stakeholders). The asymmetry of political power also operates in the interstices of the regulation, given that the water reforms promoted through WFD have served to implement a particular worldview and serve specific interests under a universalising discourse and a naturalisation of hegemonic agendas. On the other hand, the imposition of techno-bureaucratic approaches to water management has prompted the emergence of various forms of opposition, either at the local level or in coordination with other national and international forms of contestation (as the criticism of water privatisation and the campaigns against the new dams in the Upper Douro). The success of the next stages of the implementation of WFD will depend on the ability to perceive the broader socio-natural complexity of water management, the pursuit of effective forms of social inclusion and a more equal balance of negotiation power.

6. Acknowledgements

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There is an estimated 1.4 billion km³ of water in the world but only approximately three percent (39 million km³) of it is available as fresh water. Moreover, most of this fresh water is found as ice in the arctic regions, deep groundwater or atmospheric water. Since water is the source of life and essential for all life on the planet, the use of this resource is a highly important issue. "Water management" is the general term used to describe all the activities that manage the optimum use of the world's water resources. However, only a few percent of the fresh water available can be subjected to water management. It is still an enormous amount, but what's unique about water is that unlike other resources, it is irreplaceable. This book provides a general overview of various topics within water management from all over the world. The topics range from politics, current models for water resource management of rivers and reservoirs to issues related to agriculture. Water quality problems, the development of water demand and water pricing are also addressed. The collection of contributions from outstanding scientists and experts provides detailed information about different topics and gives a general overview of the current issues in water management. The book covers a wide range of current issues, reflecting on current problems and demonstrating the complexity of water management.

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Unit 405, Office Block, Hotel Equatorial Shanghai
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中国上海市延安西路65号上海国际贵都大饭店办公楼405单元
Phone: +86-21-62489820
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