The use of policy appraisal in water policy making

Comparing WFD implementation in England and France

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Abstract

Of all natural resources, water is particularly under pressure due to its intensive use. Therefore, it is vital to better understand the decision-making processes that could reverse trends in environmental deterioration. Policy appraisal tools can help decision makers develop sustainable public policies, as they support evidence-based policy choices. In practice, however, they are rarely used as a basis for decisions. In this context, this PhD has aimed to answer the following research question: *How can we explain the different uses of policy appraisal - in particular of economic analysis – beyond evidence-based policy making in water decision making?* To this end, I studied the case of the EU Water Framework Directive (WFD) (2000/60/EC) and the use of cost-benefit analysis in its application in the United Kingdom and France, as recent examples in which economic-based policy appraisal plays, in principle, a key role.

I showed that appraisal tools could reflect political objectives and environmental policy ambitions in two ways. Firstly in the choice of the appraisal tool itself, which follows a specific logic. Secondly, the operationalisation of the tool selected may be influenced by political goals. As a consequence, the use of policy appraisal for evidence-based decision making can partly be explained by the discrepancy between the output of the appraisal and the political objectives pursued. More generally, I found that the politics stream – i.e. the political context - determines the presence and importance of appraisal tools in the policy process and explains further uses, in particular in problem definition and policy formulation.

I also provided an empirical contribution to the knowledge on WFD implementation in member states. I explained the process of setting objectives and exemptions in two member states, and the role that economic analysis played in the decision-making process. I showed that ambitions related to the implementation of the WFD, and the political context more generally, shaped the decisions on the analytical tools used and that choices made in the operationalisation of these tools partly influenced the protection standards of individual water bodies. These results imply that debates on the use of policy appraisal in WFD implementation should go beyond experts' circles and be considered in the political sphere.

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Abbreviations

ACF	Advocacy Coalition Framework
CBA	Cost-benefit Analysis
CIRCABC	Communication and Information Resource Centre for Administrations, Businesses and Citizens
CIS	Common Implementation Strategy
CO_2	Carbon Dioxide
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EP	European Parliament
EU	European Union
FR	France
GDP	Gross Domestic Product
IA	Impact Assessment
IWRM	Integrated Water Resources Management
MSA	Multiple Streams Approach
N	Nitrogen
NWEBS	National Water Environment Benefits Survey
OECD	Organisation for Economic Co-operation and Development
RBD	River Basin District
RBMP	River Basin Management Plan
PoM	Programme of Measures
UK	United Kingdom
WFD	Water Framework Directive

Chapter 1: Introduction

The seriousness of the environmental challenges we face no longer needs demonstrating. The State of the World report (The Worldwatch Institute 2015) assesses the environmental damages caused by human pressures, including dramatic species loss, increased air and water pollution, exhaustion of fisheries, considerable wetland losses, and deforestation. All parts of the environment – water, oceans, biodiversity, land and atmosphere – continue to deteriorate (United Nations Environment Programme 2011). Humans have already crossed at least three planetary boundaries, i.e. ecological thresholds: they have increased the concentration of CO_2 in the atmosphere (climate change), the quantities of nitrogen in the environment (disruption of the N cycle), and fostered the extinction of species (biodiversity loss) beyond sustainable levels (Rockström et al. 2009). This may cause sudden and large-scale changes to environmental systems, with potentially catastrophic consequences for humanity (Rockström et al. 2009). The environmental footprint – i.e. the measure of human pressure on ecosystems – shows that anthropogenic activities are not sustainable at the global scale and continues to grow. In particular, the blue water footprint, which assesses the quantity of freshwater used, has increased 5.6 times over the course of the 20th century (Hoekstra & Mekonnen 2011; Hoekstra & Wiedmann 2014).

In this context, public policies that address these environmental challenges are vital. Nevertheless, environmental policies often fail here: they lack ambition, efficiency or are poorly implemented (Jordan 1999; Blühdorn 2000; Newig 2007). Public policies are the result of political decision-making processes. Therefore, if we want to make sense of these failures, we need to better understand the decision-making processes that could reverse trends in environmental deterioration. In fact, "studying a decision means to study the decisional processes, the mechanisms through which we 'decide to decide' and analyse or exclude possible alternatives before reaching the final result" (Dente 2014, p.5). Understanding decision-making processes is therefore a pre-condition for providing advice to policy makers on how to best take decisions, have policy impact and thus take actions that adequately address current environmental issues.

Rationality, defined as the "ability to apply logic and reason" (Cairney 2011, p.136), is often presented as key to optimal decision making. Rationality is usually praised and assimilated to intelligence. Consequently, numerous scholars and organisations have worked on helping decision makers enhance the rationality of their decisions (Brunsson 2007). According to the rational choice theory, individuals seek to maximise the satisfaction of their preferences (in other words their utility) in the most effective and efficient way (Holland 2002; Brunsson 2007). To this end, they compare all possible options and their consequences. They assess the value of each alternative, taking into account their preferences, and usually compute them in terms of costs and benefits. Individuals then select the alternative that promises the highest utility (Holland 2002; Turpin & Marais 2004; Brunsson 2007; Griggs 2007; Cairney 2011). Although the rational choice theory was originally restricted to individual agents, authors have later used it to study collective actors as well, most prominently public- and private-sector organisations (Brunsson 2007).

Policy making is decision making "undertaken on behalf of society by some authority" (Adger et al. 2003, p.1095). Policy decisions are "processes of choice between alternative ways to solve a collective problem" (Dente 2014, p.8). In order to reach optimal decisions for society, applying rationality would then suggest that policy makers should use the same decision steps as rational agents. However, they should not seek to maximise their own utility, but the aggregated utility of society (Andrews 2007; Cairney 2011). An essential part of such a rational process is the reliance on evidence-based decision making when policy makers choose between policy options. This is when policy appraisal tools come into play (Turnpenny et al. 2015b).

Policy appraisal is defined as "a test or judgment of some policy, with the aim to inform the decision makers on the suitability, desirability, effectiveness or efficiency of it" (de Ridder 2006 p.21). In other words, policy appraisal seeks to provide information to policy makers on the pros and cons, and sometimes even a ranking, of various policy options (Howlett et al. 2015b; Turnpenny et al. 2015a). This way policy appraisal supports evidence-based policy making, a function with which appraisal tools are associated, in particular in Europe. We will later see that appraisal tools have taken a different role in the US, where the focus usually lies on ensuring control and accountability. Evidence-based policy making seeks to promote effective and efficient

policies that integrate various sources of academic and non-academic knowledge (Organisation for Economic Co-Operation and Development 2008; Rissi & Sager 2012; Adelle & Weiland 2015). Therefore, policy appraisal reflects the underlying assumptions of rational choice theory, but again - provided that analysts and decision makers seek to maximise utility for society.

Economic analysis is the backbone of policy appraisal (Dunlop & Radaelli 2016). Cost-benefit analysis (CBA) in particular – a specific appraisal tool - is rooted in neoclassical welfare economics (Pearce et al. 2006), which seeks to maximise welfare for society (Mathis & Steffen 2015). Welfare is a measure of social conditions (Mathis & Steffen 2015). It is considered as equivalent to preferences: when individuals prefer an option among several alternatives, welfare economics assumes that the welfare of those individuals would increase with this option (Hausman 2012). CBA provide rules to aggregate preferences and determine whether a policy increases overall welfare for society, i.e. whether benefits (increases in welfare) outweigh costs (decreases in welfare) (Pearce et al. 2006). Welfare economics is grounded in rational choice theory. CBA is widely used in environmental policy and guides policy makers towards utility-maximising alternatives and efficiency (Hahn 2000; Andrews 2007; for a critical perspective, see McGarity 1991 and Ackerman & Heinzerling 2002).

Despite the dominant support for rational decision making in the literature and political discourses, policy decisions in the field of environment do not always reflect aggregated individual preferences at a societal level (Andrews 2007). In fact, in many instances of environmental policy making, economic analysis – particularly CBA – is not the basis for collective decisions (Hahn 2000; Bromley & Paavola 2002; Paavola 2002). If this is so, which role then does economic analysis, and policy appraisal more generally, actually play in public policy making?

Political scientists argue that environmental policy making is complex, chaotic and often unforeseeable (Cairney 2011; Adelle & Weiland 2015). It is the result of lobbying processes, coalitions of interest groups and political debates. In this framework, policy appraisal does not appear to really be supporting evidence-based decision making. Instead, it is a new venue for political dispute (Adelle & Weiland 2015). Some authors even question the link between policy appraisal and evidence-based policy making, suggesting alternative uses and functions of policy appraisal in the political process

(Adelle et al. 2011; 2012). Such uses can still be explained through the rational choice theory: analysts or decision makers may seek to maximise their own self-interest rather than utility for society (McCubbins et al. 1987; Damonte et al. 2014).

However, other authors chose to depart from rational choice theory entirely to understand the role of policy appraisal in public policy making, often relying on social-constructivist thinking (see, for example, Radaelli et al. 2013). Finally, quite a few authors in public policy have departed from meta-level approaches such as rational choice or social constructivism, and use meso-level theories instead. This includes the multiple streams approach (Kingdon 2014; Howlett et al. 2017), which has not yet been applied in the context of policy appraisal, but which will form an important part of my argument. I will discuss the multiple streams approach further below.

That said, some scholars thus consider appraisal as an "instrument of public policy" (Turnpenny et al. 2015a, p.247) and thereby assume that it can play a political and strategic role (Hertin et al. 2009). A political use of appraisal tools involves employing the outcome of an analysis to justify a political objective (Hertin et al. 2009). Such political objectives include decisions already made, diluted or postponed (Hertin et al. 2009; Turnpenny et al. 2015a), decisions based on political values such as environmental effectiveness, equity, political legitimacy (Adger et al. 2003) and ethical concerns (Bromley & Paavola 2002; Paavola & Bromley 2002), or procedural aspects, e.g. participation and inclusion (Paavola & Røpke 2008). In the case of strategic uses, appraisal tools support various actors in the policy-making process when it comes to managing conflict, gaining influence, and bargaining with interest groups (Turpin & Marais 2004). Various stakeholders use technical arguments, e.g. costs or additional impacts, in order to support and further their interests and positions (Hertin et al. 2009). In such cases, analyses may be manipulated (Hahn 2000). In addition, policy makers may consider economic analysis as a mere "tick box" exercise (Hertin et al. 2009, p.1199), i.e. they view assessments as useless when it comes to supporting decision making. Appraisal is then perceived as a bureaucratic impediment that needs to be performed as rapidly as possible (Hertin et al. 2009).

This research starts from the observation that policy-making processes, in the field of environment and elsewhere, are complex and chaotic (Cairney 2011; Adelle & Weiland 2015). This work explores, from a political science perspective, the logics and

motivations of decision makers in using policy appraisal. It focuses more particularly on the functions of policy appraisal tools in policy making. If these tools were designed to integrate evidence into the decision-making process, how can we explain the fact that the policies adopted do not always build on the outcome of appraisals? What are the motives of decision makers when it comes to using policy appraisal? Consequently, this work focuses on the various uses and functions of policy appraisal tools in environmental policy making, beyond evidence-based decision making.

In this study, I focus on economic analyses only, most prominently the use of CBA. Moreover, as argued above, and as I will outline below, I consider meso-level theories such as the multiple streams framework to be more promising than rational choice theories, since they better account for the chaotic policy-making process. Finally, to explore the functions of appraisal tools, I study water management as a policy process in which economic analysis has been given a prominent role.

In this chapter, I first discuss the historic uses of economic analysis in water management. Then I detail the research objectives and rationale for this work, the context and the research design. I also explain the theoretical basis on which I rely to interpret my findings and the methodological approach used throughout the research. Finally, I present the structure of this thesis.

1.1 Economic analyses and water management

Of all natural resources, water is the most crucial for human life. We use water for our most basic needs, such as drinking, sanitation and hygiene. But it is also vital for our economies, being necessary for irrigation, energy production, transportation, manufacturing and tourism. Aquatic environments are also major providers of recreational activities, such as boating, bathing and fishing, as well as granting aesthetic and cultural benefits (Wilson & Carpenter 1999; European Commission 2010; Ward 2012). More recently, the value of water for natural ecosystems in terms of habitat and biodiversity has also been acknowledged. Water thus provides a wide range of goods and services (e.g. flood control, provision of basic material, disposal of pollutants) (Reid et al. 2005; Maltby et al. 2011), making it a scarce and precious resource (Wilson & Carpenter 1999 ; European Commission 2010; Ward 2012).

Due to their high value and intensive use, water resources are now endangered. They are under constant pressure: the growing demand for water supply, discharge of pollutants, hydromorphological modifications (e.g. the building of dams or reservoirs), the introduction of alien species and climate change threaten its availability, quality and capacity to support water-dependent ecosystems and human societies (European Commission 2010; Stocker et al. 2013; Rodriguez-Labajos & Martinez-Alier 2015). Current challenges for water managers include the protection of the resource and of aquatic ecosystems, but also the sustainable, equitable and efficient sharing of water between conflicting uses (Ward 2012; European Commission 2017). The access of water and sanitation for all has also been included in the Sustainable Development Goals, as part of the 2030 Agenda for Sustainable Development (United Nations Development Programme 2015), which the EU has endorsed (Eurostat 2017).

In 1992, the scarcity and vulnerability of water resources were officially recognised in the Dublin Statement on Water and Sustainable Development (January 1992— International Conference on Water and the Environment). At this occasion, the value of water as an economic good was acknowledged (Berbel et al. 2017). This declaration triggered a paradigm shift since water could from now on be considered from an economic perspective. Since then, water economists have agreed that economic instruments and analysis – in particular CBA – can help allocate scarce water resources efficiently and maximise the benefits of their usage by society by providing the means of measuring the trade-offs involved in water management decisions. It can even speak for environmental preservation as it may show that protection measures are sometimes economically efficient and cost-beneficial (Loomis 2000; Wilson & Carpenter 1999; Ward 2012; Convery 2013 ; Berbel et al. 2017).

In the United States, CBA was originally used for water decisions as early as the first half of the 20th century. In fact, among all environmental issues, economic analysis was first applied to the water sector and evolved with the emergence of new water concerns. CBA was originally used for water projects, such as dams, navigation infrastructures or irrigation schemes. The high costs and public spending involved triggered the need to check whether these projects were actually worth the cost to society. Environmental amenities and aquatic ecosystems were taken into account a few decades later, as water quality, equitable sharing between conflicting uses and recreational activities were

increasingly considered as important (Hanley 2011; Convery 2013; Dinar & Schwabe 2015; Rodriguez-Labajos & Martinez-Alier 2015).

In Europe, water managers started using economic analysis for the management of water resources much later. We can find examples in the late 20th century, for example for the first river basin management plans in France in 1992 (Laurans et al. 2001). However, scholars seem to agree that the use of economic analysis in European water management really started with the Water Framework Directive (WFD, 2000/60/EC) (Morris 2004 ; Hanley 2011; Convery 2013). Although this is not its prime ambition, the WFD promotes economic principles as a means to improve aquatic ecosystems and to achieve sustainable use of water resources (Morris 2004; Destandau et al. 2008; Convery 2013). These principles include the use of economic analyses (analysis of current economic water uses and future trends, cost-effectiveness analysis of measures, disproportionate costs analysis) in identifying pressures, setting objectives and designing actions plans, the cost-recovery of water services (including the environmental and resource costs according to the polluter-pays principle) and the employment of economic instruments such as incentive tariffs (Brouwer 2006; Convery 2013). Economic principles are in fact considered of paramount importance to the implementation of the WFD (Laurans 2006) and often mentioned as one of the key paradigmatic changes introduced by the Directive in European water management (Martin-Ortega 2012).

1.2 Research objective and rationale

This research brings together two separate strands of literature: policy appraisal in public policy research on the one hand and economic analysis and tools, in particular CBA, in environmental economics on the other. The literature in political science and public policy studies the same tools and processes as environmental economics. However, it discusses the causes, roles, functions and consequences of these tools in political processes – rather than questions of economic efficiency and the like. This involves, in particular, analysing the distribution of political power and influence mechanisms between stakeholders. In addition, public policy scholars consider CBA and economic analysis as part of a wider assessment process called impact assessment,

i.e. a specific type of policy appraisal. This shift in terminology might cause confusion from an environmental economics perspective, as impact assessment is usually used to designate a more specific type of economic analysis in economics. Finally, political scientists not only focus on economic analysis per se, but also on other tools that may support the policy process, e.g. multi-criteria analyses (see for example Jordan & Turnpenny 2015). This work tries to establish a dialogue between public policy and environmental economics, thus crossing disciplinary boundaries.

This study aims to provide a broader explanatory framework for the different uses of economic analysis. As mentioned above, the literature on policy appraisal noticed various functions of appraisal tools, e.g. supporting evidence-based decision-making, perfunctory or manipulative (Hahn 2000; Hertin et al. 2009; Dunlop et al. 2012). It also discusses constraints and factors that may explain these various uses e.g. political impediments, legal restrictions and institutional frameworks (Turnpenny et al. 2008; Hertin et al. 2009; Radaelli 2010). Here, I aim to give an explanation for the use of economic appraisal. To this end, I partly rely on policy making and policy change theories. Theoretical frameworks interested in the policy process are numerous. For example, they aim to explain why some topics come to the political agenda, why some proposals are selected while others are not, what the role of interest coalitions or policy entrepreneurs is, and so on. Such approaches include path dependency, punctuated equilibrium, the advocacy coalition framework, the garbage can approach, the multiple streams approach, to name but some of them (Araral et al. 2015).

The policy cycle conceptualises the policy-making process as a five-stage cycle (Howlett et al. 2015a; 2017). Of specific interest here is the policy formulation stage as it shapes decision making (Turnpenny et al. 2015b). Policy formulation refers to the "process of identifying and addressing possible solutions to policy problems or, to put it another way, exploring the various options or alternatives available for addressing a problem" (Howlett 2011, p.30). The use of appraisal tools for choosing between policy options is an essential part of this process (Turnpenny et al. 2015b). Therefore, policy appraisal comes into play at the formulation stage. Consequently, I will not apply policy-making theories to all stages of the policy cycle. Since I am interested in the role of appraisal tools in supporting decisions, I will only focus on the formulation and decision stages.

This research focuses on one particular environmental aspect, water management. Therefore, this work explores how policy appraisal and economic analysis are used in water decision making. European water practitioners have not been using economic analysis for long, mainly since the WFD entered into force (Morris 2004). As a consequence, this work focuses on the WFD implementation in member states and, more precisely, on the use of economic appraisal in decision making.

The WFD encompasses many economic provisions. Nevertheless, the incentive to use economic appraisal as a tool to decide between economic constraints and environmental goals appears most strongly in the process of setting objectives. Every six years, member states may choose when and whether or not they will implement measures to restore water bodies, justifying non-implementation through the use of exemption clauses. They should however ground this decision in economic analyses. This research therefore focuses on the process of setting objectives and exemptions since member states are most likely to use economic appraisal for this aspect of WFD implementation. This project explains the various uses of economic analysis during the process of setting objectives across member states.

In a WFD context, the research question can be phrased as such:

How can we explain the different uses of policy appraisal – in particular of economic analysis – in water decision making?

I focus more particularly on the relationship between the political objectives pursued and the economic appraisals performed. In order to answer the overarching question, I divided my work into several objectives.

Objective 1: To unveil the motives of the various EU institutions for recommending a specific tool for economic analysis. I thus aim to explore the relationship between the political goals pursued and the support for a specific type of economic analysis at EU level. Since I chose to study an EU directive, the European dimension and the coordination processes at EU level are likely to influence decisions at member state level. The research steps are first to uncover the nature of the recommendations formulated at EU level; second, to explain why particular appraisal tools are preferred; and finally, to understand how EU institutions came to formulate guidance, e.g. through which negotiations and power relations. Here I will explore consenting or diverging

views on the Directive's ambition and on the appraisal tools to use which arose among legislators during the WFD negotiation process, or at a later stage between member states and the European Commission. I will also investigate to which extent diverging interpretations of the WFD could explain the apparent lack of progress on WFD implementation at EU level.

Objective 2: To determine whether and how the choices made for the economic appraisal impacted the decision-making process domestically. Research stages include exploring the economic analysis performed in terms of tools used and decisions made for their operationalisation; estimating potential divergences with agreements reached at EU level; and assessing the influence of the appraisal process on water quality objectives. Here I compare the economic analysis performed in two diverging countries.

Objective 3: To unveil the processes underpinning decision making and the role of appraisal tools therein. Here, I aim to explain the different roles played by appraisal tools (e.g. symbolic or perfunctory uses). Research steps are first to determine the various uses of economic appraisal in two member states and to identify whether appraisal only supports evidence-based decision making or whether it plays another role. I then compare the situation in both countries and account for the differences observed. Here, I rely on a theoretical framework to explain my findings.

Each objective rests on a systematic review of the existing literature on WFD implementation in member states. The research objectives will be pursued through nested cases.

At the first level, I choose to address the overall research question through the case of the WFD. I thus study the different uses of policy appraisal in water decision making by looking at the most comprehensive and environmentally ambitious EU directive in water management. However, the WFD focuses on two aspects. First, as a EU directive, it restricts the geographical extent of the research to EU member states. Second, looking exclusively at WFD implementation limits the scope of water management activities covered. Here I study more particularly the process of setting objectives and exemptions.

At the second level, I study the implementation of the WFD itself where I examine two member states in-depth through a cross-country case study. The idea is to get a

representative picture of WFD implementation in the EU through a careful choice of national case studies. I therefore use case study research at two levels.

This study aims to contribute to the existing literature in several ways. First, I bring insights from environmental policy-making theories and environmental economics to the policy appraisal literature. Second, I provide an explanatory framework for the various uses and functions of policy appraisal, thereby contributing to the policy appraisal literature. Finally, I explain the WFD implementation process in two member states and analyse in-depth the planning process, the decisions taken on objectives and exemptions, and the use of economic analysis as a tool supporting decision making. I thus contribute to the WFD body of literature.

1.3 Research context

1.3.1 The Water Framework Directive: a major policy for water protection in Europe

The EU WFD is the most ambitious piece of EU legislation in the field of water. This Directive introduced major changes and regulatory innovations in water resources management across Europe. While previous legislation was only concerned with specific pollution sources and water uses, the WFD introduced a sustainable, holistic and ecosystem-based approach to water management. The Directive thus defines for the first time a general and common framework for integrated river basin management in Europe (Kallis & Butler 2001; Adshead 2004; Hering et al. 2010; Martin-Ortega et al. 2011). The WFD ultimately aimed to achieve ‘good water status’ by 2015 for all water bodies. Moreover, it prevents any further deterioration of the water resource and aquatic ecosystems.

Although this ambitious goal has not been met so far, the WFD introduced several institutional novelties that should help water managers work towards ‘good water status’. These include the publication of River Basin Management Plans (RBMPs) every six years, where member states specify the objectives set, the participation of stakeholders and the general public, and the performance of economic analyses such as CBA to support decisions (Kallis & Butler 2001; Kaika 2003; Grimeaud 2004). Moreover, the European Commission and member states practitioners established in

2001 an innovative coordination process at the EU level, the Common Implementation Strategy (CIS). CIS working groups seek to resolve technical controversies through implementation guidelines, including on the economic analyses to perform (Martin-Ortega et al. 2014).

1.3.2 Setting objectives and exemptions to the Water Framework Directive

As mentioned above, member states are strongly encouraged to use economic appraisal during the process of setting objectives. Therefore, I will mainly focus on this WFD aspect.

When writing RBMPs (which occurred in 2009, 2015 and with another planned for 2021), member states should specify for which water bodies they will aim to reach good status over the next six years. This might at first seem contradictory with the overall WFD objective, which is to reach good status for all water bodies by 2015. In fact, several provisions allow member states to lower the Directive's objectives; member states may delay the achievement of good status to 2021 or 2027 (Art. 4.4). EU countries may even lower their environmental ambitions, i.e. to achieve a 'less stringent objective' than required by the Directive (Art. 4.5). These provisions may be used for three different reasons: when reaching good status in time is technically infeasible, when natural conditions hinder the restoration process, and when the costs of measures are disproportionate. As this research is concerned with economic analysis, I will only focus on exemptions based on 'disproportionate costs'.

Member states used exemptions extensively, having granted deadline extensions for 40 per cent of all surface water bodies and eleven per cent of all groundwater bodies in 2009. Furthermore, member states authorised the achievement of 'less stringent objectives' for 19 per cent of all surface waters and one per cent of all groundwater bodies (European Commission 2012a). According to the European Commission, the "extensive use of exemptions may reflect the low level of ambition in many of the plans as regards achieving the environmental objectives" (European Commission 2012a, p.181). In practice, member states differ greatly as to the overall ambition displayed in WFD implementation, i.e. the degree to which they would make use of exemption clauses (Bourblanc et al. 2013).

Of particular concern is the fact that the term 'disproportionate costs' – on the basis of which exemptions can be requested – is somewhat ambiguous and the process of justifying exemptions not very well defined (Görlach & Pielen 2007). This ambiguity leaves to member states the choice of their ambition for implementing the WFD and of the extent to which they may push for environmental objectives in spite of economic constraints. To address this issue, member states tried to agree on the use of common appraisal tools. Consequently, they produced CIS guidance documents suggesting using cost-benefit analyses (CBA) to evaluate disproportionate costs. Nevertheless, the guidance offers another possibility, to assess the affordability of measures for the payers (European Commission 2003). In this study, I do not only focus on the question: which instruments member states support at EU level or choose to use domestically, but I also aim to understand the reasons for why they do so.

1.4 Theoretical basis

In this study, I rely on policy-making theories to explain the different functions and uses of policy appraisal in organisations, in line with the third research objective. As explained earlier, I focus on the formulation and decision stages of the policy cycle. I therefore use a theoretical framework, which is applicable to these stages.

I chose to rely on an adaptation and combination of two existing frameworks: the Multiple Streams Approach (MSA) and the Advocacy Coalition Framework (ACF). An adaptation of both theories is necessary, since they were not originally developed to explain the formulation and decision stages. The Multiple Streams Approach in particular was created to explain the agenda-setting phase. Combining these theories also provides several advantages. First, both theories are complementary, meaning I can use the explanatory power of each to better account for policy-making processes (Howlett et al. 2017). Second, combining theories can create new ways of thinking (Cairney 2013). Finally, the literature usually advises combining the advantages of several theories (Cairney 2011).

To this purpose, I resort to the recent work of Howlett et al. (2015a; 2017). Their work combines the MSA and the ACF, and expands both theories to all stages of the policy

cycle. Before I explain this framework in more detail, I introduce the MSA and the ACF.

1.4.1 The Multiple Streams Approach

The MSA was developed by Kingdon (1984) and focuses on the agenda-setting stage. It relies on the assumption that three 'streams' co-exist.

The problem stream: This stream focuses on the acknowledgement of a societal issue that needs to be addressed by the government. This problem recognition is influenced by several factors: changes in indicators, feedback from past policies that may shed light on particular failures, or "focusing events" such as "a crisis or disaster" (Kingdon 1984, p.19). The availability of budgets may also play a role here by pushing more or less expensive programmes to the agenda.

The policy stream: This stream mainly deals with policy proposals. Solutions to problems are selected based on their technical feasibility, their adequacy with broader political requirements (for instance, efficiency and benefits outweighing costs), their acceptability and support, and their budgetary implications. Based on the Garbage Can Model, according to which "solutions [are] looking for issues to which they might be the answer" (Cohen et al. 1972, p.84), Kingdon (2014, p.19) refers to all existing solutions as the "policy primeval soup". Specialists in policy communities develop ideas that "float around" (Kingdon 2014, p.19) waiting to be promoted. Consensus in this stream is reached through persuasion.

The politics stream: This stream refers to the political context, such as elections, changes in public opinions or lobbying. Here, consensus is reached through bargaining.

Although the three streams are assumed to be largely independent, they might influence one another, e.g. through budgetary constraints (Kingdon 2014). Policy change may take place without these three streams interacting, depending more on their convergence, which creates a "policy window" (Kingdon 2014, p.88).

Policy entrepreneurs play a particularly important role in shaping the streams and in coupling them. They seize the opportunity of policy windows to advance their own proposals. More generally, political parties and elected officials tend to have a greater

role in the agenda-setting phase, while civil servants mainly work out policy alternatives during the implementation phase (Kingdon 2014).

The MSA has been applied widely in the scholarly literature. It provides complexity and dynamism in explaining decision-making processes (Howlett et al. 2017). I chose to use this theory as it relies on focusing events, policy solutions and political context to explain policy change. All these aspects play an important role in the case I chose to study. However, the MSA applies to the agenda-setting phase and therefore needs adaptation.

1.4.2 The Advocacy Coalition Framework

The ACF was developed by Sabatier and Jenkins-Smith in the 1980s in order to explain policy change (Weible & Nohrstedt 2015). The ACF focuses on policy subsystems. It relies on the assumption that various stakeholders (government organisations, agencies, environmental associations, industries, researchers, journalists…) form coalitions in order to influence decisions. Coalitions are built around shared beliefs and organised to compete with other coalitions. "Policy brokers" mediate disputes so as to settle a compromise (Sabatier 1998, p.104), resulting in a policy programme which integrates the beliefs of the winning coalition. In this framework, individuals are presumed to be boundedly rational and identify themselves with their own beliefs. They are also considered biased in judgement and as perceiving their environment through the prism of their convictions (Weible & Nohrstedt 2015).

The ACF distinguishes three levels of belief. Most strongly anchored are "deep core beliefs", which refer to fundamental individual values and, as such, are very unlikely to evolve. "Policy core beliefs" are the transposition of "deep core beliefs" to specific policy issues or subsystems. They are considered as the "glue" holding coalitions together. Finally, secondary beliefs are narrower and thus easier to change, and include the reasons for an issue in a specific location for instance. Members of coalitions are prone to the "devil shift", i.e. they tend to see their adversaries as powerful and wicked. This perception reinforces existing coalitions and complicates the achievement of a compromise (Sabatier 1998, p.103, p.110; Sabatier & Weible 2008).

In order to get more influence on the policy process, advocacy coalitions rely on various resources such as favourable public opinion, leadership from policy entrepreneurs,

technical information and studies, human and financial resources or legal authority (such as support from government agencies or legislators) (Sabatier & Weible 2008).

According to the ACF, policy change may occur through three pathways: events, learning and negotiated agreements. External and internal events are perturbations, such as disasters or changes in the economy, that might affect coalitions' resources or direct attention to a particular problem. Learning mainly occurs for secondary beliefs and may be triggered by personal experience or the availability of new scientific data. Finally, negotiated agreements may be reached through policy brokers under specific conditions (Sabatier & Weible 2008).

The ACF has several advantages: it focuses on agency through advocacy coalitions and it takes into account the role of beliefs and learning in policy making (Howlett et al. 2017). However, it has limited explanatory power when there is one clearly prevailing coalition (Fischer et al. 2007). I chose to rely on this framework for the importance it gives to beliefs in organisations. This aspect can also be used to explain cultural differences across countries. However, coalitions do not play a prominent role in the case I chose to study. Therefore, I use it in combination with the MSA.

1.4.3 Recent developments: combining the MSA and the ACF

Howlett et al. (2015a; 2017) have suggested extending the MSA to all stages of the policy cycle by using a five-streams framework. While the agenda-setting stage is composed of the three streams identified by Kingdon (problem, politics, policy), a process stream joins in at the policy formulation phase. A programme streams also appears during policy implementation. The process stream designates the actual process of tackling the problem, as opposed to finding a solution for it (e.g. successive steps, timetable). The programme stream focuses on a particular solution (e.g. instruments). Policy stages progress when 'critical junctures' or 'windows' occur, i.e. when several streams meet. During this whole process, some streams may be dominant over others and "guide the current" (Howlett et al. 2015a, p.9). External factors such as elections or catastrophes can change the course of streams.

Throughout the different stages of the policy cycle, stakeholders form coalitions to change the course of the streams and push their own ideas to the forefront (Howlett et al. 2017). Mukherjee and Howlett (2015) argue that distinct groups of stakeholders try

to influence the course of each stream. This distinction does not exclude the fact that some individuals may be active in different streams at the same time. All these agents are responsible for moving policy making forward.

In order to address the third research objective, this study relies on this new framework developed by Howlett et al. (2015a; 2017), combining the MSA and the ACF, and applies it to the formulation and decision stages of the policy cycle. The idea is to explain the use of policy appraisal in the decision-making process, thereby taking into account the political and policy contexts, the process of tackling a problem, external factors and coalitions beliefs.

1.5 Research strategy and methodological approach

1.5.1 Research strategy

In order to address the first research objective, I conduct research at the European level. I aim to understand how exemption clauses emerged during the negotiation process, whether legislators already had in mind a specific appraisal tool when they introduced the concept of 'disproportionate costs' and why this tool was selected. The aim is to grasp the original meaning and the intentions underlying disproportionality. I then look at the CIS. Here, I explore the various meanings attached to disproportionate costs for different member states and for the European Commission, in particular which appraisal tools are promoted. Looking at divergences provides insights into why specific tools are endorsed and member states' intentions regarding their use. I seek to go beyond experts' discussions on economic analysis to comprehend the political dimensions of debates.

Regarding the second and third research objectives, and once this European framework is investigated, I analyse two member states in-depth, England and France. In fact, the actual use of economic appraisal for WFD implementation in member states has so far not been studied extensively. Extant research gives a broad overview of the appraisal tools used before 2009 in several member states (Görlach & Pielen 2007; Laurenceau et al. 2009; Martin-Ortega et al. 2014); other pieces describe the economic appraisal performed in specific countries (van der Veeren 2010; Gómez-Limón & Martin-Ortega 2013; Feuillette et al. 2016). They show the diversity of approaches taken across Europe and the contrasting attitudes of practitioners towards economic appraisal (Thaler et al.

2013). However, in-depth comparative work that details and explains the choice of appraisal tools as a support for decision-making processes in member states are still lacking (but see Dehnhardt 2013; 2014 for a causal perspective on the non-use of CBA and practitioners' reluctance towards this appraisal tool in Germany). Here, I aim to explain differences in the use of policy appraisal between two countries. To this purpose, I first go into the details of the economic appraisals performed in each country. Then, I explore their institutional, cultural, and political context so as to explain the different uses and purposes of policy appraisal.

In order to answer the overarching research question, I chose to use nested case studies. I first focus on water management and the WFD as a case study for the use of policy appraisal in environmental decision-making. Within this particular case, I then chose to study the process of setting objectives and exemptions in two member states. In other words, I focus on two case studies (France and England) to analyse in-depth the WFD implementation in member states. I thus have two levels of case studies: first the WFD as an environmental policy and second a cross-country comparison of the WFD implementation.

1.5.2 Case study research

According to Gerring (2007), a "case study may be understood as the intensive study of a single case where the purpose of that study is – at least in part – to shed light on a larger class of cases (a population)." However, case studies are "not perfectly representative of the population" (Gerring 2007, p.20). Why then use case studies?

Actually, this methodology brings several advantages. A case study is an in-depth study of a phenomenon. In contrast to large samples, case studies favour depth over breadth (Flyvbjerg 2006). As such, they are particularly suited to understanding complex and understudied situations (Flyvbjerg 2006; Yin 2009). Case studies are especially useful to "investigate causal mechanisms" (Gerring 2007, p.5) in a given context, i.e. to clarify how and why a problem occurs (Yin 2009). They are also particularly helpful in explaining decisions (Yin 2009); they "may offer insight into the intentions, the reasoning capabilities, and the information-processing procedures of the actors involved in a given setting" (Gerring 2007, p.45). Since my research aims to explain the use of policy appraisal in the context of the WFD implementation in member states, relying on a case study is consistent with my objective.

In addition, case studies can both build or test theory (Flyvbjerg 2006; Gerring 2007; Yin 2009). Although I partly rely on theories to explain my findings, my objective is to contribute to theory building rather than testing. Using case study analysis is therefore adapted to this goal. However, the choice of cases is particularly important for the generalisation of findings (Flyvbjerg 2006). As to WFD implementation, I do not aim to produce an extensive and complete picture of the situation in all EU member states. Rather, I give insights into the use of policy appraisal that might be applicable to a set of countries in order to explore possible explanations for the use of economic analysis. I therefore selected the countries strategically so as to reach this objective.

1.5.3 The choice of England and France for the cross-country comparison

Here a trade-off between the depth of the analysis and the number of countries covered has to be made. While it is possible to describe the economic analyses performed in each EU country, i.e. to use a large sample, it seems much less feasible to study in depth the role that appraisal tools played and the reasons explaining their usage. According to Gerring (2007), a small-N comparison is preferable over a large-N study if one wants to get a deeper understanding and analysis of the cases. Consequently, I chose to focus on a small number of cases. Since I aim to account for differences across countries and to account for cultural differences, I studied two member states with a different approach to WFD implementation in-depth. This cross-case comparison enables identification and comparison of the various factors which influence decision making in different countries. Moreover, the vast majority of studies that investigated WFD implementation in Europe have used small-N case studies (see Chapter 2). Consequently, this methodology seems to be the most appropriate for examining in sufficient detail WFD implementation processes, which highly vary from one country to another.

According to the literature, EU member states rely on very different appraisal tools when setting objectives and exemptions (Görlach & Pielen 2007). Moreover, three main attitudes towards economic analysis seem to prevail. First, some countries like Germany are somewhat reluctant to use economic analyses (Dehnhardt 2013). Policy makers prefer to address WFD issues from an engineering and natural science approach (Dehnhardt 2014). Second, member states such as France perform to a large extent ex-post CBA to comply with European requirements and to avoid an infringement procedure (Feuillette et al. 2015). A third group of countries, such as the UK, used CBA

to justify numerous exemptions. This was however perceived as a way to delay the WFD implementation, and environmental non-governmental organisations contested its overuse (e.g. in the UK, see Cook et al. 2012; European Commission 2012c).

The choice of member states for the cross-country comparison has to be compatible with the research question addressed. Since I aim to understand the reasons for using economic analyses in the process of setting objectives, I need to choose member states that have relied significantly on exemptions based on disproportionate costs and that have used economic analysis during this process. This condition discards member states from the first category. Since I am interested in comparing different uses of policy appraisal between countries, it seems more logical to choose one country that belongs to the second category of attitude towards economic analysis and another from the third.

Evolutions with time are also an important part of my research. Consequently, I preferentially discarded member states that have joined the European Union after 2004, since the evolution of their practices is necessarily less pronounced. I also favoured countries that have been more active at the European level (in particular in the CIS working groups), which again excludes new member states that were not involved in the drafting process of the guidelines. These three conditions actually greatly limit the scope of possible member states to investigate.

Among the member states that have joined the European Union prior to 2004, only some of them have actually used exemptions based on disproportionate costs. According to the reports produced by the European Commission to evaluate the RBMPs of each member state (for example, European Commission 2012c), only Austria, Belgium, Denmark, France, Italy, Netherlands and the UK significantly used disproportionate costs as justification for exemptions. However, it seems that in practice Belgium has not used many exemptions based on disproportionate costs (European Commission 2012b). In Germany and Finland, only a few proportion of exemptions were due to disproportionate costs, while in Ireland, Luxembourg and Sweden, this argument was not used at all. No data were available at that time for Greece, Portugal and Spain. However, Gómez-Limón and Martin-Ortega (2013) report that disproportionate costs were scarcely used in Spain. Consequently, possible member states for the case studies had to be chosen among Austria, Denmark, France, Italy, the Netherlands and the UK.

The choice of the UK was rather straightforward for several reasons. First, according to Thaler et al. (2013, p.1525), "in the UK there is a long tradition of using assessments such as detailed impact assessments and environmental CBA. UK requirements for impact assessments and other CBA precede and exceed EU requirements." As Görlach and Pielen (2007, p.8) explain, the UK had "the most systematic approach, and most solidly embedded in economic methodology" towards exemptions, which seems rooted in a more general belief into "evidence-based policy making" (Nilsson et al. 2008, p.342). Consequently, the UK is ideal regarding the use of economic appraisal to support environmental decision making. Second, among all the member states previously mentioned, the UK is the only country that has used disproportionate costs as the main justification for exemptions (whereas in most countries, technical feasibility is usually the main argument) (European Commission 2012c). Consequently, the UK has used disproportionate costs most extensively. Third, this member state is rather active in the CIS working group on economics, since it is co-leading this group for the second management cycle (European Commission Undated). Fourth, although many studies have researched the UK so far, none of them has explored the use of policy appraisal and economic analyses in the framework of disproportionate costs for exemptions (see Chapter 2). Finally, the process of data collection in the UK was easier due to the University of Leeds's close contacts with officials in the UK. I focused more specifically on England, where the use of economic analysis and exemptions based on disproportionate costs was the highest in the UK (European Commission 2012c).

France was used as second case study. According to the literature, this member state resorted to economic appraisal in an almost opposite way to England and showed very different attitudes towards disproportionate costs (Feuillette et al. 2015). Accordingly, CBA was used during the first management cycle but mostly as a way to justify exemptions *ex-post*, i.e. decisions were mainly taken based on other criteria, such as stakeholders' ability to pay. Moreover, Görlach and Pielen (2007, p.5) explain that France seemed to have opted for a "social-minded approach". More generally, and in contrary to the UK, France was generally a late adopter of economic appraisal (Renda 2011). Consequently, a study of France and the UK would constitute an "extreme-case" comparison (due to the "extreme value on an independent or dependent variable of interest" (Gerring 2007, p.101)). Such cases are particularly helpful for generating hypotheses, in particular to explain why these two countries use economic appraisal and

rely on disproportionate costs in such different ways. In addition, the choice of France has many other advantages. First, although the Ministry of Environment is in charge of writing national guidelines and is responsible for reporting back to the European Commission, the decision for exemptions is taken at the river basin level (Feuillette et al. 2015). This particular situation might reveal possible tensions and disagreements between the national and river basin levels. Second, France has always been a very active member of the CIS working group on economics, co-chairing the group both during the first and second management cycles (European Commission Undated; 2001). Therefore, this country has probably influenced the CIS process to some degree. In any case, this situation shows an advanced interest for economic issues. Third, very few studies have been conducted on France so far (see Chapter 2). My work thus helps enhance the knowledge on the implementation of the WFD in this country. Finally, data collection was facilitated by the contacts I have at the French Ministry of Environment and at the Water Agencies through my former position at the Ministry of Environment.

Within each country, I also look at river basins since management activities (RBMPs, programmes of measures) and analyses are undertaken at the river basin scale. In the UK, I chose to study the Humber basin: it is close to Leeds and University of Leeds researchers already possess a lot of expertise here. In the second cycle, water practitioners in the UK conducted economic appraisals at the catchment level. Therefore, I also study one catchment within the Humber basin, the Aire and Calder catchment. In France, economic analyses were performed by the water agencies (six in total, excluding overseas territories). However, appraisals were rather heterogeneous across river basins (Feuillette et al. 2015), probably due to the decentralisation of water management. Therefore, in order to have a representative and comprehensive picture of the economic analyses performed in France for the implementation of the WFD, I perform detailed research in all mainland French river basins. I thus use an embedded case study design (Yin 2009) to analyse the WFD implementation in the UK and France: for each case country considered, I study several subunits, i.e. river basins or catchments. These subunits are not case studies themselves, but are part of the case analysis and help to get a better understanding of the situation in the country considered.

1.5.4 Methodological scope

The existing literature recommends using specific methods for studying the policy process. First, the analysis should focus on the policy subsystem, i.e. on a particular policy area that includes all stakeholders involved in the process (members of interests groups, academics, officials and journalists) (Weible & Sabatier 2006; Weible & Nohrstedt 2015). Nevertheless, few stakeholders take part in the formulation stage, which is usually limited to experts (Sidney 2007). I thus take into account in my research all stakeholders that were involved in policy appraisal processes during the stage of setting objectives and deciding on exemptions.

Second, a long-time scale (ten years at least) is usually necessary to analyse policy processes (Weible & Nohrstedt 2015). Consequently, I chose to study the WFD from its negotiation to a few years after the publication of the second RBMPs. I thus analyse the period 1996-2017, i.e. 21 years.

Moreover, some researchers advise examining the particularity and the context of environmental policy making in order to grasp which factors impacted the decision. In particular, institutions, scale, and cultural and historical context play an important role and should therefore be scrutinised (Adger et al. 2003). All these aspects are taken into account when applying the MSA and the ACF. In addition, policy-making styles differ substantially across member states and partly explain policy choices, failures and successes. They are thus worth considering (Andersen 2001). I analyse these aspects through a cross-country comparison of WFD implementation.

Finally, policy-making theories are generally not good predictors of change, partly because some factors are assumed to be unforeseeable (e.g. external events, shocks). As such, they can better explain outcomes ex-post and produce contextual information (Sabatier 1999; Flyvbjerg 2006; Kingdon 2014). I therefore use the theoretical framework as an ex-post explanation of a case study.

1.5.5 Data collection and analysis

I first mapped existing scholarship on the WFD through the use of a meta-analysis. Here, I only considered social-science research published in English-language academic journals exploring empirically the implementation of the WFD in EU member states. Based on a codebook of more than 35 items, I coded and analysed 89 journal articles.

I then used qualitative methods to address the three research objectives. I mainly relied on document analysis and semi-structured interviews, since particularly suited to qualitative case studies (Bowen 2009). Data collection first served to identify the appraisal tools recommended at the EU level and those used at the domestic level. Second, the idea was to understand which member state or EU institution promoted which tool for which purpose, how appraisal was used nationally or locally, and whether it served to support decisions.

I therefore analysed in-depth over 200 policy documents covering the period 1996-2017. These include position papers, CIS guidance documents, RBMPs, official and consultancy reports, and EU assessments of WFD implementation in member states. Documents served several purposes. First, they were a substantial source of research data. Second, I used them in order to track changes and evolutions. For example, I compared all the different draft versions of the WFD, in order to understand the position supported by each EU institution. Third, documents provided insights into the context, background and history within which WFD implementation took place. Finally, I used policy documents as a basis for interview questionnaires (Bowen 2009).

I also conducted a total of 64 semi-structured interviews, including 16 at the European level (research objective 1) and 48 at member states level (research objectives 2 and 3). At the European level, I selected participants that took part in the WFD negotiation process or the CIS. Interviewees include representatives of the European Commission, member states, stakeholders - mainly non-governmental organisations - and academic experts. I contacted members of the CIS working group on economics and guideline authors, academics and member states officials that are part of my professional network, and I used snowball sampling to get access to participants in the WFD negotiation.

At member states level, I targeted actors involved in the WFD implementation in England and France, in particular in objective-setting and economic analysis. These include State officials from central governments, departments and agencies, non-governmental organisations and various stakeholders (representatives of farmers, landowners, water user associations, and water industries). I identified interviewees through my professional network, organisations websites and snowballing. Interviewees were conducted jointly for Chapter 4 and 5. Interviews results informed one or both

chapters, or provided contextual information (e.g. water governance, legislation, historical background, political framework).

Interviewees were recorded and then transcribed. The first objective of conducting interviews was to complete findings from the document analysis, and to understand evolutions, strategies, constraints, lobbies and possible conflicts between EU institutions, member states, interest groups, national ambitions and local implementation. The second goal was to corroborate findings from the document analysis so as to increase the reliability of the results obtained (Bowen 2009).

I analysed documents and transcripts iteratively, combining content and thematic analysis. I selected the most relevant information in the document and organised data into categories for analysis. I then identified emerging themes and coded data accordingly. This process was performed through a superficial reading first followed by a more thorough scrutiny. Finally, information was interpreted and synthesised (Bowen 2009). A complete list of interviewees and policy documents is available in Appendices A and B.

1.6 Outline of PhD

This PhD is presented in the form of four research articles presented in the following four chapters.

First, I map and provide a systematic review of existing scholarship on the WFD in Chapter 2, through the use of a meta-analysis. This chapter is a published paper: Boeuf B, Fritsch O (2016). Studying the Implementation of the Water Framework Directive in Europe: a Meta-Analysis of 89 Journal Articles. *Ecology & Society* 21(2), 19.

Then I address the first research objective, which is to understand how and why EU institutions came to recommend a specific economic analysis for the process of setting objectives and exemptions. This is tackled in Chapter 3 through research at the European level that explores WFD negotiation and the CIS process. This chapter is a published paper: Boeuf B, Fritsch O, Martin-Ortega J (2016). Undermining European Environmental Policy Goals? The EU Water Framework Directive and the Politics of Exemptions. *Water* 8, 1-15.

The second objective is to investigate whether and how the methodological choices made for economic appraisal influenced the decision-making process. This is dealt with in Chapter 4 through a comparison of the economic analyses performed in England and France. This chapter is a paper accepted for publication on 26th January 2018: Boeuf B, Fritsch O, Martin-Ortega J (2018). Justifying exemptions through policy appraisal: ecological ambitions and water policy in France and the United Kingdom. *Water Policy* 20(3), 647-666.

The third objective is to explain the different uses of policy appraisal in supporting the process of setting objectives for individual water bodies. This is addressed in Chapter 5, where I compare the various functions of appraisal tools in England and France, and account for differences through a theoretical framework. This chapter will be submitted to Regulation & Governance in due course.

Finally, Chapter 6 synthesises and discusses findings, considers research limitations and provides avenues for future researches.

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Chapter 2: Studying the implementation of the Water Framework Directive in Europe: a meta-analysis of 89 journal articles

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Abstract

The Water Framework Directive (WFD) is arguably the most ambitious piece of European Union (EU) legislation in the field of water. The Directive defines a general framework for integrated river basin management in Europe with a view to achieving 'good water status' by 2015. Institutional novelties include, among others, water management at hydrological scales, the involvement of non-state actors in water planning, and various economic principles, as well as a common strategy to support EU member states during the implementation of the Directive. More than 15 years after the adoption of the WFD, and with the passing of an important milestone, 2015, we believe it is time for an interim assessment. This article provides a systematic review of existing scholarship on WFD implementation. We identify well-documented areas of research, describe largely unchartered territories, and suggest avenues for future studies. Methodologically, we relied on a meta-analysis. Based on a codebook of more than 35 items, we analysed 89 journal articles reporting on the implementation of the Directive in EU member states. Our review is organised around three major themes. The first is 'who, when, and where'; we explore publication patterns, thereby looking into authors, timelines, and target journals. The second is 'what'; we analyse the object of study in our source articles with a particular focus on case study countries, policy levels, the temporal stage of WFD implementation, and if the Directive was not studied in its entirety, the aspect of the WFD that received scholarly attention. The third is 'how' i.e., theoretical and methodological choices made when studying the WFD.

Key Words

EU Environmental Policy; Meta-analysis; Policy Implementation; Systematic Review; Water Framework Directive; Water Governance

2.1 Introduction

The Water Framework Directive (WFD), adopted in 2000, is arguably the most ambitious piece of European Union (EU) legislation in the field of water. The Directive defines a general framework for integrated river basin management in Europe with a view to achieving 'good water status' by 2015. Institutional novelties include, among others, water planning at hydrological rather than administrative scales, the involvement of non-state actors, various economic principles as reflected in tools such as cost-effectiveness analysis, and a common strategy to support EU member states implementing the Directive (Kallis & Butler 2001; Kaika 2003; Adshead 2004; Grimeaud 2004).

Not surprisingly, the WFD has attracted wide scholarly attention. At the time of writing, the Social Science Citation Index lists no less than 728 articles referring to the Directive in the title or the abstract. Researchers from disciplines as diverse as political science, legal studies, economics and sociology have studied the Directive. Interdisciplinary approaches are legion. Arguably, not all of those 700+ articles are 'spot on', but there is no denying that the WFD is a prime topic for social scientists working on water resources.

However, as much as we know about the WFD and its implementation in Europe, attempts to map existing scholarship are scarce. Previous research provides a checkered pattern of single case studies or small-n comparative work, often within one country. Almost 15 years after the adoption of the Directive, and with the passing of an important milestone, 2015, we believe it is time for an interim assessment. Providing a systematic review of existing scholarship, this article identifies well-documented areas of research, describes largely unchartered territories, and suggests avenues for future studies. In doing so, this survey is the first to provide a comprehensive and systematic review of scholarship on WFD implementation in Europe.

Our review is organised around three major themes. The first theme is 'who, when, and where'; we explore publication patterns, thereby looking into authors, timelines, and target journals. The second is 'what'; we analyse the object of study in our source articles with a particular focus on case study countries, policy levels, the temporal stage of WFD implementation, and if the Directive was not studied in its entirety, the aspect

of the WFD that received scholarly attention. The third is 'how', i.e. theoretical and methodological choices made when studying the WFD.

That being said, we would like to make plain what we are not doing. We examined the nature of research questions asked, and we report on theory and methods. However, we do not provide answers given to those questions. In other words, we make no attempt to aggregate research findings to present a broader picture of WFD implementation in Europe. Scholars interested in accumulated data may consult the four official implementation reports published by the European Commission (2007; 2009b; 2012b; 2015) and work carried out by Kanakoudis and colleagues (Kanakoudis & Tsitsifli 2010; Kanakoudis et al. 2015); the authors focus on Greece, but also use European Commission data to report on WFD implementation in the EU27. We do not contribute to this discussion.

Methodologically, we relied on meta-analysis. Meta-analytical approaches aggregate in a systematic fashion knowledge from source texts, thereby using partly or fully quantitative aggregation methods. Initially developed to make causal statements about the relationship between two or more variables across a range of source studies, i.e. to answer a specific research question, meta-analysis is increasingly being used to summarise an area of research as a whole. Such systematic reviews then do not explore questions of causality, but provide a thorough overview of a specific body of literature with regard to the research questions asked, theoretical approaches used, research designs and methods chosen, and jurisdictions and time periods covered (Poteete & Ostrom 2008; Exadaktylos & Radaelli 2009; Lam et al. 2012). Our article reflects the latter ambition. We examined 89 articles, published in English-language academic journals, that explore empirically and from a social science perspective the implementation of the WFD in EU member states. To this end, we extracted information on more than 35 dimensions from each source article.

2.2 The Water Framework Directive

Water is one of the oldest and most heavily regulated areas in EU environmental policy, covering issues such as drinking water, waste water, and groundwater. However, the sector had always been plagued, since the adoption of the first directives at European

level in the early 1970s, by serious implementation deficits and a lack of policy effectiveness. Three factors were of particular importance: low acceptance rates on the part of target groups, the mismatch between ecological (river basins) and political (political and administrative institutions) scales, and the fact that standards-based approaches regulating individual or families of substances completely ignored the problem of synergetic ecological effects (Jordan 1999; Grant et al. 2000; Kallis 2005).

Through the WFD, adopted in December 2000, the EU introduced a promising set of political instruments to tackle the challenges that have long characterised EU water management (Kallis & Butler 2001). Principally, the WFD aims to develop an "integrated community policy on water" (Preamble 3 WFD) by bringing together all water resources, uses, values, stakeholders, and relevant decision-making levels under a common legal regime (European Commission 2003, p.5-6). To this end, the Directive creates a framework for existing policies, repeals others, and provides a reference point for subsequent legislation, such as the new Groundwater Directive.

Good surface water status, as well as good groundwater status, were the key objectives to be achieved by 2015. Additionally, member states are required to protect existing water bodies from deterioration. For surface waters, the assessment of the status is based on a measurement scale that rates biological and hydromorphological characteristics as high, good, moderate, poor, and bad, and chemical characteristics as good and fail. The Directive thus breaks new ground by complementing chemical water quality assessments with the more general assessment of ecological quality. In particular, a surface water body is of good quality if there are only minor departures from the quality of pristine water bodies with minimal anthropogenic impact. Groundwater is classified as good or poor, based on its chemical and its quantitative status. Artificial or heavily modified water bodies such as canals are to achieve at least good ecological potential, which is as close as possible to good status. The achievement of the 2015 water policy goals may be delayed up to 2027 or even lowered to a less stringent objective under reference to natural conditions, technical feasibility, or disproportionate costs.

Taking into account that the existing body of EU water legislation already consists of far-reaching substantive measures, the WFD puts a high premium on the procedural side of water management. Five novelties are crucial:

River basin districts: Recognising that water is not static and that water bodies exist across political and administrative boundaries, member states are required to manage water at hydrological scales. To this end, River Basin Districts (RBDs) shall be established, respective management bodies shall be created, or if member states elect to remain within their existing administrative structures, collaboration shall be ensured between jurisdictions to manage river basins.

River basin management planning: The WFD planning process consists of eight steps: assessment of water status, characterisation of physical and societal pressures on water bodies, designation of artificial and heavily modified water bodies, determination of water bodies at risk, revision of an existing River Basin Management Plan, adoption of a Programme of Measures to specify concrete actions, implementation of those two documents, monitoring, and review. This sequence of activities is to be repeated every six years.

Public participation: Engagement activities involve three components: information, consultation, and active involvement. Information requirements mainly include obligations to make status and risk assessments, background information, and maps publicly available. In terms of consultation, member states must organise three rounds of public comment during the preparation of River Basin Management Plans. Active involvement describes a more intense mode of participation and may include planning in small groups and face-to-face.

Economic analysis: The Directive encourages decision makers to consider economic principles at various stages of the planning process. This may involve cost-benefit analysis to justify exemptions, cost-effectiveness tests and other analyses to identify suitable management options, and pricing and cost-recovery mechanisms to change water consumption patterns.

Policy integration: To achieve the Directive's policy goals, member state authorities are required to ensure policy integration not only within the water sector (for instance, integration of surface water and groundwater), but also within adjacent fields, such as flood control, forestry, or climate change. Rather than being a specific governance tool, policy integration represents a guiding principle of WFD water management.

These five components are held together by a strict timetable. Adopted in 2000, the

Directive required EU member states to transpose it into national law within three years. Until 2009, member states were then obliged to establish RBDs, to designate or create new management authorities at the river basin level, to identify and map water bodies, to establish monitoring networks, and to adopt a first River Basin Management Plan and Programme of Measures for each RBD. From 2009 onwards, member states would then reinitiate the above-mentioned sequence of management activities every six years.

All member states engage, though in varying degrees, in the Common Implementation Strategy (CIS). Established by the European Commission and the member states in 2001, the CIS brings together domestic water practitioners, regulators, and experts so as to report best practices and encourage mutual learning. In terms of organisation, CIS participants collaborate in working groups that reflect key challenges to WFD implementation, for instance, on monitoring, groundwater, heavily modified water bodies, or economics. CIS outputs include more than 30 legally non-binding implementation guidelines that provide best-practice cases, advice for specific water management problems, and benchmarks for good water governance. The CIRCABC website (Communication and Information Resource Centre for Administrations, Businesses and Citizens; https://circabc.europa.eu/faces/jsp/extension/wai/navigation/container.jsp) serves as an important coordination and communication device.

Who implements the Directive? The WFD is a legally binding EU policy, which is why all member states are obliged to transpose the Directive and put it into practice. EU candidate states may implement parts of the Directive as part of their accession agreements. Likewise, associated countries such as Norway and Switzerland may adopt key features of WFD water management.

To sum up, all EU member states implement the WFD. In the past nine years, those countries may have engaged in at least six overlapping, yet conceptually distinct, activities: water management at hydrological scales, the preparation of River Basin Management Plans and Programmes of Measures, public participation, economic analysis, and policy integration, plus participation in CIS working groups at the EU level. However, there is also a temporal dimension: we distinguish the preparation period between 2003 and 2009, characterised by institution building and the preparation of the first set of River Basin Management Plans and Programmes of Measures, from the first management cycle, from 2009 to 2015. This perspective leaves aside the

transposition into national law (up until 2003).

Let us now undertake a thought experiment and describe WFD implementation as a 3-dimensional space, consisting of 28 (countries) x 6 (activities) x 2 (time periods) = at least 336 cells that could be filled with exciting data. Importantly, these 336 cells are not mere data points, but spaces that, each for itself, may tell complex stories about actors, ideologies, and institutions. To illustrate, one cell would contain information on public participation in France during the first management cycle. We appreciate that this thought experiment is somewhat crude, but we may still think of the above-mentioned space as a container subsequently to be filled with intriguing findings from WFD scholarship. Research priorities are distributed unevenly with regards to countries, WFD requirements, and time periods. This leads us to suggest that some sectors of this 3-dimensional space are densely populated, whereas others remain largely unchartered terrain. We are not necessarily arguing that the research community should first and foremost seek to fill those 336 cells. After all, scholars may legitimately elect to use WFD implementation as a case study to further an agenda unrelated to the implementation of the Directive. However, scholars wishing to contribute to scholarly debates on WFD implementation, and on EU policy implementation more broadly, may use this image as a device to reflect on areas of research that are well documented and on those that are understudied or widely ignored.

2.3 Studying EU policy implementation

The previous section outlined a purely descriptive research programme: what requirements could or should be taken into account in WFD implementation research? However, to explain the implementation patterns described in the matrix above, one would have to consider a set of independent variables. For this, one would have to make use of one of the explanatory frameworks developed in the EU policy implementation and Europeanisation literature.

This literature did, in its early days, borrow much from its transatlantic counterpart in the United States (Pressman & Wildavsky 1984; deLeon 1999; Hill & Hupe 2002). In doing so, the European community reproduced quite a few shortcomings characteristic of the U.S. literature, in particular its tendency to generate endless lists of potential

causal factors. To recall, O'Toole Jr. (1986) counted more than 300 variables discussed in the literature. Since then, much progress has been made. We discuss three leading approaches in Europeanisation research: the goodness-of-fit approach, the actor-based approaches, and the worlds-of-compliance approach.

Goodness-of-fit approach: Relying on historical institutionalism, this approach argues that existing paths are resistant to change. EU policy implementation will be smooth if European requirements can be accommodated within current domestic paths, yet will be delayed or incorrectly implemented if they require substantive changes. To assess the degree of suitability and to predict compliance patterns, scholars compare European requirements and domestic policies. Often, authors distinguish policy fit, emphasising the compatibility of domestic and European policies, from institutional fit, highlighting the congruity between domestic institutions and institutional requirements of EU directives (Börzel 1999).

Increasingly, however, empirical work disconfirms the argument (Haverland 2000; Falkner et al. 2005). This is because the hypothesis is "rather static in nature" (Mastenbroek 2005, p.1110). Plausibly, domestic actors are not necessarily interested in preserving the status quo. Instead, they may want to change existing policies and institutions and thus utilise the EU for domestic purposes. In response to these criticisms, proponents of the goodness-of-fit perspective added a number of auxiliary variables to the initial argument (Risse et al. 2001; Thomson 2007; Hartlapp 2009). However, these amendments lead to a theoretically elegant, though empirically inconclusive, hypothesis that makes the notion of goodness of fit overly complex and, because of its ad hoc character, does not allow for ex ante hypothesising.

Actor-based approaches: Other scholars, in contrast, abandoned the structuralist core of the goodness-of-fit argument entirely and suggested examining actors, interests, and beliefs directly. From a rational-choice perspective, this includes exchange, bargaining, and principal-agent models (Haverland & Romeijn 2007; Kaeding 2008). Sociological-institutionalist accounts instead theorise compliance with EU directives as a result of socialisation, persuasion, and learning processes (Checkel 2001).

Worlds-of-compliance approach: Falkner et al. (2005) and Falkner and Treib (2008) argue that the substance of a particular EU policy is of little relevance for EU policy

implementation. Instead, the authors focus on national compliance cultures, i.e. general attitudes toward the rule of law and compliance with legally binding rules. To this end, they distinguish four worlds of compliance in Europe, i.e. clusters of countries that share a common sense of obligation towards implementation duties.

As of now, the empirical evidence is inconclusive, and a number of approaches are available combining elements from each perspective (Knill 2001). However, the above-mentioned approaches may serve as a source of inspiration for those whose research is chiefly concerned with understanding and explaining WFD implementation. We will return to this scholarship when we discuss the use of theory in extant research.

2.4 Methods and data

This article reviews social science scholarship, published in English-language academic journals, that explores empirically the implementation of the WFD in EU member states. To identify articles matching our criteria, we searched the Web of Science, Science Direct, and Google Scholar databases, using the terms "Water Framework Directive", "WFD", "Integrated Water Resources Management", or "IWRM" in the title, abstract, key words, or topic. We also screened the lists of references of relevant publications and located further work by particular authors through their list of publications. In line with our search criteria, we excluded non-academic publications such as policy documents and reports prepared by non-governmental organisations and consultancy firms. Likewise, we did not consider academic research published in book sections, conference papers, and doctoral dissertations, plus otherwise-relevant journal articles published in languages other than English.

We then examined the remaining set of papers and excluded those that did not meet our key search criterion: to report empirically on WFD implementation. This way we discarded articles describing the prehistory (Kaika & Page 2003) and content and ambition (Adshead 2004) of the Directive; scholarship offering legal interpretations (Grimeaud 2001) or normative critiques, for instance, as to whether the WFD is compatible with concepts such as Integrated Water Resources Management (Rahaman et al. 2004); and works anticipating rather than studying implementation patterns (Hedelin & Lindh 2008). Among the empirical studies left, we did not consider articles

reflecting physical and natural science research (de Toffol et al. 2005), discussing models based on WFD inputs (Crabtree et al. 2009), or studying phenomena not directly linked to the actual implementation of the Directive in a member state. These would include, for instance, researcher-led experiments with public participation (Newig et al. 2008) or economic analysis (Martin-Ortega 2012), which may have informed WFD implementation but were not part of a country's official implementation schedule. We also excluded articles if the empirical parts were shorter than three pages (Carter 2007).

As a consequence, the findings reported in this article are based on 89 journal articles (see Table 1).

Table 1: Our sample

Source articles considered	Countries studied	Key themes
Adshead 2006	Germany, United Kingdom	Participation
Albrecht 2013	Germany	Planning process
Allan 2012	United Kingdom	Ecological status and goals, Planning process
Andersson et al. 2012	Sweden	Planning process
Baaner 2011	Denmark, Sweden	Planning process
Behagel & Arts 2014	Netherlands	Participation
Behagel & Turnhout 2011	Netherlands	Participation
Benson et al. 2014	United Kingdom	Participation
Beunen et al. 2009	Netherlands	Policy integration
Bithas et al. 2014	Greece	Economic analysis
Blackstock et al. 2009	United Kingdom	Policy integration
Blackstock et al. 2012	United Kingdom	Participation
Blackstock et al. 2014	United Kingdom	Participation
Blackstock 2009	United Kingdom	Ecological goals and status, Participation, Policy integration
Borowski et al. 2008	Germany	Participation
Bourblanc et al. 2013	Denmark, France, Netherlands, United Kingdom	Ecological goals and status, Participation, River basin management
Carter & Howe 2006	United Kingdom	Participation
De Stefano et al. 2013	Austria, Belgium, Bulgaria, Estonia, Finland, France, Greece, Hungary, Ireland, Italy, Latvia, Poland, Portugal, Slovakia, Spain, Sweden, United Kingdom	Ecological goals and status
Dehnhardt 2013	Germany	Economic analysis
Dehnhardt 2014	Germany	Economic analysis

Demetropoulou et al. 2010	Greece	Participation
Dieperink et al. 2012	Netherlands	Ecological goals and status
Drazkiewicz et al. 2015	Germany	Participation
Earle & Blacklocke 2008	Ireland	Ecological goals and status
Estrela 2011	Spain	Planning process
Feuillette et al. 2016	France	Economic analysis
Flynn & Kröger 2003	Ireland	Participation, River basin management
Franzén et al. 2015	Sweden	Participation
Fritsch & Benson 2013	United Kingdom	Participation, River basin management
Gómez-Limón & Martin-Ortega 2013	Spain	Economic analysis
Gooch & Baggett 2013	Sweden	Participation, River basin management
Hammer et al. 2011	Sweden	Planning process
Hanley & Black 2006	United Kingdom	Economic analysis
Hernández-Mora & Ballester 2011	Spain	Participation
Hophmayer-Tokich & Krozer 2008	Germany, United Kingdom	Participation
Howarth 2009	United Kingdom	Ecological goals and status, Participation
Hüesker & Moss 2015	Germany	River basin management
Ioris 2012	Portugal	WFD in general
Ioris 2015	Portugal	WFD in general
Irvine and O'Brien 2009	Ireland	Participation
Jonsson 2005	Sweden	Participation
Junier & Mostert 2012	Netherlands	Planning process, River basin management
Kanakoudis & Tsitsifli 2010	EU27	WFD in general
Kanakoudis et al. 2015	EU27, Greece	Planning process
Kastens & Newig 2007	Germany	Ecological goals and status, Participation
Kastens & Newig 2008	Germany	Participation
Keessen et al. 2010	Belgium, Denmark, France, Germany, Italy, Luxembourg, Netherlands, Portugal, Romania, Spain, United Kingdom	Ecological goals and status, Policy integration
Keskitalo & Pettersson 2012	Sweden	Policy integration
Kirk et al. 2007	United Kingdom	Planning process
Koontz & Newig 2014a	Germany	Participation
Koontz & Newig 2014b	Germany	Participation
Kouw 2014	Netherlands	Participation

Kowalczak et al. 2013	Czech Republic, Poland	Participation
Larsen 2011	Denmark	Policy integration
Laurenceau et al. 2009	Belgium, France, Netherlands	Economic analysis
Liefferink et al. 2011	Denmark, France, Netherlands	Ecological goals and status, Participation, Policy integration, River basin management
Lundmark & Jonsson 2013	Sweden	Participation
Lundqvist 2004	Sweden	Ecological goals and status, Participation
Maganda 2013	Luxembourg	Participation, River basin management
Medd & Marvin 2007	United Kingdom	Planning process
Meyer & Thiel 2012	Germany	Participation, Planning process
Moren-Abat & Rodriguez-Roldan 2012	Spain	Ecological goals and status, River basin management
Moss 2004	Germany	River basin management
Moss 2008	United Kingdom	Ecological goals and status
Moss 2012	Germany	River basin management
Mylopoulos & Kolokytha 2008	Greece	River basin management
Neef 2008	Germany	Participation
Newson 2011	United Kingdom	Participation
Nielsen et al. 2013	Denmark, Finland, Latvia, Lithuania, Poland, Sweden	River basin management
Parés 2011	Spain	Participation
Parés et al. 2015	Spain	Participation
Raadgever et al. 2011	Netherlands	Planning process
Richter et al. 2013	Germany	Ecological goals and status
Slavíková & Jílková 2011	Czech Republic	Participation
Spiller et al. 2012	United Kingdom	WFD in general
Thaler et al. 2013	Belgium, Finland, France, Italy, Spain, Sweden, United Kingdom	Economic analysis
Theesfeld & Schleyer 2013	Germany	Participation, River basin management
Thiel & Egerton 2011	Portugal	River basin management
Thiel 2014	Spain	River basin management
Thiel 2015	Germany, Portugal, Spain	River basin management
van der Arend & Behagel 2011	Netherlands	Participation
van der Heijden & ten Heuvelhof 2012	Netherlands	Participation
van der Heijden & ten Heuvelhof 2013	Netherlands	Participation

van der Heijden et al. 2014	Netherlands	Participation, River basin management
van der Veeren 2010	Netherlands	Economic analysis
Watson et al. 2009	United Kingdom	Participation
Watson & Howe 2006	United Kingdom	Participation
Waylen et al. 2015	United Kingdom	Participation
Woods 2008	United Kingdom	Participation

To analyse the research reported in each source article, we relied on a codebook based on more than 35 items covering author affiliations and countries, research priorities and questions, implementation requirements (for instance, river basin management, public participation, or economic analysis), and levels of analysis (national, RBD, or catchment), as well as the ambition of a study (descriptive, causal, or evaluative) and related theoretical and methodological choices. These items were chosen so as to draw a complete picture of the thematic, geographic, and temporal scales of the research undertaken so far. Because of the small sample size, we do not go beyond basic statistics when we present our findings. Appendix C provides a complete list of our codebook items.

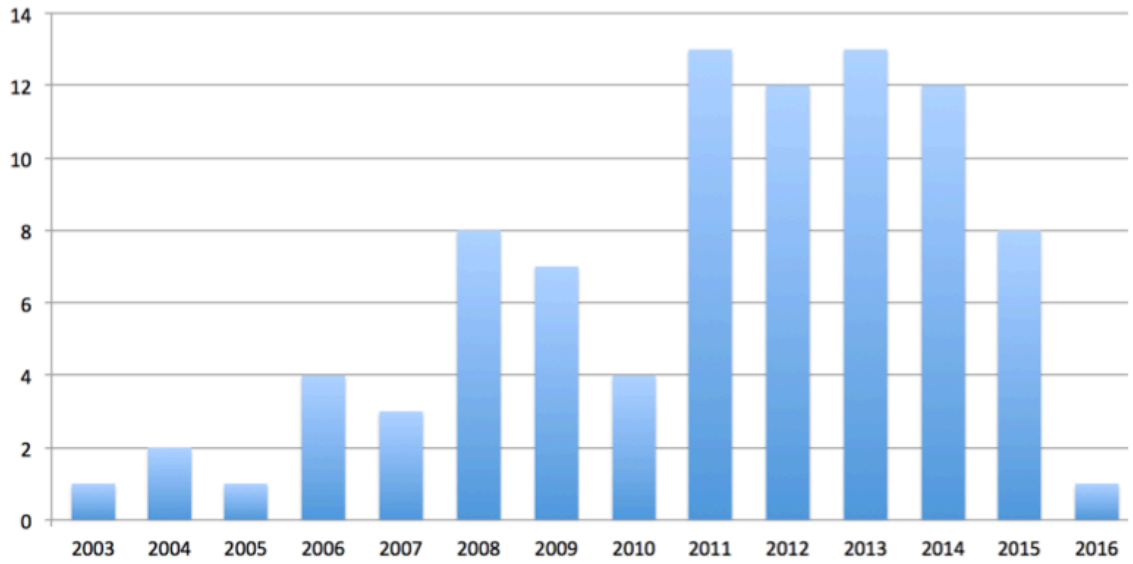
We then used categorical, dichotomous, and ordinal variables to code our findings; manually written comments served to justify decisions and to provide additional material for the subsequent analysis and interpretation. The two authors of this article coded, independently from each other, all 89 source papers and resolved disagreements through deliberation.

2.5 Publication patterns: who publishes when and where?

We examined 89 journal articles studying, from various disciplinary, theoretical and methodological angles, WFD implementation in Europe. The number as such is impressive. Academic scholarship on the Directive is booming, probably being the most widely studied EU Directive, and definitely the most widely studied piece of EU legislation in the field of environment. However, those 89 studies have not been published evenly across the years. The academic community began to pay attention to the empirical study of WFD implementation more systematically in 2007, followed by a remarkable increase in publications after 2010 (Figure 1). In fact, more than 66 per cent

of all articles were published in the last five years. Furthermore, we are aware of more manuscripts being under way; in other words, the trend is likely to continue.

Figure 1: Number of publications over time

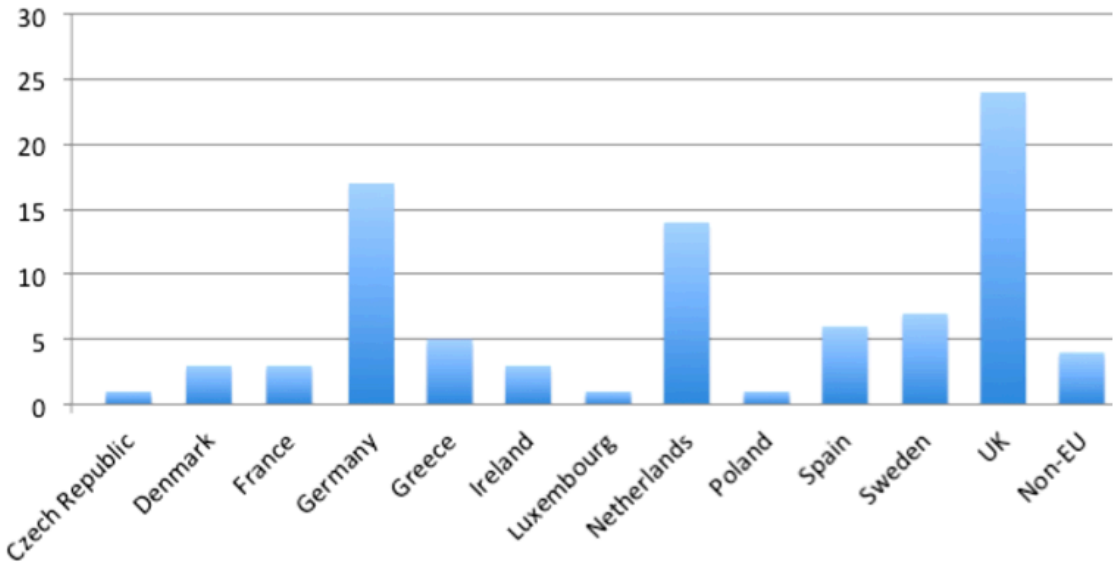


Not surprisingly, those figures reflect WFD implementation patterns in many EU member states. In compliance with EU legislation, many countries had transposed the Directive into national law by 2003 before defining RBDs, setting up the necessary institutions and characterising water bodies. Early research largely reflects those priorities, mainly focusing on the establishment of RBDs (Moss 2004), the characterisation process (Kirk et al. 2007), or pilot projects carried out in the context of the Common Implementation Strategy (Carter & Howe 2006; Watson & Howe 2006). However, as we will show further below, it is mainly the institutional novelties in the Directive that intrigued the scholarly community, in particular the involvement of non-state actors in water planning and river basin management. Obviously, those processes could only be described, theorised, and evaluated when they were already under way, i.e. when River Basin Management Plans were adopted in 2009-2010. Consequently, studies analysing the actual planning process mushroomed in 2011, and figures have remained at high levels since.

What do we know about the authors of those studies? We looked into three dimensions: the country of origin of the first author, their professional background, and if the author

is an academic, the departmental affiliation. First, we recorded the country of origin for the lead author of each article. Those authors work in institutions in 13 different member states (Figure 2). Countries in northwestern Europe dominated; in fact, more than 61 per cent of all studies were first-authored by scholars based in the United Kingdom, Germany, and the Netherlands. Scholars working in the Czech Republic, Denmark, France, Greece, Ireland, Luxembourg, Poland, Spain, Sweden, and outside Europe published the remaining 39 per cent. We were unable to identify publications authored by scholars in the remaining 15 member states. In fairness, we only talk about lead authors here. However, the overall pattern did not look significantly different when we took into account all authors of a submission; the figures for authors based at institutions in southern and eastern Europe remained significantly low.

Figure 2: Number of publications by country of origin (first author)



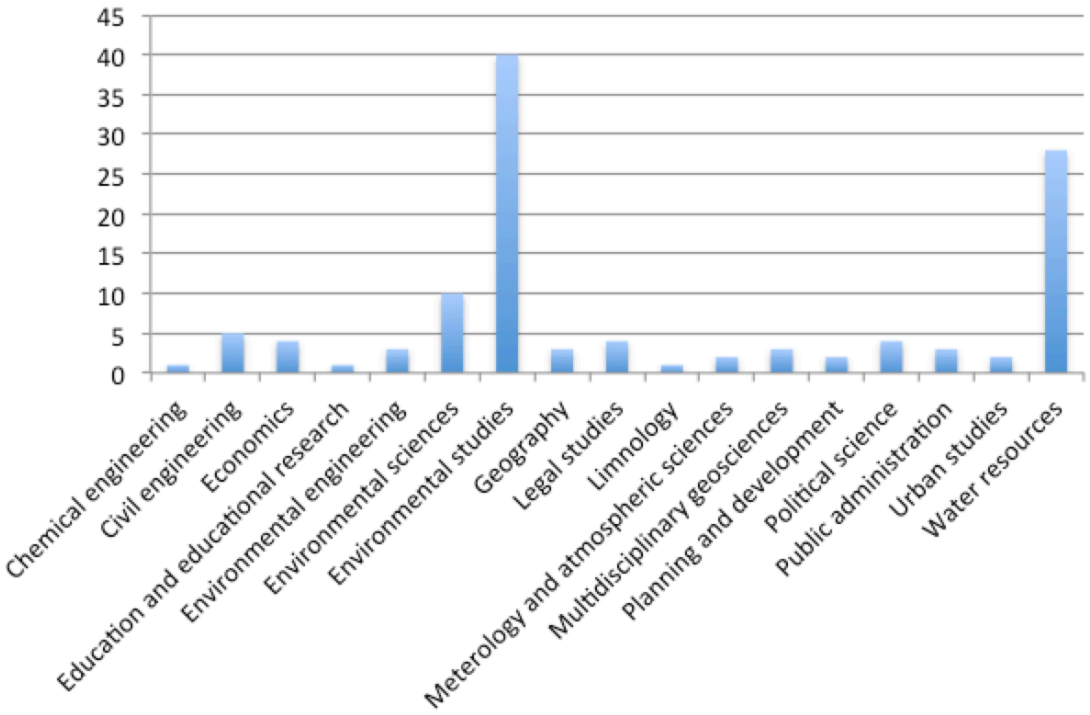
These figures are not counterintuitive. Ultimately, they may simply reflect general patterns of academic productivity. There is no doubt that scholars in southern and eastern Europe carry out high-quality research across the board. Still, academics from northwestern Europe tend to publish in international peer-reviewed journals more often than their colleagues in other parts of Europe. We may speculate as to why this is so, but whatever the causes are they say little about WFD research as such. However, it is plausible to argue that the Directive is generally more widely studied in the United Kingdom, Germany, and the Netherlands. This may be because the WFD, as a water quality Directive, addresses issues of more fundamental importance in northwestern

Europe, setting in motion policy makers, civil society, national funding bodies, and the scholarly community. Although troubled by water quality problems too, many regions in southern Europe put a higher premium on the question of water quantity and supply, a preference that may bind scarce research resources. Nevertheless, the observed pattern may have a significant influence on case selection, resulting in a noticeable imbalance as to the countries studied by the WFD community.

Second, a majority of our first authors, some 77 out of 89 articles in the sample, are academics from universities or national research institutes. Ten authors are practitioners, for instance, from government departments, environmental regulators, or charities; two authors have a double affiliation. We were not surprised to see a majority of academics here. Still, we believe that the 11 per cent non-academics in our sample is above average, highlighting the importance of WFD-related research for environmental practitioners in Europe. Third, the WFD community in Europe largely consists of scholars working at interdisciplinary environmental social science departments or, in a few cases, at natural science or engineering schools, in total 59 out of 79 in our sample. Only 17 scholars work at social science departments with a clear disciplinary focus: 6 in politics, 5 in law, and 6 in economics. To be clear, this says nothing about their disciplinary background. However, it suggests that many authors operate in an interdisciplinary environment, often with a sympathy for applied research. As we argue below, this is likely to shape theoretical and methodological choices when studying WFD implementation in Europe.

Our analysis of target journals also highlights the interdisciplinary ambition of many scholars. Figure 3 summarises the Web of Science subject categories of those journals that have published articles in our sample. There are two caveats. First, some journals are listed in several subject categories, so the absolute number of entries is higher than the number of articles in our sample. Second, a few journals are not listed in the Web of Science, and we manually assigned plausible subject categories to those outlets, based on editorial mission statements and other information found on the journal website.

Figure 3: Number of publications by Web of Science subject categories



Accordingly, manuscripts about the implementation of the WFD usually find their home in interdisciplinary journals, particularly in those specialising in environmental social science and water resources. Authors rarely target journals in social science subdisciplines such as political science (van der Arend & Behagel 2011; Koontz & Newig 2014b), public administration (Behagel & Arts 2014), economics (Bithas et al. 2014; Dehnhardt 2013), or legal studies (Adshead 2006; Keessen et al. 2010). At first sight, this is somewhat counterintuitive. After all, many authors explore topics such as public participation or the use of cost-benefit analysis in water planning. Arguably, their findings may be of great interest for a wider audience in political science or economics, for instance, for scholars working on deliberative democracy or evidence-based policy making. However, the approaches taken to study such phenomena, specifically the interdisciplinary and often applied nature of WFD-related research, make such work less appropriate for narrow disciplinary debates and more suitable for an interdisciplinary audience and their journals. Still, we are somewhat concerned that scholarly communities may talk past each other; in other words, interdisciplinary outlets may have become another niche for a community of experts rather than an arena of exchange across disciplines. Two journals have become particularly important for scholars specialising in European water management: *Land Use Policy*, with 11 out of

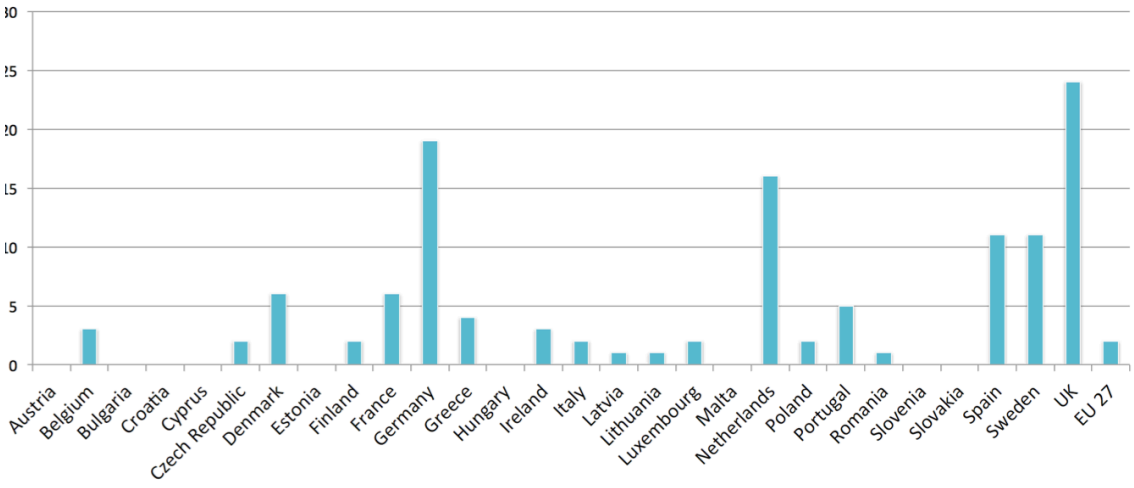
89 articles in our sample, and *Environmental Policy & Governance* (including its predecessor *European Environment*) with 10 articles. *Local Environment, Water Policy* and the *International Journal of Water Governance* constitute another group of preferred target journals.

2.6 Mapping scholarly interest: countries, policy levels, themes

Now that we have established who publishes when and where, let us take a closer look at the object of those studies: the what. To this end, we organised our review around five dimensions: countries, policy levels, transboundary water management, the temporal stage of WFD implementation, and if the Directive has not been studied in its entirety, the aspects of the Directive that attracted scholarly attention. In other words, we map scholarly interest across a range of spatial, temporal, and substantial dimensions.

We begin with dimension one, i.e. countries studied. Figure 4 displays the number of publications per country. The absolute number of entries is higher than the number of articles in our sample; this is because some papers report on more than one country. Generally, our sample is characterised by an unhealthy imbalance. Five countries were studied quite thoroughly in the past: the United Kingdom (24 studies), Germany (19 studies), the Netherlands (16 studies), and Spain and Sweden (11 studies each). Another group of countries is covered by between three to six articles, including Belgium, Denmark, France, Greece, Ireland, and Portugal. However, a majority of EU member states have received little or no scholarly attention at all. These include many countries that have joined the EU in 2004 or thereafter, for instance, Hungary, Romania, and Slovakia, but also the Baltic states. What should be clear from this brief survey is that much is known about WFD implementation in northern and western Europe, but relatively little about WFD implementation in Mediterranean countries, including founding members and heavyweights such as France and Italy, and in eastern Europe.

Figure 4: Number of studies per case study country



We offer two explanations. On the one hand, the above pattern simply reflects patterns of authorship. We have in our sample, for various reasons, a higher number of scholars based at British, Dutch, and German institutions, and this may influence case selection. There are good reasons for that: they speak the language, they have the contacts, they know the context, and they respond to requirements of national funding bodies. On the other hand, there may be an enlargement effect: the 2004, 2007, and 2013 accessions came with important transitory provisions and may have delayed WFD implementation in those countries.

Is all this a problem? Yes and no at the same time. Case selection is not random. Academics choose cases to make a specific argument, to test an established theoretical proposition, or to develop a new one. This argument may result in a specific interpretation or critique that remains valid and plausible beyond the case studied. Scholars in our sample sometimes study the WFD, or specific provisions of the Directive, to make a claim that is entirely decoupled from the Directive. For instance, Drazkiewicz et al. (2015) used WFD cases to test the hypothesis that participatory arrangements enhance the ecological quality of environmental decisions and their implementation. There is little reason to study Austria, Bulgaria, or Malta if there was no participation in those countries that could have had an effect on environmental outcomes. However, as we show further below, when we talk about research design choices, an overwhelming majority of studies in our sample are descriptive, sometimes with evaluative undertones. Authors report what is going on and sometimes use ad hoc or theory-informed benchmarks to assess what they observe, often, so it seems, with a

view to supporting the implementation of WFD provisions in their country. From this perspective, the above-mentioned imbalance is unfortunate because it provides an incomplete picture. This is no trivial observation: many evaluations suggest that WFD provisions were implemented in an incomplete or suboptimal way. That may be true or not, but it would certainly be helpful to put such assessments into context by studying countries whose implementation record is, if we trust EU reports and media coverage, less than ideal too. In other words, selective cases may highlight deficits that are negligible if compared against other cases and may direct our attention away from more serious problems.

We now turn to dimension two: the policy level studied. We distinguish three levels: the national level, relevant for the domestic transposition of the WFD and sometimes for the general organisation of WFD water planning in a EU member state; the RBD level, i.e. the reference level envisaged in the Directive for the preparation of management plans; and the sub-RBD level, in this article conveniently called the catchment level, although we do not associate any specific ecological definition to this term. Table 2 below summarises our findings.

Table 2: Number of studies per policy level

Policy level	National	River basin district	Catchment
Number of studies considering this level	14	17	12
Number of studies studying only this level	30	16	25

Accordingly, we have 30 articles in our sample that strictly analyse the national level. These are followed by research looking into processes at catchment level. There is a relatively low number of 16 articles studying the WFD at the RBD level. A further set of 18 articles study combinations of, and sometimes the interactions between, several levels. We were surprised about the minor importance of RBDs and the larger number of studies focusing on catchments, given the prominence of RBDs in the Directive. We offer three explanations. First, some member states may have found the RBD level somewhat impractical and organised important management activities at lower levels

instead. This may be the case when RBDs conflict with administrative boundaries in a federal system such as Germany, where important planning activities are carried out at catchment level (Koontz & Newig 2014a). Obviously, this may direct scholarly attention away from RBDs. Second, some RBDs are inconveniently large to be studied in-depth through qualitative methods. In other words, the study of catchments is a methodological choice although, as we will argue below, such choices have not always been made explicit. Third, when the actual policy level does not matter, scholars go where the data are. For instance, when Borowski et al. (2008) decided to study the effects of participatory arrangements on social learning, they chose the level where such involvement processes take place. Case selection follows theory. Still, in light of the fact that many studies in this field have no causal ambition and remain descriptive, it is fair to argue that such descriptions then tend to show an incomplete picture. Incomplete in the sense that the reader does not always know how representative a catchment is vis-à-vis other catchments. Furthermore, extensive knowledge about one particular policy level does not necessarily enhance our knowledge of other levels and their interactions. For instance, we possess an in-depth understanding of German WFD water planning at the catchment level and of important initiatives at the federal level. However, despite a wealth of publications on Germany we are still in the dark as to the coordinative mechanisms between federal states, i.e. mechanisms in place to integrate river basin planning and catchment level activities in various states. Future research will definitely benefit from perspectives that integrate various policy levels to provide a more complete picture of WFD water planning.

Dimension three looks into the transboundary aspect of river basin management. Almost all countries in continental Europe share at least one river basin with their neighbours. So far, no powerful mechanisms are in place to encourage river basin management beyond national borders. International commissions exist for each transboundary basin, but important parts of the planning process are excluded from such coordination, not least because countries implemented WFD provisions at a very different pace. At the time of writing, the scholarly community has not taken many steps to look into the transboundary aspect of WFD implementation. We have 33 studies studying RBDs, a vast majority of those RBDs being transboundary, but only one study (Mylopoulos & Kolokytha 2008) addresses this issue by studying both sides of a Greek-Bulgarian basin. All other studies remain on ‘their’ side of the river; Meyer

and Thiel (2012), for instance, study the German part of the Odra basin and ignore the Polish part. Likewise, the largest river basin in Europe, the Danube, has been managed for more than 150 years in the spirit of transboundary water management, through various international commissions established by international agreements. However, this has rarely attracted scholarly attention, and never in a WFD context. We believe this is a fundamental research gap. We acknowledge that there are limits to such a research programme, exactly because river basin management beyond national borders currently meets various political, administrative, and perhaps, ideological obstacles. Still, scholarship on WFD implementation would greatly benefit from studies establishing the presence or absence of transboundary mechanisms.

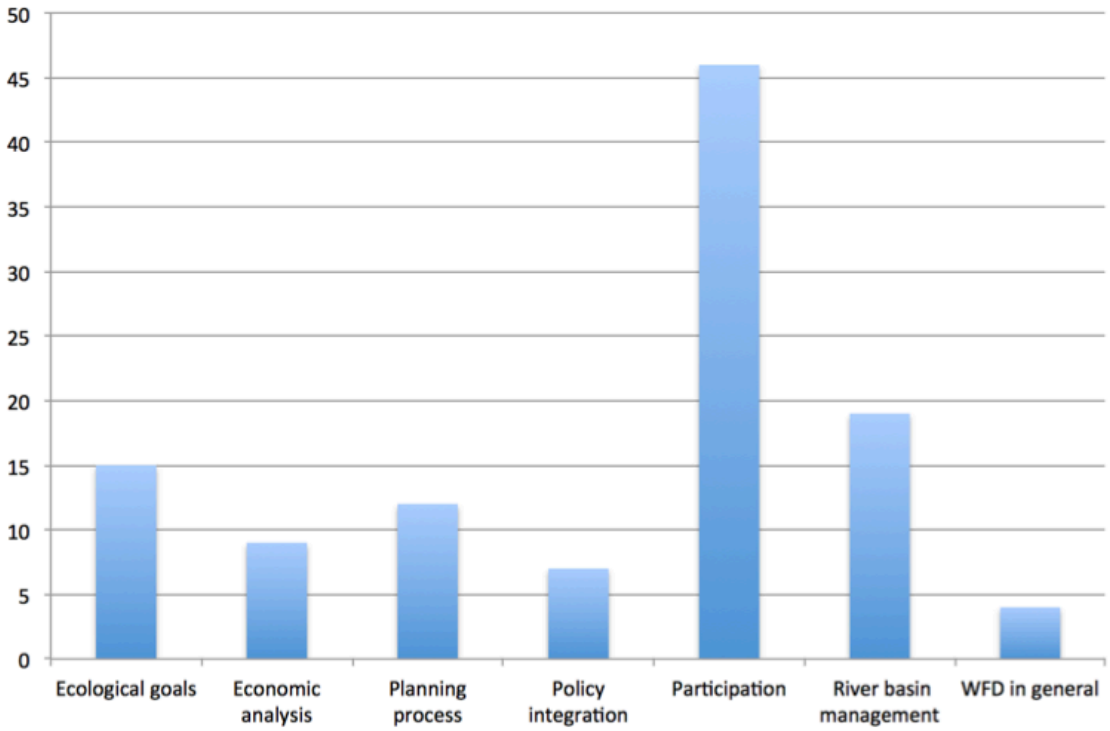
We now move from spatial and scalar aspects to the temporal dimension of implementing the Directive. This is dimension four: what stages of the WFD planning process have been studied so far? Member states were supposed to implement the Directive in various steps. This involves transposing the WFD into national law, identifying RBDs, nominating a competent authority, designating water bodies, assessing pressures on aquatic environments and evaluating the risk of missing environmental targets (characterisation process), and the drafting of River Basin Management Plans and Programmes of Measures. The early stages of the implementation process were accompanied by pilot measures. They were carried out in the context of the common strategy of implementation with a view to supporting the implementation of 'tricky measures', such as the involvement of non-state actors or the use of economic analysis in water planning.

Our sample includes three articles that analyse pilot projects: two of them on participation and one on cost-benefit analysis. All three report on the United Kingdom. Nine papers address, among other issues, the process of transposing the WFD into national law. A vast majority of papers in our sample, 86 out of 89, cover the preparation phase from 2003 to 2009 (and in some countries, 2010). This is not very counterintuitive per se. After all, many exciting innovations, from a social science perspective, could be observed only during or after the preparation phase. These include the establishment of RBDs, the involvement of stakeholders in the planning process, and the application of various economic decision-making tools. However, there is a caveat here: many studies provide a snapshot, i.e. report about a specific moment in

time or a particular step in implementing the Directive. A few studies present a bigger picture or compare WFD implementation efforts over time. For example, we identified only three articles explicitly studying the first implementation cycle from 2009 to 2015 or systematically comparing the experience gained in different sectors and countries in the preparation phase and the first cycle.

Finally, in dimension five, we analysed the various themes and requirements, usually institutional innovations, that can be found in the WFD and that may have attracted scholarly attention. We distinguished seven themes: the ecological goals of the Directive and how achievement of those goals has been encouraged or enforced in EU member states, including the designation of water bodies; the use of economic principles as reflected in tools such as cost-benefit analysis in water planning; the establishment of RBDs and problems that arise as a consequence of rescaling; the involvement of non-state actors in water planning; the integration of other policy areas in WFD water management, for instance, climate, forestry, flooding, and biodiversity; the planning process, if not specifically focused on participation, economic tools, policy integration, or river basin management; and a residual category: WFD in general. This last category is particularly useful for studies looking into the overall transposition of the Directive into national law. However, the category also covers quantitative research aggregating several WFD themes across a large number of EU member states such that important lessons can be drawn regarding the general implementation of the Directive in Europe, although at the same time, because of the step of aggregating information, little can be said in detail about, for example, participation, economic analysis, or policy integration. Figure 5 below reports our findings. Quite a few articles discuss more than one theme; the absolute number of entries is therefore higher than the number of articles in our sample.

Figure 5: Number of studies per WFD theme



What do the data tell us? We observed a great imbalance as to the institutional novelties promoted by the WFD. The involvement of non-state actors in water planning has inspired a rich literature. In fact, 52 per cent of all articles and (the figures differ here because articles often report on more than one theme) 41 per cent of all themes are related to public participation in WFD water management. To be clear, it is beyond the scope of this article to discuss the achievements made in this field. However, what can be said is that previous work centres on three themes. First, we have a number of publications taking a Europeanisation perspective, i.e. they ask why specific domestic arrangements have come into place and what role the EU plays therein (Liefferink et al. 2011). Second, authors explore the effects of participation, typically on social learning processes (Borowski et al. 2008), ecological outcomes and implementation (Drazkiewicz et al. 2015), or legitimacy (Behagel & Turnhout 2011). Third, we found a series of articles comparing instances of participation against legal or normative benchmarks, i.e. evaluative exercises (Watson & Howe 2006; Slavíková & Jílková 2011; Benson et al. 2014). With the exception of works focusing on ecological outcomes, an aspect still treated with neglect, the above questions represent strands of research that speak to a wider and already well-established literature.

Certainly, this enthusiasm for participation within the WFD research community calls for an explanation. We offer three. First, research interviews with national water managers and European Commission officials, carried out in the context of other projects, suggest that of all institutional novelties proposed by the WFD, public participation perhaps represents the greatest challenge to national administrative cultures and established water management traditions. Exploring public and stakeholder engagement therefore constitutes an excellent opportunity to study administrative reform, institutional change, and learning in contested settings. Second, these challenges resulted, in our mind, in an exceptionally high number of funded projects at national and EU levels, consultancy opportunities, and other incentives for researchers to collaborate with policy makers and stakeholders on participation. Third, participation resonates with a wide variety of literature, much more than other institutional novelties in the Directive do. This includes communities working on EU policy implementation, on participatory and deliberative democracy, on regulatory reform, on policy effectiveness of participatory governance, on social learning, and many others.

We found less work, 20 per cent of all articles, on water management at ecological scales. Once again, scholars study questions related to the Europeanisation of domestic arrangements, i.e. of policy implementation. When authors identify misfits between EU requirements and domestic practice, and in this context this means between ecological and administrative scales, a link is usually made to the literature on spatial fit and institutional interplay (Moss 2004; 2012). This literature is even more prominent in works investigating economic rationales for specific scalar arrangements (Thiel & Egerton 2011; Thiel 2014).

However, regulatory tools such as cost-benefit analysis remain understudied (but see Dehnhardt 2013; 2014). In other words, scholarship investigating the identification of environmental benefits and costs, approaches toward cost recovery of water services and incentive pricing, and the link between participation and economic analysis, in particular how they complement each other, is still in great demand. We also believe that the politics of exemptions is neglected so far, i.e. political strategies that often result in less stringent water quality objectives. Finally, policy integration is rarely considered in prior work, in particular with regard to climate policy - our sample includes two articles that exclusively analyse this relationship in Denmark and Scotland (Blackstock

2009; Larsen 2011) - and to EU policies based on similar management philosophies. These include, for instance, the Birds and Habitats Directives, the Marine Strategy Framework Directive, and the Floods Directive; we hypothesise they could be a source of both mutual reinforcement and conflict (Beunen et al. 2009). In fairness, the literature on institutional interplay (Young 2002; in a WFD context see, e.g. Moss 2004; Newig & Fritsch 2009; Hüesker & Moss 2015) has addressed such questions. However, we still see the promise of linking spatial approaches to the integration of different policy fields in WFD research more than in the past.

2.7 Studying WFD implementation: theory and methods

In this section we discuss how previous scholarship has approached the study of WFD implementation. To this end, we focus on three aspects. The first is the ambition of the research project; we hereby distinguish descriptive, causal, and evaluative work. The second is questions of research design and methodology. The third is choices made in terms of concepts and theory.

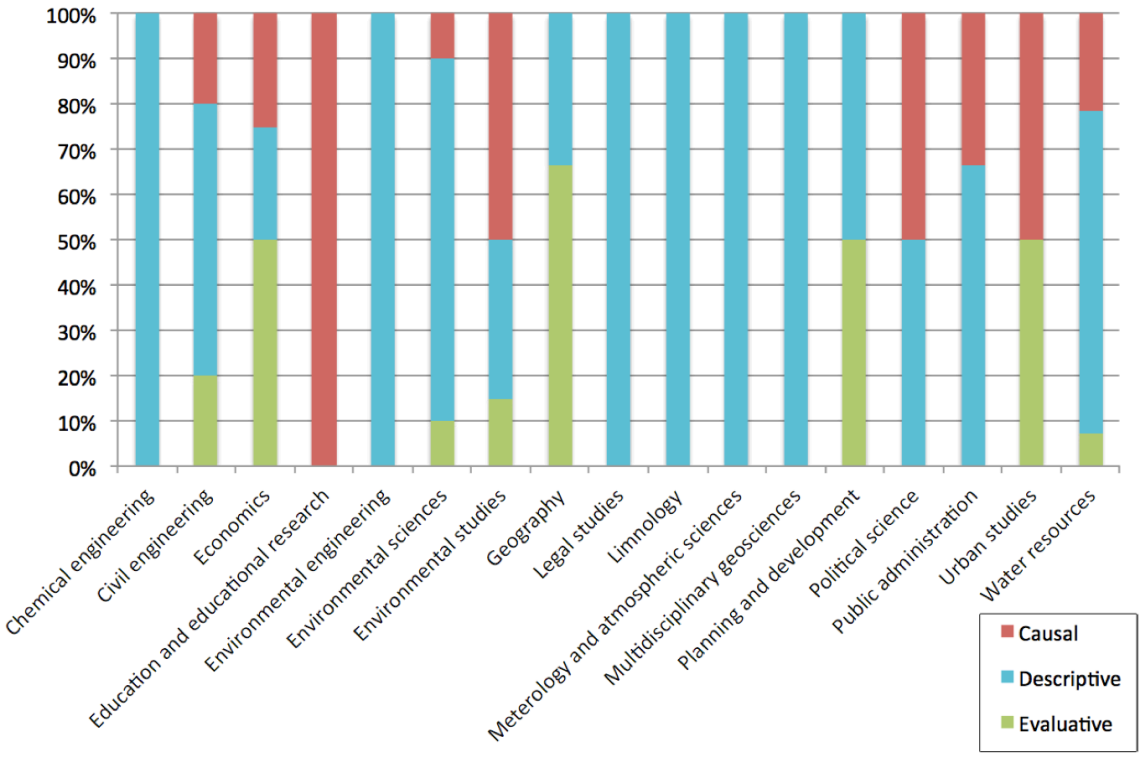
In terms of ambition, we identified three ideal types: (1) papers with a causal ambition that try, supported by theory and conceptual frameworks, to establish a causal link between two or more independent and dependent variables; (2) evaluative papers that compare patterns of WFD implementation against legal requirements or normative frameworks; and (3) descriptive papers that portray and detail a phenomenon without embedding it in an explanatory or normative framework. We complemented those ideal types with two additional categories: causal papers without theory, i.e. based on ad hoc explanations; and evaluative papers without normative framework, i.e. providing ad hoc evaluations.

We observed a large number of descriptive work in our sample. About 55 per cent of all articles, 49 out of 89, describe the implementation of the Directive, or of a specific WFD theme, in Europe. However, those authors do not use their empirical material to build, explore, or test theories or to appraise their subject of analysis using a normative framework. Furthermore, 13 articles in our sample are descriptive in nature, but come with ad hoc causal explanations. Likewise, 3 papers present ad hoc evaluations. Only 18 articles display a distinct causal ambition, relying on theory and hypotheses, and 6

papers offer a normative critique based on a previously defined framework against which authors compare their observations. In other words, only 24 per cent of all articles go beyond descriptive or ad hoc ambitions.

According to our data, journal articles display a descriptive research interest more often if they appear in physical science, engineering, or interdisciplinary journals. Figure 6 below summarises the type of ambition across the Web of Science journal subject categories in which the journals in our sample are listed.

Figure 6: Research ambition across Web of Science subject categories



Our sample of 89 articles includes quite a few articles published in physical science journals or outlets with a technical orientation, i.e. in journals belonging to Web of Science subject categories such as chemical engineering, civil engineering, environmental sciences, limnology, or meteorology. Figure 6 suggests that those journals have a particularly strong preference for descriptive submissions. The picture is mixed with regard to interdisciplinary journals. We have many descriptive pieces in periodicals specialising in water resources, whereas the environmental Studies category is more balanced. Finally, journals in classic social science subdisciplines such as

economics, political science, or public administration as well as in geography and urban studies tend to publish more research with causal or evaluative ambitions. Our analyses also suggest that practitioners are more likely to publish descriptive work, and they prefer to do so in physical science, engineering, or interdisciplinary journals.

All studies with an evaluative ambition have one thing in common: they focus on public participation, including research on Ireland (Irvine and O'Brien 2009), the Czech Republic (Slavíková & Jílková 2011), Spain (Parés 2011), and the United Kingdom (Blackstock et al. 2012; Fritsch & Benson 2013; Benson et al. 2014). None of those countries had well-established participatory mechanisms in place prior to the adoption of the Directive. It is therefore not surprising to see authors evaluating the progress made after the WFD was transposed into national law.

We observed more heterogeneity when we looked at causal projects in our sample. Articles cover areas as diverse as public participation, river basin management, and economic analysis, but also the Directive as a whole. The majority of articles use WFD implementation as the dependent variable, i.e. they try to shed light on the political, economic, or societal causes of specific implementation patterns. To this end, authors either refer to the Europeanisation literature (Liefferink et al. 2011; Moss 2004) or use public policy approaches, including institutional theories (Thiel & Egerton 2011; Nielsen et al. 2013; Thiel 2014), policy change models (Bourblanc et al. 2013), and the advocacy coalition framework (Dehnhardt 2014). Another set of work uses WFD implementation as the independent variable. Such studies explore, for instance, the effects of participatory exercises whereby social learning (Borowski et al. 2008; Lundmark & Jonsson 2013) or policy implementation and environmental outcomes (Koontz & Newig 2014b; Drazkiewicz et al. 2015) constitute the dependent variables.

The Europeanisation literature has developed a number of fruitful approaches to explain EU policy implementation. We distinguished earlier the goodness-of-fit, actor-based, and worlds-of-compliance approaches, plus theories combining the goodness-of-fit approach with additional variables. The WFD community has, to date, made only limited use of this literature. In fairness, this may be because authors never meant to explain implementation patterns in the first place; instead, they may have selected the Directive as an independent variable. However, only two papers in our sample analyse the implementation of the WFD as dependent variable and utilise the Europeanisation

literature systematically (Liefferink et al. 2011; Moss 2004); both papers employ a variant of the goodness-of-fit approach with additional variables. Although Albrecht (2013) mentions the term "Europeanisation" in the title of her paper, no further reference to this literature is made in the remainder of the article. There is certainly potential to employ a wider array of approaches in a WFD context, ideally in a comparative setting with competing theories.

The overall dominance of descriptive projects in this literature is, in our estimation, problematic. To be clear, we recognise that explanation and evaluation are not necessarily key priorities for many authors studying the WFD. We also appreciate the fact that many interdisciplinary scholars seek impact outside rather than inside the academy. Finally, we agree that "mere description" (Gerring 2012, p.721) has its merits. To illustrate, descriptive research may constitute a springboard for subsequent evaluative or causal projects, including meta-analyses and comparative studies. Unfortunately, however, empirical documentation of such uses in a WFD context is minimal. So far we are left with a pile of articles that describe in more or less detail important features of WFD implementation in Europe. However, we as readers are somewhat left in the dark as to what the purpose, mission, or function of those articles is. After all, their observations cannot easily be translated across cases or disciplines; these articles often contain rich materials shy of a research question. To enhance the echo of such research beyond the community of WFD scholars, we think authors are well advised to carry the empirical torch slightly farther than to the nearest descriptive pit stop.

This is where theory kicks in. Essentially, WFD implementation research is theory-free territory. Almost 50 articles out of 89 do not mention theory at all. Others mention concepts and theories in between the empirical material, but those references do not really enhance our understanding of the overall argument; name dropping seems to outplay systematic utilisation. There are a small number of theory-guided studies in our sample where conceptual considerations inform hypothesis building or normative frameworks. However, by and large, theory falls by the wayside. This is a direct corollary of the descriptive or ad hoc direction taken by many studies. If somebody prioritises description or is content with ad hoc conclusions, there is little necessity for abstract reasoning. We find this lack of theory stunning. Theories are extremely useful

vehicles to translate ideas across cases and disciplines, and we are convinced that the WFD community would benefit from a more systematic recourse to concepts, hypotheses, systematic classifications, and theory.

In terms of methodology, the WFD implementation literature is still in its infancy. We initially planned to map methodological choices made in this literature against classic approaches in social science. However, we failed to do so: more than 30 per cent, 27 out of 89 articles in our sample, provide virtually no information on research design, methods, and data. We can sometimes infer from the list of references that policy documents have informed the analysis; we may make the educated guess that some conclusions must be based on interview data or direct observation. However, the sheer absence of any methodological statement in almost one third of all publications casts a shadow over the entire subfield. Transparency and openness with regard to data sources and analysis are prerequisites for critical debate and enable the confirmation and refutation of claims. It is a professional standard that should not be given up lightly, and we do not see the merits of downplaying methodological precision. According to our data, authors operating in physical science or engineering schools are more likely to take a relaxed approach to methodology when they report on WFD implementation; likewise, such articles tend to be published in natural science or engineering journals.

Another set of 18 articles report on data and research design. However, this information does not form a coherent methodological section, but is presented as part of the introduction, in the empirical sections, or simply in a footnote. The average word count is 138; in 9 papers it is 75 words or fewer, which is, upon sober reflection, definitely insufficient to inform adequately about the methodological choices made. Finally, 44 out of 89 articles, fewer than half of the sample, provide a separate section dedicated to data and methods, with an average length of 579 words. Those studies usually rely on qualitative methods, particularly interview data, policy documents, participatory observation, and media analyses. Because of the overall lack of theory, there is little dialogue between theory and methods. In other words, methodological choices are rarely motivated by theory. Consequently, justifications for specific research designs and data analysis methods are very practical in nature.

With regard to research design, our sample looks very uniform. First, our knowledge about WFD implementation in Europe primarily relies on single case studies or small-n

comparisons within one country. Our sample includes 74 single country studies, 2 comparisons between EU countries and jurisdictions overseas, as well as 11 comparative studies within Europe (between 2 and 11 countries each). There is a striking lack of large-n quantitative research: we only identified 2 studies (Kanakoudis & Tsitsifli 2010; Kanakoudis et al. 2015). Second, those 11 small-n studies are not always comparative in methodological terms. This is because they frequently fail to sort cases into comparable sets, and cases are rarely chosen because of their properties. In other words, there are few attempts to use only most-similar, most-different, or related strategies so as to maximise the benefits of a comparative research design. In this sense, many multicountry studies resemble case collections rather than theoretically and methodologically justified case comparisons. Not surprisingly then, 6 of those 11 studies are descriptive; 4 others have a causal ambition, and the remaining study offers an ad hoc explanation.

We argued before that the WFD community has submitted their research to a diverse range of journals, from economics and political science outlets to interdisciplinary journals and physical science periodicals. We now explore whether publication choices are linked to research ambition and methodological transparency. The underlying intuition is that articles characterised by less ambitious research programmes or weaker methodology parts are likely to be published in lower-ranked journals.

We first used the Web of Science to establish the relative position of a journal in its respective subject category ranking, based on the two-year impact factor at the time of publication of each article in our sample. To this end, we classified those journals as belonging to one of the following seven categories: top 5 per cent, top 10 per cent, top 25 per cent, top 50 per cent, top 75 per cent, or top 100 per cent of its respective Web of Science journal subject category; journals not listed at all form the last category. This way we are able to compare journals across Web of Science subject categories, although those categories differ as to their average impact factor and the number of journals listed. In other words, we argue that a journal on position 6 in a subject category with 138 journals enjoys, within its disciplinary community, a greater reputation than a journal on position 4 in a subject category of 59 journals. If a journal was listed in several categories, we used the best measure of this journal. The approach also enabled us to control for publication years, i.e. we considered the possibility that journals move

up and down in the rankings over time.

We are aware that this approach has limits. On the one hand, we used the publication year of an article although the time of submission would be a more precise measure; this information, however, was not available to us. On the other hand, the position of a journal in a subject category ranking reflects its impact factor, a metric that has attracted widespread criticisms (Giles & Garand 2007; Plümper 2007; Garand et al. 2009; Eyre-Walker & Stoletzki 2013). The impact factor is statistically vulnerable because of the small sample size in many subject categories. Citation patterns often reflect journal availability rather than journal quality; authors cannot use a specific article if their institution provides no access. The impact factor is influenced by self-citations. Finally, the impact factor counts citations, but does not consider whether authors cite papers in a supporting or in a critical fashion. This implies that the impact factor says less about quality and more about reputation. However, we still believe that the relative position of a journal in the rankings provides the most useful metric in the context of this article.

Our findings are straightforward: although there is no linear trend, our analysis suggests that theory-based causal and evaluative projects are more likely to be published in higher-ranked journals. Descriptive papers and those relying on ad hoc analyses, in contrast, tend to be published in outlets at the bottom of their subject category ranking or in outlets not listed in the Web of Science at all (Figure 7). Figure 8 displays the relationship between methodological transparency and position in the rankings.

Figure 7: Research ambition across journal ranking positions

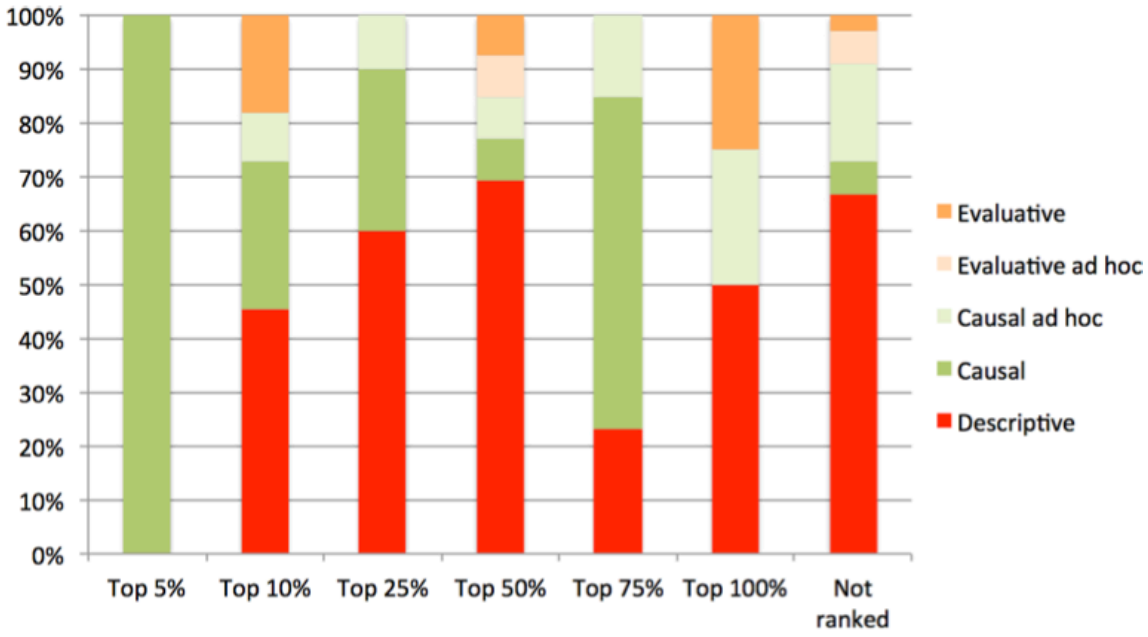
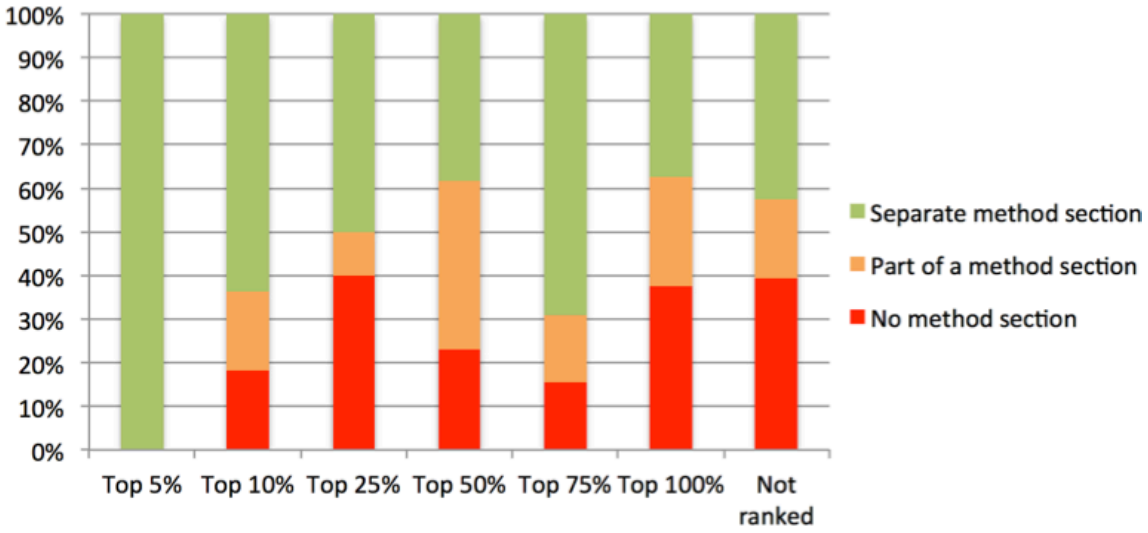


Figure 8: Methodological transparency across journal ranking positions



Our findings suggest that, although there is one outlier category at 75 per cent, higher-ranked journals tend to prefer submissions with a separate and, as we have shown earlier, longer methods section. Lower-ranked journals or outlets not listed at all are more likely to publish papers where information on data, cases and research design forms a shorter part of the introduction or empirical section, or papers with no methodological information at all.

2.8 Conclusion

We set out to systematically review studies dedicated to the implementation of the WFD in Europe. Based on a meta-analysis of 89 journal articles, we explored more than 35 dimensions in each study to report on authors and journals, countries, policy levels, and WFD themes, as well as on theory, methods, and research design.

Returning to our thought experiment described earlier, Table 3 below displays research priorities with regards to countries and WFD requirements, thereby ignoring the temporal dimension. The chart stresses that quite a few areas of research are well documented, whereas others appear as blind spots. We discuss them in turn below.

Table 3: Number of studies per country and WFD theme

Country	Ecological status	Economic analysis	Planning process	Policy integration	Participation	River basin management	WFD in general
Belgium	1	2	0	1	0	0	0
Czech Republic	0	0	0	0	2	0	0
Denmark	3	0	1	3	2	3	0
Finland	0	1	0	0	0	1	0
France	4	3	0	2	2	2	0
Germany	3	2	2	1	11	6	0
Greece	0	1	1	0	1	1	0
Ireland	1	0	0	0	2	1	0
Italy	1	1	0	1	0	0	0
Latvia	0	0	0	0	0	1	0
Lithuania	0	0	0	0	0	1	0
Luxembourg	1	0	0	1	1	1	0
Netherlands	4	2	2	3	9	4	0
Poland	0	0	0	0	1	1	0
Portugal	1	0	0	1	0	2	2
Romania	1	0	0	1	0	0	0
Spain	3	2	1	1	3	3	0
Sweden	1	1	3	1	5	2	0
United Kingdom	6	1	2	2	15	2	0
EU27	0	0	1	0	0	0	2

WFD indicates Water Framework Directive.

We found, first, that there is a cluster of very well-researched countries, including the United Kingdom, the Netherlands, and Germany. However, member states that joined the EU in 2004 and 2007 as well as Mediterranean countries such as Italy and Greece are under-represented. These are gaps to be filled. However, we envisage two more promising research programmes: on the one hand, we encourage scholars to compare groups of countries. EU policy implementation research talks about 'worlds of compliance' (Falkner et al. 2005), and the WFD would lend itself well to an empirical test of this claim. Furthermore, we believe a more systematic comparison of northern and southern EU member states will help understand the role of water quality and water quantity problems in EU environmental policy implementation. On the other hand, we

suggest taking a closer look at candidate states, countries addressed by the European Neighbourhood Policy, and associated countries such as Switzerland and Norway (but see Baaner 2011).

Second, there is a certain imbalance as to the institutional novelties promoted by the WFD. Although the involvement of non-state actors in water management has inspired a rich literature, there is less in-depth research on river basin planning and management at ecological scales. Most importantly, economic principles, as reflected in tools such as cost-benefit analysis, have not been studied in depth. This includes cost-effectiveness analysis, incentive tarification, adequate levels of cost recovery, and designation of heavily modified water bodies, all of them challenging in terms of knowledge, uncertainty, legitimacy, and social acceptability. The politics of exemptions, which often results in less stringent water quality objectives, also remains understudied. We identified three additional areas for future research. On the one hand, the Directive and early guidance documents made no reference to measures supporting adaptation to climate change. However, the topic has become more prominent at the EU level (European Commission 2009a), and we suggest more systematic research exploring the link between WFD management activities and climate change adaptation. On the other hand, EU policy documents increasingly make reference to ecosystem services as a key concept to support WFD implementation (European Commission 2012a). Future research could take the cue and analyse whether, and if so how, this plays out on the ground. Furthermore, we encourage more empirical research on the interaction between the WFD, the Floods Directive, and the Marine Strategy Framework Directive, and with legislation unrelated to water, for instance the Birds and Habitats Directives. Intuitively, we would expect the potential for mutual reinforcement, for instance, when it comes to promoting a culture of participation in environmental management, but also for conflict and contestation in other areas (but see Newig et al. 2014).

Third, there is a lot of research on the preparation phase of WFD implementation, more specifically on the process of drafting the first set of River Basin Management Plans. However, we know little about continuity and change from the preparation phase to the first cycle, and there is little comparative work over time. Further research priorities may include the achievement of the 2015 water quality goals and the role of governance innovations such as participation therein, and comparisons of the preparation phase, the

first management cycle, and the on-going second management cycle. The latter may relate to a number of literatures, including those on policy learning and the role of guidelines, training, and capacity building in policy making (May 1992).

Fourth, there is a conspicuous lack of theory in WFD scholarship. Authors tend to describe implementation patterns and, at times, to apply normative frameworks, but only a minority of studies refer to theory when explaining compliance with the WFD and embed observations in their social, economic, or political contexts. In this paper we outline a number of approaches and refer to others. All of them may be useful to help explain patterns of WFD implementation. We are convinced that theory deserves a more prominent place in future research on the WFD and its implementation in Europe.

Fifth, methods and research design are patently neglected and a serious cause of concern. Authors accord little attention to methodological questions, and papers mostly have a descriptive orientation. Overall, 21 out of 89 articles are descriptive and provide no information on data and methods. Moreover, our current knowledge about the implementation of the WFD in Europe relies mainly on single case studies or small-n comparative studies within one country. Cross-country comparisons are a minority, and there is a striking lack of large-n quantitative research. We believe future research would benefit from a departure from single-country studies.

An update of this meta-analysis on 1/11/2017 is provided in Appendix D.

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Chapter 3: Undermining European Environmental Policy Goals? The EU Water Framework Directive and the Politics of Exemptions

B. Boeuf, O. Fritsch and J. Martin-Ortega

Abstract

The Water Framework Directive (WFD) is the core legislative instrument in the European Union for the protection of water resources. Adopted in 2000, its objectives were to achieve 'good status' for water bodies by 2015 and prevent any further deterioration. However, the European Commission and some stakeholders are rather dissatisfied with the implementation of the Directive so far, in particular with the use of exemptions to the environmental objectives. Exemptions are of paramount importance: they may constitute a significant obstacle to the achievement of the WFD's objectives as they enable member states to lower the ambition of the Directive and to delay the achievement of good status, thereby undermining the environmental goal of the WFD. Critical voices observe an excessive reliance on exemptions, poor justifications, and great variations in their use. Based on an analysis of 120 policy documents and 15 semi-structured interviews, this article provides explanations for the politics of exemptions in EU water management. It shows that different viewpoints and interpretations on the WFD's objectives and exemptions were already present in the negotiation phase of the Directive, but remained undefined on purpose. Moreover, dysfunctional decision-making procedures in the Common Implementation Strategy and the lack of political support in WFD implementation were significant obstacles to an agreement on this important issue. Finally, decisions on WFD implementation in member states were often driven by pragmatism. The article explains how the negotiations of the WFD and the EU-level discussion on the implementation of the Directive undermined environmental goals in EU governance; its findings are also relevant for policy fields other than water.

Keywords

Water Framework Directive; Governance; Exemptions; Economic analysis

3.1 Introduction

The Water Framework Directive (WFD, 2000/60/EC) is the principal legislative instrument for protecting water resources in the European Union (EU). Adopted in 2000, it aims to achieve a 'good status' for all water bodies in Europe and to prevent any further deterioration. In order to reach this ambitious goal, the WFD requires EU member states to manage water at hydrological units, to prepare strategic River Basin Management Plans (RBMP) and more operational Programmes of Measures (PoM) and, while doing so, to engage with stakeholders and the wider public. This article explores a widely understudied aspect of the Directive: the politics of exemptions in EU water planning.

Exemptions are the thorn in the side of the WFD. Exemption clauses are present in the WFD alongside environmental objectives. They enable member states to delay the achievement of good water status up to twelve years (Article 4.4 WFD), to abandon the overall accomplishment of good status and aim at 'less stringent objectives' instead (Article 4.5 WFD), and to deteriorate water quality even further for projects of 'overriding public interest' (Article 4.7 WFD). At the same time, exemptions are a major source of concern for many. Although they may seem desirable in specific cases, exemptions may, if overused, torpedo the WFD's water quality goals and a number of other ambitious European policies such as the EU's Environmental Action Programme to 2020.

The European Commission, stakeholders and academics have all expressed their disappointment with the progress made in Europe so far (Kanakoudis & Tsitsifli 2010; European Commission 2012a; World Wildlife Fund 2015; Richter et al. 2013). According to the Commission (2012b, p.174), in 2012 only 53 per cent of all water bodies were expected to be in good status by 2015 (more up-to-date projections are not available at the time of writing). While the causes for the dire performance are complex, exemptions certainly play a role: "The extensive use of exemptions may reflect the low level of ambition in many of the plans as regards achieving the environmental objectives" (European Commission 2012b, p.181).

Up to 2012, deadline extensions were granted for 40 per cent of all surface water bodies and eleven per cent of all groundwater bodies. Furthermore, member states authorised

the achievement of ‘less stringent objectives’ for 19 per cent of all surface waters and one per cent of all groundwater bodies (European Commission 2012b). What is more, the number of exemptions is likely to be higher in the current planning cycle (WRc 2015). The European Commission assessment reports from 2012 on river basin management plans for each member state reveal a great degree of variance between EU countries and type of exemption. While the UK granted deadline extensions in 8914 cases, the Czech Republic did so 974 times and Slovenia only 19 times. At the same time, member states authorised many more deadline extensions than exemptions related to ‘less stringent objectives’ and ‘further deterioration due to projects of overriding public interest’.

Problematically, member states poorly justify the use of exemptions. Applications for exemptions usually lack information on methods, decision criteria, and underlying assumptions as well as economic data and analyses. When information is provided, Europe-wide comparisons suffer from the fact that countries seem to use very different techniques to establish cases for exemptions. For example, exemptions granted due to disproportionate costs rely on methods as diverse as cost–benefit analysis (CBA), ability-to-pay, financial impacts or distributional effects (European Commission 2012b; 2015).

The politics of exemptions has, surprisingly, rarely been addressed in the literature. The Directive enjoys wide scholarly attention (for a systematic review, see Boeuf & Fritsch 2016), yet a majority of studies focus on river basin management and public participation in WFD water planning (Blackstock 2009; Jager et al. 2016). Studies on the other economic elements of the Directive such as cost-recovery and cost-effectiveness are scarce as well (Boeuf & Fritsch 2016). Previous works discuss exemptions in three ways.

First, a few studies have analysed in depth the negotiations and the early days of the Directive (Aubin & Varone 2002; Kaika 2003; Kaika & Page 2003; Page & Kaika 2003). Exemptions are mentioned but do not fare very prominently. Second, others explore empirically the actual use of exemptions, disproportionality assessments - a possible economic justification for exemptions - and economic tools in WFD implementation (Brouwer 2008; van der Veeren 2010; Dehnhardt 2013; Gómez-Limón & Martin-Ortega 2013; Feuillette et al. 2016). The message this literature sends out is

that exemptions are used and justified in very different ways, and that the role of the EU is somewhat opaque here. Third, another strand of research takes the insight that "objective criteria" for the use of exemptions are missing in the WFD (Görlach & Pielen 2007, p.1) as a starting point and combines case studies with normative considerations, providing interpretations, justifications and guidance, often with reference to the concept of 'disproportionality'. This concept describes the possibility that the monetary costs of achieving a good ecological status may be disproportionately high when compared to the economic and social benefits (Martin-Ortega et al. 2014; Klauer et al. 2016).

Building on the above, this article seeks to trace the EU level debate on exemptions in WFD water planning since the beginning of negotiations to the present day, with a particular focus on disproportionality as a possible justification, in order to understand the critiques made on their use by member states. However, this article does not take a position in this debate; rather, we show the various viewpoints held by the different parties during the negotiation of the WFD. We also aim to understand how the debates that occurred during the process of drafting guidelines for WFD implementation failed to come to a common understanding on exemptions. These controversies and the inability to find an agreement may explain why member states use exemptions extensively and justify them poorly, resulting in the chequered pattern heavily criticised by the Commission.

3.2 Data and methods

This article covers three important periods in the WFD life cycle: (a) the negotiations of the Directive, that began in 1996 with a European Commission communication on the future of EU water policy, followed in 1997 by a Commission proposal for a new EU directive in the field of water policy, and ended in 2000 with the adoption of the Directive; (b) the phase of working on the Common Implementation Strategy (CIS); and (c) the implementation in EU member states after 2009 until 2015.

We undertook an in-depth analysis of 120 policy documents. A summary of the types of materials and the processes analysed is presented here and outlines the temporal logic used to sort and analyse the data.

The negotiations of the WFD: We identified 40 documents drafted in preparation of the Directive, including draft proposals from the Commission, and responses and position papers from the European Parliament (EP), the Council of Ministers, the Economic and Social Committee, and the Committee of the Regions.

The CIS, established in 2001 by the Commission and member state practitioners, aims to specify and operationalise the Directive and to resolve technical controversies through implementation guidelines. Our analysis, based on 41 documents, mainly focuses on the period 2001 to 2009 when key decisions on exemptions to WFD water policy goals were taken. We examined CIS strategy documents, work programmes and minutes of meetings held by national water directors with a view to extracting more high-level, political positions. We then moved on to study the more technical, operational level of drafting implementation guidelines, thereby examining minutes of workshops and meetings, inputs from non-governmental organisations as well as draft and final implementation guidelines.

Finally, we analysed the post-2009 implementation phase, i.e. the period in which EU member states implemented the first RBMPs (a total of 39 documents). Again, we returned to the CIS to explore how national positions and practices influenced EU level debates and helped shape Europe-wide solutions. We also looked into documents providing insights into the more recent thinking of the European Commission and analysed legal proceedings.

In addition, we conducted 16 semi-structured interviews (INT 01 to INT 16 in Appendix A). Interviewees included representatives of the European Commission and of several member states who took part in the WFD negotiation process or in the CIS. We also interviewed stakeholders – mainly representatives of non-governmental organisations – and academic experts who attended the CIS. The idea was to collect the viewpoint and experience of the various institutions and stakeholders involved at EU level over the three time periods detailed above.

We selected interviewees through three pathways. First, we identified current or past members of the working group on economics in the CIS, in particular the European Commission staff members who steered the working group and guideline authors.

Second, we used our professional network, mainly academics and representatives of EU member states involved in the WFD implementation. Finally, interviewees helped us identify other relevant contacts, i.e. we used snowball sampling. This technique was particularly useful to get in touch with various representatives involved in the WFD negotiation process more than fifteen years ago.

Interviews were transcribed and all materials analysed using the NVivo software. Further information on data and methods are available in Appendices A, B and E.

3.3 Negotiating the WFD: opposing views

When the European Commission presented their first proposal in February 1997 for what would later become the WFD, many had already anticipated lengthy negotiations between the key actors at the European level. These include the Commission, the Parliament, and the Council of Ministers, with the latter representing the relevant national ministers in the field of water protection. In particular, the EP expected a major increase of power vis-à-vis the Council through the Treaty of Amsterdam, which was about to enter into force in January 1999 (Kaika & Page 2003).

Although the Council and the Parliament were generally working towards similar aims, the proposal contained quite a few sensitive spots, resulting in a dispute that required a formal conciliation procedure and numerous concessions from either side. Amongst others, the protection of groundwater, the emission of various hazardous substances, and the cost-recovery of water services proved to be sore points (Kaika 2003; Kaika & Page 2003). The relationship between the Commission and the Parliament, in contrast, is traditionally very close in the field of environment (Burns & Carter 2010), and both actors largely supported each other during the WFD negotiations.

3.3.1 Ambitions and deadlines

The Directive aims to achieve ‘good status’ for all water bodies in Europe. The term ‘water status’ brings together chemical, biological and hydromorphological parameters for surface waters, measured at a scale from ‘high’, ‘good’, ‘moderate’, ‘poor’ to ‘bad’. Groundwater, in contrast, may be in ‘good’ or ‘poor’ status, based on chemical and quantitative criteria.

Arguably, even the most ambitious policies are of little value if exemptions exist in such a way that they enable actors to endlessly delay or entirely suspend their implementation. Because objectives and exemptions justifying the departure from 'good status' for water bodies represent two sides of the same coin, the overall ambition of the WFD and the exemptions were negotiated as a package. Three aspects were of particular importance.

- *Degree of ambition:* While a majority in the EP supported a very ambitious interpretation of the goals of the Directive, member state governments, and hence the Council, displayed concern over the effects of the Directive on industries and the agricultural sector (Kaika 2003; Page & Kaika 2003).

- *Legally-binding nature of ambition:* The Council strongly favoured a legal text emphasising aspirations. The Parliament, in contrast, supported legally binding, measurable changes (INT13). The disagreement was never fully resolved, and the final text still contains slightly contradictory statements. For instance, member states "shall protect, enhance and restore all bodies of surface water" (rather than "shall aim to"), "with the aim of achieving" (rather than "achieve") WFD objectives (Article 4.1 a(ii) WFD). This resulted in disagreement amongst jurists as to the legal bindingness of those provisions (Howarth 2009; van Kempen 2012).

- *Time frame:* Finally, the European institutions held divided viewpoints over the time granted to achieve the objectives. While the EP requested ten years, the Council suggested 16 (Council of the European Union 1999b; European Parliament 2000a). The final text established 15 years. However, the Conciliation Committee reduced the number of deadline extensions beyond the original 15 years period, from three (as proposed by the Council) to two six-year management cycles.

The above controversies highlight a theme that characterises the WFD drafting process more generally: the Commission and the EP preferred to take a strict and ambitious viewpoint, whereas the Council sought to water down the content of the Directive.

3.3.2 Implementation costs

The above debate on the ambitions of the WFD reflects a general concern over the costs associated with the implementation of the Directive (De Abreu 2001). This is hardly news: the question of expenses has always been at the heart of the conflict between environmental pioneer countries in the EU and those taking a more reluctant approach (Andersen & Liefferink 1997).

Concerns over costs may first relate to affordability: some member states may not be in a position to make the necessary investments to improve water quality over a short time-period, independently of the long-terms gains. The costs of the WFD implementation were not assessed during the negotiation, since data on water status and necessary measures were lacking back at that time (European Commission 1997). Be it as it may, the very absence of reliable evidence with regards to the implementation costs involved was a major source of concern and resulted in conservative positions on the side of the member states. The latter in particular wanted to avoid experiences similar to the ones made with the 1991 Urban Waste Water Treatment Directive, which caused unexpected expenses (INT07; INT10; Aubin & Varone 2002). The Commission tried to calm the waters by arguing that "the probable costs of this proposal will be affordable over the timescale involved" (European Commission 1997, p.19). However, the Spanish delegation came to very different conclusions, casting doubt over the optimistic estimates provided by the Commission (INT07).

Second, concerned countries may argue that the costs of the WFD exceed the benefits, or that investment into policy areas other than water promises higher benefits than the WFD does. In other words, concerns can relate to the cost–benefit ratio. During the negotiations, the Council requested a CBA of the Directive. However, the Commission denied the request, arguing that member states should perform such an analysis during the elaboration of the RBMPs (De Abreu 2001). Furthermore, the merits of cost–benefit analysis are hotly disputed in environmental policy and management, not the least because of the difficulty, if not impossibility, to "pric[e] the priceless" (Ackerman & Heinzerling 2002, p.1553). Consequently, there was no serious attempt to assess the pros and cons of the WFD at this stage - and no systematic discussion of the benefits and costs over time. Finally, no attempt was made to compare the benefits associated with the WFD to those related to alternative environmental or non-environmental

policies. This would have required a full impact assessment, a tool that was introduced at EU level in 2003 only (Fritsch et al. 2013).

In terms of strategy, the logical consequence for member states in this framework of uncertainty was to negotiate the WFD such that defensive measures against undue expenses were built directly into the Directive: reduce the overall ambition of the WFD, reduce the legal bindingness of its objectives, or ensure a longer implementation period to distribute implementation costs over time, as shown above. Another strategy was to negotiate a set of exemptions that, in spite of a high overall ambition of the Directive, would enable member states to take defensive measures in specific circumstances.

3.3.3 Negotiating exemptions

Although objectives and exemptions represent two sides of the same coin, the objectives of the WFD became a major bone of contention. Exemptions played a marginal role only. Plausibly, the whole idea of 'exemptions' presupposes that the overall intention of the WFD is accepted, although additional rules may be required to govern exceptional situations. However, the fact that the negotiating parties spent more time discussing the overall ambition of the Directive rather than occasional departures from its objectives may suggest that, in fact, not all negotiating parties actually shared the overall vision of the WFD.

The positions held by the Council and the EP hereby did not differ very much from their views about the overall objectives: the Parliament maintained that exemptions should be used in exceptional circumstances only in order to avoid overuse, abuse and patterns that would turn the overall ambition of the Directive on its head. The EP therefore sought to reduce the overall scope and applicability of exemptions and to develop strict and unambiguous criteria for their use (European Parliament 2000a). The Council, in contrast, showed a more diverse picture, from environmental pioneer countries keen to adopt a rather strict piece of legislation to member states supporting more moderate positions. However, a majority was in favour of relaxed criteria for exemptions (INT07). Our discussion below on deadline extensions highlights this general pattern.

3.3.4 The case of deadline extensions

The question of deadline extensions, their length and the conditions under which they should be granted, was amongst the most controversial topics to be discussed during the

negotiations (INT12). Other exemption clauses, in particular on more relaxed policy objectives, were much less debated. Two themes emerge from the discussion.

- *Justifying and approving exemptions:* In the original Commission proposal three requirements had to be met: Delay only if natural conditions do not allow rapid improvements, provision of evidence that all necessary measures were taken, and written justification in RBMPs. The Council agreed that RBMPs were the right place to provide such justifications yet highlighted the necessity to work out "appropriate, evident and transparent criteria" for deadline extensions (but probably to be developed in comitology committees or the CIS) (Council of the European Union 1999b, p.8). The Parliament, instead, held that member states criteria were insufficient and suggested that the Commission, as the Guardian of the Treaty, should approve each individual deadline extension (European Parliament 2000a), a proposal the Commission found to be excessive (European Parliament 2000b). Nevertheless, the Commission ensured that they would review deadline extensions and less stringent objectives ex post "to ensure a full and consistent implementation of the Directive" (Council of the European Union 1999a, Annex B, p.1). The final text is based on the proposal made by the Council.

- *Scope of application:* The Council (1999a, Annex A, p.8) took a more adversarial stance vis-à-vis the Commission which held that extensions of timescales should only apply if improvements of water status were prevented by unfavourable natural conditions. Instead, member states shall be able to extend deadlines "for the purposes of phased achievement of the objectives", if "all improvements in the status of bodies of water cannot reasonably be achieved within the timescales set out". In other words, the Council requested a *carte blanche* to grant deadline extensions for a variety of undefined reasons. Moreover, the Council added in the Preamble: "Member States may phase implementation of the programme of measures in order to spread the costs of implementation". They thus tried to address their concerns related to costs through deadline extensions. The position of the Parliament helped to craft a compromise here. The EP identified three clearly defined justifications for deadline extensions: unfavourable natural conditions, technical unfeasibility and

disproportionate costs (European Parliament 2000a). The Conciliation committee partly accepted the formulation of the Council, i.e. that deadlines "may be extended for the purposes of phased achievement of the objectives", with the addition that "no further deterioration occurs" (Article 4.4 WFD).

3.3.5 The case of disproportionality

During the negotiations, disproportionality of costs or expenses emerged as a possible justification for exemptions, along with technical feasibility and natural conditions. Although no debate occurred on the precise meaning of this term, it seems that misconceptions about its definition were widespread. This may be explained by the limited involvement of economists during the WFD negotiation, which often included engineers or water scientists (INT07; INT08). Moreover, negotiators had little incentive to address the issue; after all, terminological vagueness or confusion can be a useful thing to exploit during the implementation phase. Some members of the Parliament may also have purposefully kept this ambiguous wording in the proposal. Their motivation may have been a genuine support for subsidiarity, i.e. to take action at the European level only when they can be better achieved than at member state level, or a strategic move to downplay the environmental ambition of the WFD (for a general discussion, see Collier 1997). The transcript of debates that took place at the Parliament for the second reading indeed show that some members of the EP were concerned with the costs and the economic impacts of the WFD, in particular for farmers and industries. Having this possible strategic misuse in mind, the Economic and Social Committee (1997, p.85) warned that such terms would be "dangerous to interpret" and suggested a more precise definition, for instance a specific cost–benefit ratio that would take into account social and environmental benefits of improving water quality. However, those recommendations were not followed. Table 4 provides a summary of the different positions held by each institution.

Table 4: Position of each institution during the negotiation

Topic	European Commission	European Parliament	Council of the European Union
Degree of ambition	Ambitious	Very ambitious	Less ambitious
Legally-binding nature of ambition	Legally binding	Legally binding	Aspirational
Time frame	10 years for implementation	10 years for implementation, 12 years for deadline extensions	16 years for implementation, 18 years for deadline extensions
Exemptions	Exceptional use	Exceptional use, stringent criteria	Use for phased achievement, relaxed criteria
Justifying and approving exemptions	The EC should review exemptions	The EC should approve each exemption	Member States should provide criteria and justifications for exemptions
Deadline extensions: Scope of application	Unfavourable natural conditions	Unfavourable natural conditions, technical unfeasibility, disproportionate costs	Phased achievement of the objectives

To sum up, despite their explosive potential the negotiating parties did not devote much time and attention to the intricacies of exemptions to the WFD's water quality goals. Key terms qualifying the use of exemptions, such as 'disproportionality', remained undefined and, in this way, served political agreement. The next section will explore whether the more technical discussions surrounding the CIS were able to fill the above key terms with meaning or whether the lack of definition provided a basis for a fragmented and lacklustre implementation in member states.

3.4 The Common Implementation Strategy: a technical debate over a political issue

The CIS is a network of water practitioners and stakeholders, established in 2001 by the Commission and EU member states with a view to harmonising WFD implementation. To this end, CIS participants work to develop a common understanding of the Directive, share methods and technical knowledge, to exchange information and draft implementation guidelines. The CIS is organised around a number of working groups, which reflect key challenges to WFD implementation, such as groundwater, climate change and monitoring. The water directors, high-rank domestic bureaucrats in the field of water, steer the CIS, define working group mandates, approve guidance documents and take the final decisions. The informal character of the CIS was never questioned, and CIS outputs, in particular implementation guidelines, are legally non-binding (European Commission 2001).

3.4.1 Discussing exemptions in the CIS

Exemptions were first mentioned in the CIS Working Group on Water and Economics, established to develop a guideline to support the implementation of the economic provisions in the Directive (European Commission 2003b). This guidance document mainly focuses on the role of economic instruments during the characterisation of water bodies, the management of heavily modified water bodies, and the application of the cost-recovery principle (European Commission 2003b; INT06). Consequently, exemptions played a minor role only; the document presented various ways to think about exemptions, but did not take a clear-cut position and offered few hands-on recommendations for practitioners (INT10).

The debate picked up steam in 2006 when the water directors identified exemptions as a priority topic and, shortly thereafter, when they called for a common approach (Water Directors of the European Union 2006; 2007b). In 2009, a CIS guidance document was published focusing on exemptions (European Commission 2009b).

The 2003 and 2009 guidelines helped to specify a number of provisions left open during the negotiations. First, it was acknowledged that decisions on disproportionality are political in nature. Economic analysis therefore may support, but never determine such decisions (European Commission 2009b; INT05). Second, CIS partners agreed that a step-wise process should be used that prioritised deadline extensions over the achievement of less stringent objectives (European Commission 2003b; INT08; INT15). Third, even if an exemption was applied, all feasible measures to improve water quality should be taken (European Commission 2008).

On the other hand, no agreement was found with regards to the frequency of exemptions granted in WFD water planning. While the Commission emphasised once more that exemptions were the last resort (Water Directors 2007a; 2007b; INT15), and should not serve “as a wide backdoor for not taking actions” (Water Directors 2007a, p.1), some member states had, in the meantime, carried out an economic analysis and knew that they would need to rely on exemptions more often than anticipated during the negotiations, due to the high costs involved (INT05; INT11).

3.4.2 Disagreements on disproportionality assessments in the preparation phase

According to the WFD, Member states have the possibility to justify exemptions if restoration measures imply disproportionate costs or expenses. Members of the working group on economics first interpreted disproportionality assessments in light of economic theory as a comparison of costs and benefits. The costs of implementing restoration measures could be defined as 'disproportionate' for a specific water body when the financial and indirect costs of the necessary measures would outweigh the environmental and economic benefits of achieving good status by an "appreciable" margin (European Commission 2003b, p.193; INT09). Much of the debate would then centre on the precise cost–benefit ratio, to justify disproportionality.

However, the method used to justify disproportionate costs was increasingly debated. Two questions were raised: whether another approach, 'ability to pay' (also referred to as 'affordability') could be a valid justification for disproportionality assessments and, if so, how to include and apply this concept in practice (Braüer & Dworak 2008; European Commission 2008; INT08). The ability to pay does not take into account environmental benefits. It compares the costs of restoration measures with the financial capacity of payers to fund these measures. As such, it considers distribution issues and financial impacts on payers as a priority. Affordability may apply to water services users (e.g., households and their ability to pay for their water bills) or to the PoM payers (e.g., private funding, polluters or the public budget) (European Commission 2014a; 2014b).

The debate between advocates of CBA and the affordability principle for the assessment of disproportionate costs had in fact four dimensions: methodology, the ambition of the WFD, water management principles, and wider political concerns.

Methodology: The methodological debate did not focus on the threshold to define disproportionality. There was a fair consensus that this had to be defined by member states, on a case-by-case basis. The discussion centred on against what costs should be compared: benefits or financial capacities. Although both praised and criticised in the academic realm, academics have developed numerous methods to calculate costs and assess environmental benefits. Affordability in contrast does not take a prominent role in the policy appraisal literature (Dunlop & Radaelli 2016). In particular, few criteria

exist in the literature to assess affordability. There is one exception: water bills that amounted to three per cent of a households' income are generally considered as a poverty threshold (Organisation for Economic Co-Operation and Development 2009). This methodological difference, i.e. the presence of widely shared methods and criteria for CBA and their absence for affordability, may explain why the European Commission and some member states favoured CBA as a method. First, they supported CBA as a 'good practice', although affordability proponents questioned the robustness of the method (INT05; INT06). Second, if CBA was used, the Commission could more easily review justifications and check or re-do the analysis (INT01; INT10). The Commission perceived CBA as a guarantee that member states would not 'tweak' economic analyses so as to downplay the objectives (INT05).

WFD ambition: Methodological choices influence the overall goals of the WFD and the financial resources made available to achieve them. The Commission and a few member states feared that ability to pay could "water down the ambition of the Directive" (Water Directors 2007a, p.1; INT05). This concern was greatest for justifications based on constraints to the public budget that would restrict the scope of the PoMs (European Commission 2008): the Commission feared that member states would simply not make available the necessary financial resources to achieve good status. Still, some member states preferred the affordability principle, because it serves to distribute implementation costs over the three management cycles, based on the resources actually available (Water Directors 2007b). As a consequence, some of the member states that were first in favour of CBA assessments increasingly considered the ability to pay as a possible justification, due to constraints to the public budget or the economic crisis (INT09; INT10). The Commission (2012a), in contrast, strongly supported cost–benefit assessments. An explanation could be that the Commission hoped to see the WFD ambition rise as a result of this assessment. However, this strategy is arguable: there is no guarantee that, for a given water body, a CBA would less likely lead to an exemption than an affordability assessment. Moreover, when costs are higher than benefits, a CBA could lead member states to divest money away from water policy towards other policy areas with a better cost–benefit ratio.

The polluter pays and cost recovery principles: The opponents of the ability-to-pay principle raised another argument. Affordability may conflict with the polluter-pays

principle, which should be at work to fund PoMs, and the cost-recovery principle, in particular water tariffs that should incentivise water users to consume or pollute less (Article 9 WFD; INT09; INT11). The discussions that took place during the WFD negotiations on cost-recovery (Page & Kaika 2003) show how contentious this issue was between member states and the Commission.

Economic efficiency versus social concerns: Finally, this debate went beyond a mere expert argument over the most rigorous economic method to use to justify disproportionality. In fact, it mirrored deeper socio-political discrepancies between member states and with the Commission. Affordability, because of its focus on distribution issues and financial impacts can be considered as a "social-minded" approach (Görlach & Pielen 2007, p.5; Kanakoudis & Tsitsifli 2015). Conventional CBAs instead focus on efficiency, on maximising human welfare, and although distribution effects can be theoretically incorporated (Pearce et al. 2006), analysis of affordability does not enter the equation (Martin-Ortega et al. 2014).

Therefore, the debate on the right method to assess disproportionality may reflect a deeper political conflict: while some countries and the Commission strongly support the use of economic tools and principles for environmental protection, other member states were more concerned with the distribution of costs to other stakeholders and social consequences.

The agreements finally reached were: CBA or ability to pay may be used for deadline extensions. When affordability is considered, the consequences of non-action (i.e. forgone benefits) should be assessed and alternative financing taken into account, for instance the public budget or European funds. The idea was to not only take into account budgetary or financial considerations, but also to consider the environmental consequences of not achieving good status. No agreement was reached on the method to use to justify exemptions related to less stringent objectives (European Commission 2005; 2008). In the end, the CIS only agreed to advocate water management based on data and methodologies, transparency and some degree of public participation in decisions on exemptions (European Commission 2005; 2007; 2009b; Water Directors 2007a). In particular, decisions, criteria and methods used to take the decision should be explained and justified (European Commission 2008; INT15).

3.4.3 Reasons for the failure to come to an agreement on exemptions

Failure to reconcile different positions on exemptions in the framework of the CIS may be attributed to the inability of the CIS, through its structure and functioning, to tackle political issues.

First of all, as it has been shown, the topic is highly political. The WFD provisions on exemptions leave a door open for member states to prioritise social, economic or other environmental policy goals over the WFD objectives. The argument of disproportionate costs may be used so as to adapt the ambition of the Directive to political priorities identified at the national level. These political choices cannot be settled in decision-making contexts such as the CIS: participants are experts in specific areas and develop technical solutions to practical issues. Consequently, debates remain on the technical level, which does not necessarily consider the WFD ambition.

Second, the CIS was designed to adopt technical non-legally binding implementation guidelines. As a consequence, members of working groups, in general academics and representatives from member states administrations (INT09), did not have the mandate to negotiate political issues.

Third, even if CIS working groups came to an agreement on political issues, water directors were able to veto unwelcome decisions. This situation weakened the ambition of the agreements taken in working groups (European Commission 2003a; World Wildlife Fund & Euopean Environmental Bureau 2004) and was a substantial obstacle to highly political decisions.

However, it was not only the structure of the CIS that prevented agreements on exemptions. The Commission and member states increasingly adopted a defensive strategy that impeded the crafting of a compromise (INT08; INT10; INT11).

On the one hand, the Commission strongly opposed provisions it did not agree with (INT06; INT10): for example, when the first cycle started in 2009 the water directors raised the issue of ability to pay once again (European Commission 2014a). Five years later, the Working Group on Economics agreed to produce a guidance document on ability to pay for the PoMs in order to gather experiences from member states and to define a common method (European Commission 2014b). However, the Commission

was dissatisfied, and the document was abandoned and never released (INT10). This behaviour can be explained by the uneven distribution of power within the CIS: the common strategy included Commission officials and member state representatives. The EP was not involved. Due to the absence of the Parliament, whose positions were close to the viewpoints held by the Commission, member states had more weight to shape implementation guidelines in a preferred direction. The Commission thus had difficulties steering CIS decisions and had to take a strong defensive position.

On the other hand, there was a lack of political support from member states to define common criteria and thresholds for disproportionality: within CIS working groups, representatives from France and the Netherlands proposed common criteria for the use of the affordability principle (e.g. in terms of percentage of GDP, increase in water bill) or common practices (e.g. focus on macroeconomic costs), but they did not gain political support from the water directors (INT14). Member states may have preferred to invoke the subsidiarity principle when it came to disproportionality assessments. Alternatively, EU countries may have been wary "because once there is a specific definition […] you can make member states accountable" (INT14). After all, an agreement on specific methods or criteria at EU level would have greatly limited the scope of action for member states to depart from those criteria, to adapt them at the local level or to take into account more political considerations, without risking an infringement procedure. This fear of infringement procedures and financial penalties may explain an apparent contradiction: while member states asked for guidance on exemptions to anticipate possible infringement cases, they refused to come to an agreement that would make them accountable. Another explanation could be that countries had increasing difficulties implementing the WFD within the given timeframe. Consequently, they may have become less inclined to come to an ambitious consensus.

3.5 Beyond policy: the pragmatism of the WFD implementation

In 2009, EU member states began to put RBMPs into practice and hence to engage more directly with exemptions and their justification. For this reason, the debate on exemptions largely moved to the national level, and discussions at EU level became less

intense.

However, the implementation on the ground triggered a new controversy: “a battle between pragmatism and idealism with respect to achieving objectiveness and applying exemptions” (European Commission 2009a, p.33). The Commission supported an ‘idealistic’ position whereby justifications rely on a defined method, transparent criteria and ‘proper economic analysis’ based on a CBA to inform the political decision and the public (INT01; INT02; INT10; INT15).

In this framework, the Commission requested better justifications, in particular more data, to understand challenges to WFD implementation, to discuss future strategies, and to ensure accountability (INT01). This includes data related to the costs of PoMs, the costs of not achieving WFD objectives, and the benefits of reaching good status (European Commission 2012a). The Commission launched a call for research proposals to help member states produce more and better data. The project finally commissioned, AquaMoney, aimed to provide technical guidance to help practitioners assess the costs and benefits of the WFD (Brouwer et al. 2009).

Member states, in contrast, preferred ‘pragmatic’ approaches (INT03), e.g. approaches that limit the monetisation of benefits (Water Directors of the European Union 2012), keep the analysis simple whenever possible (European Commission 2007) or apply a screening procedure to reduce the level of detail of the analysis (INT08).

In particular, there was some scepticism about CBA and, more precisely, methods that aim to valuate benefits monetarily, due to the costs and time involved, the lack of skilled human resources to perform such methods, and their methodological limitations (European Commission 2010; Martin-Ortega 2012; INT03; INT08). Moreover, some member states questioned their usefulness in achieving transparency and informing public participation exercises; furthermore, their intelligibility for non-experts was queried (Görlach & Pielen 2007). Consequently, CBA was used to a limited extent only: “There is no point, there was no time, there was no money” (INT03).

Affordability was perceived as a more feasible and pragmatic approach than CBA (Water Directors 2007b; Braüer & Dworak 2008). Apparently, member states informally agreed to use ability-to-pay as a tool to screen measures. If they could be

paid for, then they should be implemented; if not, then a more in-depth analysis should be performed (INT08).

In addition, many water managers had a background in engineering and found it difficult to collect data and design and implement economic methodologies, in particular to justify exemptions (European Commission 2010; Mattheiß et al. 2012; Gómez-Limón & Martin-Ortega 2013; INT11; INT14).

Consequently, the Commission expected a certain standard for the justification of exemptions, i.e. an extensive and detailed economic analysis. This made sense if exemptions were rarely used. However, countries planning to rely more extensively on exemptions had to face time, budgetary and skills-related constraints to comply with this standard. This gap between the Commission's expectations and domestic implementation fed the critiques of some stakeholders on the justification of exemptions.

3.6 Conclusions

While the WFD sets ambitious goals for water protection in Europe, the existence of several exemption clauses, if overused, can seriously undermine the environmental goals of EU policy. The European Commission and stakeholders are thus worried to see exemptions used extensively, justified poorly, and implemented in very different ways across Europe. This article offers an explanation of this situation so that insights can be gained regarding the lowering of EU's environmental goals, in relation to the WFD and environmental legislation more broadly. It traces the history of the negotiations (1995–2000), the discussions that took place in the framework of the CIS following the negotiations (2003–2009) and the implementation of the Directive (post-2009).

Our findings show that member states and the European Commission had very different perceptions about the use and justification of exemptions. First, during the WFD negotiation, member states were concerned with the implementation costs involved. In the absence of data on costs, they tried to lower the objectives and include exemption provisions, not for exceptional cases, but so as to spread costs over time. Second, the CIS failed to find a common agreement on ambiguous terms such as 'disproportionate

costs/expenses', since participants rarely had the mandate to negotiate this topic and lacked the political support, not least due to fears of infringement procedures that could be initiated in response to failure to comply with ambitious methods and goals. Third, pragmatic considerations often led member states to justify exemptions in their own ways or not to justify them at all.

Future research could complement this work with further in-depth national and cross-country comparisons of the implementation of exemptions, in order to better understand on a case-by-case basis how exemptions are implemented and justified across the EU. Also, if academics sought to further develop methodologies to justify disproportionate costs in member states, they should do so in a rigorous but pragmatic way which would be as little time and resource consuming as possible (but see Klauer et al. 2016).

This research has suggested that exemptions and the ambiguity of terms related to exemptions partly resulted from the uncertainty about the costs and benefits of the WFD during the negotiations. Therefore, if the WFD will be revised in 2019 as planned, an impact assessment could help establish a common frame of reference and data basis for all negotiating parties with a view to reducing the desire to resort to exemption clauses. Moreover, all negotiating parties, in particular the European Commission, should be aware of the potential danger of exemption clauses in EU directives. Ideally, key terms should be well defined during the negotiations in order to reduce or even avoid any sense of ambiguity, since a common understanding is very difficult to settle later. Another option would be to change the CIS framework and take it to a higher level, so as to enable political decisions to be taken, e.g. by involving the Council of Ministers or the European Parliament. Discussions on exemptions should leave the expert sphere and consider political implications in open debate. Finally, such discussions should address what is at the heart of the debate on exemptions: whether and how the protection of water resources can be prioritised vis-à-vis other environmental or even non-environmental policies. In times in which the EU is increasingly questioned, it is important to wave the flag for one of its core pillars, i.e. to develop and maintain ambitious environmental policies with a view to ensuring the well-being of EU citizens and future generations.

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Chapter 4: Justifying exemptions through policy appraisal: ecological ambitions and water policy in France and the United Kingdom

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Abstract

The Water Framework Directive aims to achieve 'good status' for all water bodies in the European Union. However, exemption clauses enable member states to delay protective measures and to lower water quality objectives. The ambiguity of exemption clauses has lead to a plurality of approaches across the continent. They differ as to their political objectives, i.e. the overall ambition displayed in implementing the Directive, and to their methodological choices, i.e. the analytical tools used to justify exemptions. This article argues that those political and methodological dimensions influence each other. Relying on a framework of analysis that integrates key recommendations from the literature, we explore the usage and justification of exemptions in two countries, the United Kingdom and France. Our analysis suggests that analytical methods were often decided so as to reflect the ecological ambitions of a country, and some methodological choices seem to have had unintended consequences for water quality objectives. We conclude that economic methods should be adapted so that they take into account, rather than ignore, the political ambitions of a country in the field of water.

Keywords

Affordability; Cost-Benefit Analysis; Disproportionate Costs; Exemptions; Water Framework Directive

4.1 Introduction

The Water Framework Directive (WFD, 2000/60/EC) represents a major shift in EU water policy from isolated attempts to reduce pollution from various *specific* sources and clearly *defined* types of water usage towards a more *holistic* approach. The Directive recommends or makes compulsory water management principles such as river basin management, public participation and economic analysis, with a view to preventing any further deterioration and achieving 'good status' for all surface and groundwater bodies.

Specifically, the WFD obliges EU member states to draft River Basin Management Plans (RBMP), which specify water quality objectives for individual water bodies and justify exemptions. Programmes of Measures, published at the same time, identify the actions required to achieve these objectives. Water authorities operate within six-year management cycles; this includes the initial drafting, update and implementation of RBMPs and Programmes of Measures. The first cycle started in 2009 when the first RBMPs were published. The second cycle began in 2015 with the update of the plans. The third cycle will last from 2021 to 2027.

However, exemption clauses enable EU member states to delay protective measures for up to twelve years (Art 4.4 WFD) or to lower water quality objectives for individual water bodies, i.e. to reach 'less stringent objectives' (Art 4.5 WFD). Member states may resort to these exemptions under three circumstances: if natural conditions are unfavourable, if the achievement of good status is technically infeasible, or if the associated costs are disproportionately high. They may also deteriorate water body quality to pursue projects of major general interest (Art 4.7 WFD).

This article focuses on exemptions related to deadline extensions and less stringent objectives based on disproportionate costs only. Exemption clauses were widely used across Europe: for instance, up until 2009, deadline extensions were granted for 40 per cent of all surface water bodies and for 11 per cent of all groundwater bodies (European Commission 2012b). Obviously, the use of exemptions has a major impact on the degree to which the overall aim of the WFD will be achieved. At the time of writing, more than 15 years after the WFD entered into force, many EU countries are still a far cry away from achieving good water status. Back in 2012 the European Commission

(2012b) had estimated that only 53 per cent of all water bodies would reach a good status by 2015. More up-to-date data is not yet available, but we have little reason to assume that these estimates were wrong. There are many reasons for that, including technical (e.g. lack of knowledge), political (e.g. lack of incentive pricing) and economic difficulties (e.g. financial restraints) (European Commission 2012a; Stanley et al. 2012; Levraut 2013). Yet, exemptions certainly play a role here.

The term 'disproportionate costs' is somewhat ambiguous and the process of justifying exemptions not very well defined (Görlach & Pielen 2007). This can be traced back to political disagreements during the negotiation phase of the Directive, almost 20 years ago. Even today, the legal status of the overall aim of 'good status', the extent to which exemptions should be relied on, and the economic tools used to justify disproportionality are still in dispute (Boeuf et al. 2016). This has resulted in a plurality of approaches: on the one hand, member states differ greatly as to the overall ambition displayed in WFD implementation, i.e. the degree to which they would make use of exemption clauses (Bourblanc et al. 2013). In other words, we observe diversity as to the *political* aspects of WFD implementation. On the other hand, EU member states rely on very different analytical tools to justify the presence of 'disproportionate costs', one of the conditions for an exemption clause (van der Veeren 2010; Gómez-Limón & Martin-Ortega 2013; Dehnhardt 2014; Martin-Ortega et al. 2014; Feuillette et al. 2016). This suggests a high degree of diversity with regards to the *methodological* aspects of WFD implementation.

This article argues that *political* and *methodological* aspects are interrelated and cannot be separated from each other. Political ambitions may influence which analytical tools are used - and how; and tools, far from being purely technical and neutral, may have intended and unintended consequences for the political ambitions on the ground (Lascoumes & Le Gales 2007). We will show that the ambitions of EU member states related to WFD implementation have shaped the analytical tools used and that these choices have influenced the protection standards of individual water bodies. Based on original data and extensive fieldwork in two EU member states, the United Kingdom (UK) and France, this article explores a widely understudied phenomenon: the politics of exemptions in WFD implementation and the role of 'disproportionate costs' therein.

This way we introduce a novel argument to the literature on WFD implementation. So far, in-depth studies on the actual use and justification of exemptions and their relationship to the political ambitions displayed by a country remain scarce (Boeuf & Fritsch 2016). Existing research tends to provide broad overviews across Europe (e.g. Görlach & Pielen 2007; Klauer et al. 2007; Martin-Ortega et al. 2014; Maia 2017). Some of them are already outdated. WFD management activities are organised in six-year cycles, and works such as Gómez-Limón & Martin-Ortega (2013) explored the first management cycle from 2009 to 2015 only (and even here mainly the first two or three years). We know little about the second cycle and how water managers took into account feedback from the first management cycle. In fact, we are not aware of any study that has already looked into the second WFD cycle (i.e. 2015 to 2021). Other works offer recommendations based on academic experiments (e.g. Del Saz-Salazar et al. 2009; Vinten et al. 2012; Galioto et al. 2013; Perni & Martínez-Paz 2013; Martin-Ortega et al. 2015; Klauer et al. 2016; Machac & Slavikova 2016; Klauer et al. 2017). Obviously, these works may provide great benefits to practitioners and researchers, but they say little about what is happening on the ground.

4.2 Analytical framework

The WFD does not properly define what 'disproportionate costs' are and how disproportionality should be established. Two methods - and thus two interpretations of this term - emerged from discussions at EU level. The costs of protective measures could be compared to the benefits provided to society through the improvement in water quality: disproportionality as a result of a cost-benefit analysis (CBA). Alternatively, costs could be compared to the ability of stakeholders to pay for protective measures: disproportionality as the inability of various sectors or polluters to afford the measures (Boeuf et al. 2016).

There is a rich academic literature making recommendations on how to undertake disproportionality analyses (Brouwer 2008; Del Saz-Salazar et al. 2009; Martin-Ortega 2012; Galioto et al. 2013; Gómez-Limón & Martin-Ortega 2013; Martin-Ortega et al. 2014; Feuillette et al. 2016; Klauer et al. 2016; Klauer et al. 2017). While these studies differ in important ways, they have one thing in common: they acknowledge that CBA

and affordability tests are multi-dimensional. Essentially, the comparison of benefits and costs lies at the heart of every CBA, and so does the juxtaposition of costs and available resources in affordability tests. In order to carry out those tests, however, environmental economists are required to consider a range of decisions which govern how precisely the method shall be put into practice (Pearce et al. 2006; Davidson 2014). Our argument is that these decisions not only define the operationalisation of the method, but may also influence analytical outcomes. The contents of these decisions form what we call here the 'dimensions' of CBA and affordability tests.

We select five dimensions from the literature: scale, screening, costs and benefits data, uncertainty, and additional parameters. They were selected for three reasons: first, they are comprehensive, i.e. taken together, they cover all the technical aspects related to CBA, to affordability tests, or to both. Second, they may be applied globally and enable cross-country comparisons. Third, they all depend on the degree of ambition displayed by an EU member state for implementing the WFD, and their precise operationalisation may influence the process of setting objectives.

The overall function of these dimensions in this research therefore is to *unpack* two complex analytical tools – CBA and affordability tests – and to provide the signposts needed to understand the application of these tools in diverse empirical settings. The above dimensions have no normative meaning here, i.e. we use them to anatomise, dissect and examine rather than to assess and evaluate. In doing so, these dimensions provide a structure for our case study analysis and lay the foundation for the argument that we wish to make: first, we compare the choices that water managers in England and France have made with regards to each dimension. Second, we explore the relationship between these choices and the political ambition displayed by each country. We describe these five dimensions below.

4.2.1 Scale

Both CBA and affordability tests are performed on a specific geographical perimeter. In the case of WFD implementation, at least four hydrographical units could be considered: the water body, the catchment or sub-catchment, the river basin, or the national scale.

4.2.3 Screening

CBA and affordability tests could be performed systematically and consistently for each hydrographical unit. Alternatively, one may attempt to limit the number of units analysed or to reduce the depth of the analyses. Preliminary screenings support a decision here and, in doing so, save resources. For example, water managers may want to identify hydrographical units where implementation costs are likely to be disproportionately high.

4.2.4 Costs and benefits data

Data are a necessary input to both CBA and affordability tests. Here, we focus on costs and benefits data. They may be assessed qualitatively, quantitatively (but not monetised) or monetarily. Costs include investment, operating, administrative and environmental costs as well as income reductions. Benefits involve market and non-market benefits and typically inform CBA only. Finally, we examine whether benefit transfers were used. Benefit transfers apply benefit values estimated from a particular location to another location with similar characteristics. This method is often used when local data are unavailable, but it comes with obvious methodological weaknesses (Klauer et al. 2016).

4.2.5 Uncertainty

Uncertainty is a common feature of environmental policy-making processes. In WFD water management, this may refer to the status of water bodies (and therefore to the nature and costs of measures that should be implemented), the effectiveness and efficiency of measures, input data, the monetisation of benefits and costs, and methodological limitations related to the use of benefit transfers. Here, we consider whether and how these uncertainties have been taken into account when assessing disproportionality.

4.2.6 Additional parameters

We consider here various methodological decisions to operationalise CBA and affordability tests. For CBA, this includes the cost-benefit ratio, i.e. the threshold distinguishing proportionally and disproportionally high costs. Economic theory suggests that the cost-benefit ratio should be one. We also consider the rate used to discount future benefits and costs. Discount rates respond, amongst others, to the insight

that many people prefer short-term over long-term gains and long-term over short-term costs. A high discount rate gives more weight to current expenses while a low discount rate favours long-term benefits. Therefore, the discount rate has an ethical dimension because it determines the extent to which the interests of future generations are taken into account (Martin-Ortega et al. 2014; Martin-Ortega et al. 2015). We also study which categories of users, criteria and thresholds were used in affordability tests.

4.3 Data and methods

This article compares the UK (specifically England) and France, two countries that have relied extensively on disproportionate costs to justify exemptions (Levraut 2013; Environment Agency 2015).

In England, economic analyses were performed consistently across the country, up until 2015 at national and after 2015 at catchment level. We therefore explore the national level, one representative river basin and one equally representative catchment: the Humber basin and the Aire and Calder catchment, respectively.

Economic analyses in France, on the other hand, differed significantly from one river basin to another. Consequently, this research focuses on the national and the river basin level whereby all river basins in mainland France and Corsica were investigated, namely Adour-Garonne, Corsica, Loire-Brittany, Meuse, Rhine, Rhone and Coastal Mediterranean, Sambre, Scheldt, and Seine-Normandy. We do not take into account the French overseas territories.

This research examines the first and the second WFD management cycle, i.e. economic analyses carried out to support the 2009 and 2015 RBMPs. To this end, we analysed 77 policy documents drafted between 2003 and 2016 by policy makers at the local, regional and national level in the UK and France as well as at EU level. Appendix B provides a complete list of policy documents studied.

Furthermore, we conducted, transcribed and analysed 48 semi-structured interviews with actors directly involved in the implementation of the WFD in the UK and France. Interviewees include state - central government, departments or agencies- and non-state actors - environmental non-governmental organisations and stakeholders. We chose

participants so as to get a representative picture of the objective-setting process in both countries, in the first and second WFD management cycle. We first identified interviewees through our professional network. This includes representatives of water agencies involved in the working groups on economics and WFD planning at national level in France, members of the CIS and consultants in the UK. We also found through Internet searches contacts in non-governmental organisations and river trusts, as well as members of the national and the Humber river basin liaison panels. Finally, interviewees directed us through other relevant contacts, i.e. we used snowball sampling. The 48 interviews conducted were used to obtain results for both Chapter 4 and 5. However, only 32 interviewees provided relevant data for Chapter 4. All interviewees are listed in Appendix A (INT-EN and INT-FR).

4.4 Political ambitions and objective setting in England and France

This section discusses the general ambition displayed by England and France during the implementation of the WFD. RBMPs and Programmes of Measures are 'ambitious' when they set objectives that are significantly higher than the initial situation – and 'cautious' when this is not the case. We use the terms 'ambitious' and 'cautious' neutrally, with no positive or negative connotations.

4.4.1 England

In each constituent part of the UK – England, Northern Ireland, Scotland, and Wales – a designated non-departmental public body manages the water environment and, therefore, produces RBMPs and performs economic analyses. In England this is the Environment Agency (EA), which carried out this task from six regional offices until 2014 and, since then, from 14 area offices. The Department for Environment, Food and Rural Affairs (Defra) is legally responsible for the timely and correct implementation of the WFD. Defra's Secretary of State approves the final RBMPs, including the WFD water quality objectives (INT-EN01). This suggests that the preparation of RBMPs in England is very much centralised.

Water managers in England take a cautious and pragmatic approach to WFD implementation. In the first management cycle, 26 per cent of all surface water bodies were monitored to have a good or high ecological status or potential. The aim was to

reach good ecological status in 30 per cent of all water bodies by 2015. In the second cycle, however, the EA aimed to increase the proportion of surface water bodies with a good ecological status from 17 per cent monitored in 2015 to 21 per cent in 2021, and to reach a less stringent objective for ecological status in 25 per cent of all cases (Environment Agency 2015). This could suggest that water quality deteriorated between 2009 and 2015. However, the changed figures are mainly due to a re-designation of water bodies, resulting in a decrease in the overall number of water bodies, and to more comprehensive monitoring data from further investigations. Moreover, if water managers were uncertain whether necessary measures could really be implemented, they resorted more systematically to exemptions in the second cycle, specifically deadline extensions (INT-EN01).

This suggests that water managers in England interpret the WFD as an obligation to *aim* to achieve good status (except for exemptions), i.e. a "best effort approach" (Bourblanc et al. 2013, p.1457). In other words, the English approach to the WFD aims to avoid over-implementing the Directive – also known as 'gold-plating' (Jans et al. 2009). This stands in contrast to the politically motivated ambition to implement the WFD beyond minimum requirements in France, as we will explain later.

According to Bourblanc et al. (2013, p.1465), "the more politicians and policy makers feel they are held accountable by EU institutions, the more the level of ambition will be adjusted to the perceived adequate implementation process in front of the EU". Water managers in England see the implementation of the Programmes of Measures, rather than the achievement of good water status, as a legally binding requirement. They therefore prefer to adopt Programmes of Measures that are likely to be implemented even if – or better, exactly because – they display a certain lack of ambition (Dieperink et al. 2012; INT-EN04).

The degree of caution expressed here is well compatible with the reluctant position that the UK has generally taken towards European integration and the level of scepticism shown as to the benefits the EU can provide to member states. The UK government has always sought to avoid 'gold-plating' during the transposition and implementation of EU law and, to this end, encouraged ministries, departments and independent regulatory agencies to apply EU standards to the minimum so as to minimise costs and efforts

where they are not justified in terms of benefits (Knill 2001; Wurzel 2002; Fritsch 2011; UK Government 2015).

4.4.2 France

Water management in France is decentralised, which is why the river basin level deserves particular attention. In each basin, a River Basin Committee brings together elected policy makers at the local level (40 per cent of all seats), water users (industry and commerce, agriculture, recreation, environmental movements, water consumers - also 40 per cent) and non-elected officials from local authorities (20 per cent). Supported by one of the six water agencies - public bodies operating at regional level under the responsibility of the Ministry of Environment - each Committee defines the water management priorities in their basin, establishes the overall aim (i.e. the percentage of water bodies that should reach good status by the next deadline) and recommends the budget available to implement the Programme of Measures (INT-FR07, INT-FR10, INT-FR18, INT-FR23, INT-FR25, INT-FR27). The water agencies determine the water quality objectives for individual water bodies. The River Basin Coordinating Prefect, a state representative at the regional level, then approves the RBMP (Levraut 2013). The Ministry of Environment coordinates this work, being legally responsible for the implementation of the WFD (Levraut 2013).

In contrast to water managers in England, authorities in France generally set ambitious water quality goals which were more difficult to achieve (Levraut 2013). The *Grenelle de l'environnement*, a political convention that included members of civil society and took place in 2007, decided that two thirds (in practice 64 per cent) of all surface water bodies should be in good ecological status by 2015. This effectively translates into a legally-binding commitment to restrict the use of exemptions to one third of all surface water bodies or less – an ambitious, symbolic target that had a major influence on the planning process at river basin level (INT-FR12). In 2009, 41 per cent of all surface water bodies were already in good ecological status (Levraut 2013). France aimed to increase this figure by another 23 per cent. In 2015, only 44 per cent of all surface water bodies were in good ecological status, and the new aim was to improve this figure to 66 per cent by 2021 (INT-FR17). However, figures of water bodies in good status are not quite comparable between the first and second cycles. This is because the guidelines to assess the status of water bodies have changed in between. Both in the first and the

second cycle, water managers preferred deadline extensions over less stringent objectives to justify exemptions (INT-FR17).

Bourblanc et al. (2013, p.1449) offer several reasons for the different approaches taken in England and France. The "visibility of the policy process" (Bourblanc et al. 2013, p.1449), not the least thanks to the highly political, public role played by the *Grenelle de l'environnement,* is of particular importance when it comes to understanding the high ambitions pursued in France. Another factor is "the division of responsibilities" (Bourblanc et al. 2013, p.1449). Although the River Basin Committees, supported by the water agencies, set the objectives, the Committees are not responsible for their achievement and funding. Usually, local authorities are in charge of implementing the measures. River Basin Committees therefore do not necessarily feel accountable for the objectives they set. The authors also argue that accountability towards the European Commission matters. In contrast to the UK, pro-European sentiments are a defining element of France's international identity, and the country is genuinely committed to achieve policy goals set at EU level. It should be noted, though, that its performance has always been somewhat less impressive in the field of environment. The European Commission repeatedly initiated infringement procedures against France, and it is plausible to assume that the high ambitions pursued by France in the water sector were and are an attempt to improve its reputation (Bourblanc et al. 2013).

In short, the UK and French approaches to the WFD stem from two different policy and administrative stances. We will now show how the economic analyses performed to justify exemptions reflect these differences.

4.5 Operationalising disproportionality analyses

In our two case studies, the logic behind exemptions and their justification differed substantially. We also observe evolution over time, i.e. between the two management cycles.

In England, water managers primarily referred to the uncertain status of water bodies to justify exemptions in the first cycle (Environment Agency 2009). Uncertainty comes with the risk that costs would outweigh benefits and that public investments be misspent

for unnecessary or ineffective measures. Water managers thus favoured deadline extensions to collect more data on the status of water bodies and spread the costs of measures over time (Defra 2009). In the first cycle, economic analyses therefore played a minor role only in exemption-related decisions. The European Commission and environmental movements criticised this extensive reliance on uncertainty as a basis for exemptions (INT-EN10; INT-EN18). Defra responded by publishing a statement of position which, amongst others, committed to enhance their water quality data so as to avoid legal action from the World Wildlife Fund and the Angling Trust (INT-EN10; INT-EN15; INT-EN18). In the second management cycle, economic analyses played a more prominent role. The EA trained their area staff to perform CBA on each catchment and used these analyses to define the level of ambition (good status or less stringent). When funding was not readily available for necessary measures, Defra would apply for a deadline extension (INT-EN01).

In France, River Basin Committees were constrained in so far as they were obliged to pursue the national target set by the *Grenelle de l'Environnement*, according to which two thirds of all surface water bodies were to be in good ecological status by 2015 (INT-FR12). Economic analyses therefore were not only designed to identify and justify cases of exemptions, but also to limit their number. However, we observe a considerable degree of variation across river basins as to the methods used to justify the use of exemptions. Analysts performed over 700 CBA in total (Feuillette et al. 2016). Water managers largely preferred deadline extensions over less stringent objectives in order to stick to higher ambitions. At the end of the first cycle, the European Commission criticised France for the lack of available justification for exemptions (Levraut 2013). In the second management cycle, the Ministry attempted to harmonise methods across river basins and requested to make economic analyses publicly available (INT-FR17). However, not all water agencies complied.

We now apply our framework of analysis to each country. We offer a summary of our findings in Table 5 below and provide additional information in Appendix F.

4.5.1 Scale

Water managers in England and France operated at different scales to perform economic analyses and set water quality objectives. In the first management cycle, analysts in England mainly performed economic appraisals at the national or river basin

scale as part of an impact assessment of the RBMPs (INT-EN01). In the second cycle, EA staff performed CBA at sub-catchment scale (the number of water bodies within these sub-catchments varied), close to each other or with similar activities impacting them (INT-EN05). In France, the water agencies conducted CBA and affordability assessments at the water body, catchment (groups of around ten water bodies) or river basin scale (INT-FR02; INT-FR09; INT-FR14; INT-FR22; INT-FR23; INT-FR27). While the EA tried to optimise the scale used for the analysis in the second cycle in order to balance the level of detail with the number of analyses, authorities in France were less concerned about this aspect.

However, scale matters. On the one hand, authorities operating at larger scales reduce the number of analyses and therefore save time and resources. Moreover, analyses at larger scales reduce the risks of double counting costs and benefits that apply to several water bodies (INT-EN05). To illustrate, let us consider a factory that is located at a particular water body and that pollutes another water body as well. Reducing the pollution load, for example by building a treatment plant, will incur costs for the factory. These costs would be considered for the water body where the factory is located. However, the benefits accrue to both water bodies. The overall analysis would be faulty if the analyst took into account these costs in CBA for both water bodies: this would be double counting. On the other hand, analyses at smaller scales may consider more robust local data. The catchment scale thus seems to be ideal if one wants to increase the robustness of the analysis and avoid an overestimation of costs or benefits. At the same time, this practical problem raises legal questions: Article 4.4 and Article 4.5 (WFD) require decision making and reporting at the water body scale. However, there is disagreement as to whether the underlying analysis must be performed at the water body scale as well. So far, this ambiguity has not yet been resolved legally.

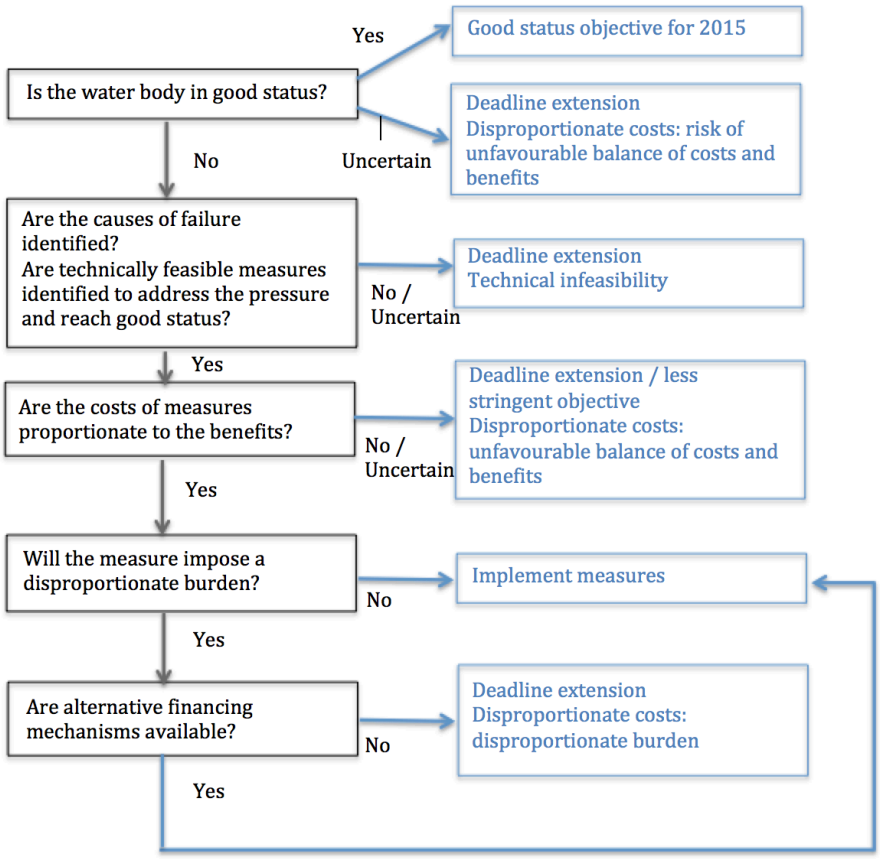
4.5.2 Screening procedure

In order to assess whether measures to improve the quality of each water body would incur disproportionate costs, economists have the choice between detailed disproportionality analyses on each hydrological unit or screening procedures. The latter enable analysts to sort and group cases, but also to select the water bodies on which a detailed assessment should be undertaken. Due to time and resource constraints, both

countries used screening procedures; however, their screening processes differed substantially.

In England, in the first cycle, water managers used decision trees to sort cases and decide upon exemptions and their justification: unfavourable natural conditions, technical infeasibility, or disproportionate costs (see Figure 9 below). Analyses related to disproportionate costs were usually performed at national level, i.e. showed little context sensitivity, and were generally not very detailed (Defra & Environment Agency 2009).

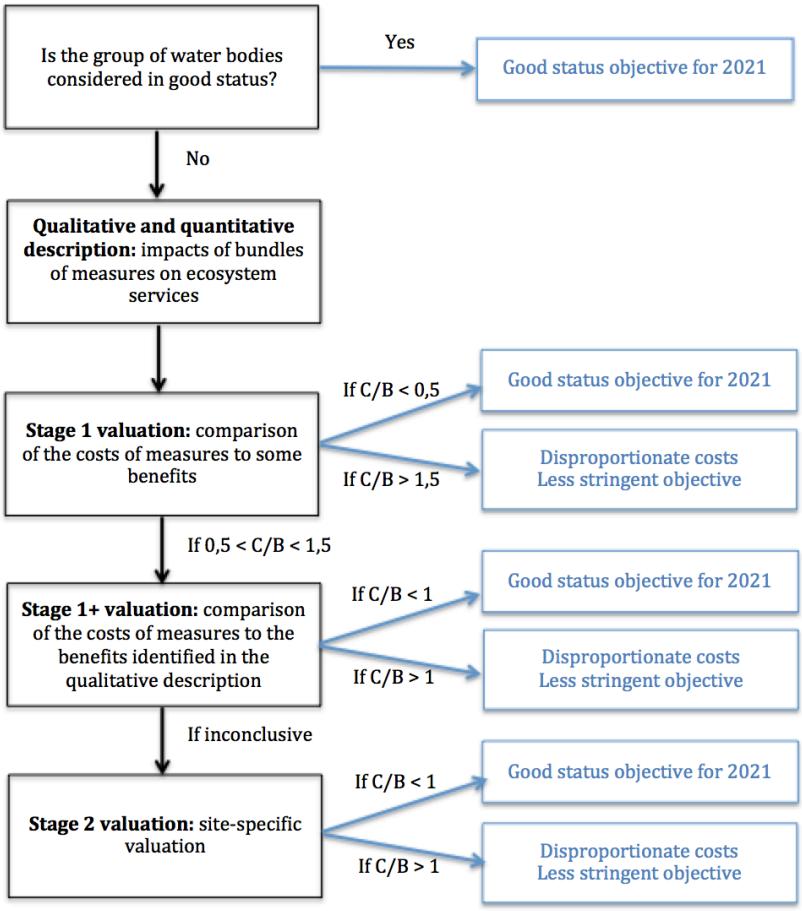
Figure 9: Summary of the main steps used by the EA in decision trees to decide on exemptions in the first management cycle, Source: authors



In the second management cycle, area EA offices applied a step-wise procedure or 'triage approach' so as to perform in-depth analyses only if they were absolutely necessary and the expected impacts high (Environment Agency 2014, p.8). In a first step, analysts would identify and describe the potential impacts of different bundles of measures; no monetisation was envisaged at this stage. They estimated the expected

(dis)benefits using a scale from 'significant' to 'noticeable' and 'no net change' and compared them to the 'do-nothing option'. The second step, a 'stage 1' valuation, took into account a range of monetised benefits and explored which bundles of measures were particularly cost-beneficial or not. If necessary, a 'stage 1+' valuation was performed. This analysis included a more comprehensive range of monetised benefits identified during the qualitative description. Finally, analysts could perform a 'stage 2' site-specific valuation if the previous results were inconclusive (Environment Agency 2014) (see Figure 10). This advanced appraisal method was rarely used in practice, since stage 1+ analyses were usually satisfactory (INT-EN01).

Figure 10: Main steps used by the EA to decide on exemptions in the second management cycle, Source: authors



The water agencies in France used different screening criteria. This included stakeholder ability to pay, the costs of measures compared to past expenditures, particularly high costs incurred by a specific type of measure, and cost thresholds (INT-

FR09; INT-FR23, INT-FR27). In the second management cycle, national guidance recommended CBA when measures were not a priority and where affordability tests produced negative results (Commissariat Général au Développement Durable 2014).

Screening procedures may have a profound impact on management decisions. In England, the EA used a staged approach to determine the depth of the analysis. Analysts thus undertook a more or less comprehensive CBA for most water bodies. Because 'stage 1' valuations did not take into account the full range of benefits, this process could lead to the exemption of water bodies where protective measures would actually come with a positive cost-benefit ratio. In other words, the EA's staged procedure, relying on a subset of potentially available data, resulted in a more cautious approach when it came to objectives and exemptions. That said, a preliminary study published by the EA (2013) concluded that the results of 'stage 1' valuations did not significantly differ from more in-depth assessments. Consequently, the relevance of this factor should not be overestimated.

In France, however, analysts used screening criteria to select water bodies on which to perform a CBA. This approach had the advantage of reducing the number of analyses to be performed. However, it also limited the potential number of exemptions. As such, it favoured a more ambitious interpretation of the WFD. For example, applying a cost threshold means that measures with low costs, but also potentially low benefits, were not eligible to an exemption. The diversity of screening criteria used in France also shows that they are more relevant if tailored to local characteristics. In the Rhone and Coastal Mediterranean basin a cost threshold was used due to the geography of the river basin. While protective measures were inexpensive in mountainous areas with low human pressures on water bodies, actions were costly in densely populated and industrialised cities (INT-FR27). Another example is Loire-Brittany where water pollution through agriculture is a major problem, which was therefore explicitly flagged up for an economic appraisal (INT-FR23).

4.5.3 Costs and benefits data

Costs and benefits data constitute a crucial input to economic analysis. They may differ as to their nature (qualitative, quantitative or monetary), their source, their quality and their scale. All these characteristics may influence water management decisions.

In the first management cycle, the EA extracted cost-related data from water company business plans (INT-EN03; INT-EN06), earlier impact assessments and in-house sources, for instance data collected through permits. However, analysts did not consider all costs (Defra 2009). In the second cycle, the Agency tried to broaden the data available to the analyses (INT-EN03) based on in-house sources and used a database on agricultural activities and pollutants that would subsequently inform CBA (INT-EN08). Although EA staff was encouraged to use local costs (INT-EN05), analysts often relied on national databases that did not always accurately reflect local realities (INT-EN21). With regards to benefits, the EA relied on the National Water Environment Benefits Survey (NWEBS), which elicited preference values from 1,487 people in 50 locations and valued aesthetic, biodiversity and recreational benefits of water status improvement. In the first management cycle, EA economists used these values to prepare national and regional impact assessments (Metcalfe et al. 2012; Environment Agency 2013). In the second cycle, EA staff integrated an updated version of these benefit values into the stage 1 valuation process (Environment Agency 2014). Furthermore, a qualitative assessment was made to better take into account non-monetised and non-market benefits. As a cogent example, the concept of ecosystem services, which informed valuations, was used to frame this plurality of benefits in assessments (INT-EN05; INT-EN09).

In France, economists calculated investment and maintenance costs based on databases developed by the water agencies, experts assessments, in-house and external studies and local data (INT-FR06; INT-FR09; INT-FR23). In the second management cycle, water agencies enhanced the quality and quantity of their data on costs, in particular through additional studies, e.g. on hydromorphological measures (INT-FR27; INT-FR25). When it comes to benefits, the Ministry prepared a systematic review of valuation studies so as to build a national database of non-market benefits (angling, kayaking, bathing, windsurfing, hiking, observing, boating) and non-use values (property values). Market benefits mainly refer to the costs saved on drinking water treatment and generally weighted for more than 50 per cent of the total benefits (Feuillette et al. 2016). Unfortunately, the Ministry only found about 40 studies and was unable to assess many categories of benefits. It then saved those benefit values that could be extracted from the academic literature, as incomplete as they were, in a Microsoft Excel tool designed to perform the CBA (Feuillette et al. 2016; INT-FR13). Consequently, some benefit

categories, in particular non-market benefits, were not systematically considered during the CBA although they constitute, in an ideal world, an important element of disproportionality analyses. In order to establish the benefits of protective measures in a specific water body, the analyst would then select the most relevant non-market benefit values and multiply the Ministry's default value by the number of water users. The Ministry suggested to use local data sources to establish the number of water users, for instance surveys on site visits. In practice, however, analysts relied on generic figures of the population near a water body (Feuillette et al. 2016). Some water agencies also prepared local studies to improve the data (INT-FR09; INT-FR23; INT-FR27). In the second management cycle, the Ministry updated its systematic review through the inclusion of new publications, although not numerous (Commissariat Général au Développement Durable 2014).

The approach followed in England seems to have favoured more ambitious water quality objectives than the one pursued in France. This is because EA staff did not take into account all the costs related to the achievement of good water status while the parallel usage of NWEBS and additional qualitative analyses provided a comprehensive overview of all the benefits. Unsurprisingly, this approach increased the cost-benefit ratio. In France, in contrast, the database on benefits was patchy, and non-market benefits were rarely taken into account, favouring a less ambitious implementation of the WFD. This factor may partly explain why only 25 per cent of all CBA had a negative cost-benefit ratio in England (Environment Agency 2015), as compared to 75 per cent in France. Obviously, this conflicted with the high ambitions associated with WFD implementation in France. Water economists therefore criticised the method used for the valuation of benefits and promoted a more qualitative approach (Feuillette et al. 2016).

Using benefit transfers seems to be unavoidable if one faces a large number of water bodies. However, analysts in England appear to apply this method in a more accurate way than in France. This may explain why economists in the French water agencies criticised the use of benefit transfers. The basis on which authorities in France applied benefit values was particularly problematic. Analysts would use the number of residents near a water body, so that areas with a smaller population density were heavily penalised (Feuillette et al. 2016). This approach favoured a less ambitious

implementation of the WFD. We do not make similar observations in England where analyses were carried out at the catchment rather than the water body scale. This is because average population densities are generally more homogenous at larger hydrographic scales. Moreover, analysts at the local level included upper bound benefits values and looked at wider benefits for scarcely populated areas with a high non-use value. Finally, EA staff did not only consider upstream-downstream issues in their economic analyses, but also during the planning process (monitoring and determination of the water status and subsequent measures) (INT-EN05). The use of benefit transfers was thus less problematic in England than in France.

4.5.4 Uncertainty

Both countries considered uncertainties during the whole planning process. This includes uncertainties related to the status of water bodies, to activities impacting the aquatic environment and to the efficiency of measures. However, England and France responded very differently to their presence, and these responses reflect the different ambitions of these countries associated with WFD implementation.

In the first cycle, the inability to accurately assess the current status of water bodies, the reasons for a degraded status and the necessary measures were a key reason for water managers in England to request exemptions based on disproportionate costs. Obviously, uncertainties related to the water status may result in uncertainties as to the nature, effectiveness and efficiency of measures taken to improve water bodies (Environment Agency 2009). Accordingly, analysts were trying to avoid the possibility that the costs outweigh the benefits if inappropriate and inefficient measures were to be taken. In order to win time for additional research, regulators preferred deadline extensions to less stringent objectives (Defra 2009). Although in the second management cycle uncertainty was less central to disproportionality analysis, EA staff continued to take into account uncertainties when they prepared the 2015 RBMPs. For example, they discounted benefit values based on their level of confidence in the data describing the water status (INT-EN08). Consequently, EA analysts took uncertainties into account to avoid misspending (Defra & Environment Agency 2009), resulting in a cautious approach to setting water quality objectives.

In line with the French commitment to implement the WFD to a high standard, the overall approach was to avoid exemptions towards less stringent objectives unless the

impossibility of reaching good status by 2027 had been proven (Ministère de L'Ecologie de l'Energie du Développement Durable et de la Mer 2009). Consequently, a majority of exemptions requested were deadline extensions. Like in England, the idea was to gain time to increase the scientific knowledge base. Water agencies even pursued the objective of good status for several water bodies characterised by high degrees of uncertainty (Levraut 2013; INT-FR10). Moreover, analysts used a cost-benefit ratio of 0.8 to account for the possibility that benefit values were underestimated, resulting in rather ambitious objectives in case of uncertainty (Ministère de L'Ecologie de l'Energie du Développement Durable et de la Mer 2009).

4.5.5 Additional parameters

Several additional parameters were used in both countries to operationalise the CBA and the affordability tests. This includes the discount rate and the cost-benefit ratio in CBA and various indicators and thresholds in affordability tests.

In England, analysts used a discount rate of 3.5 per cent for the first 30 years and 3 per cent for any subsequent years, in accordance with guidance from the Treasury (HM Treasury 2003). The cost-benefit ratio was primarily used in stage 1 valuations in screening procedures: if the cost-benefit ratio was between 0.5 and 1.5, economists would perform a stage 1+ valuation (Environment Agency 2014). In France, analysts used a cost-benefit ratio of 0.8 and a discount rate of 4 per cent over 30 years in the first management cycle and of 2.5 per cent in the second (Commissariat Général au Développement Durable 2014).

The discount rate used in France in the first management cycle was thus higher than in England. This resulted in a higher number of exemptions in France, because it valued future benefits less. However, France changed the discount rate in the second cycle; in fact, it is lower than in England now. This change favoured more ambitious water quality objectives and is well in line with the ambitious take on WFD implementation in France. In England, the discount rate was medium, remained stable over time and therefore had a moderate impact only on the result of the analyses. In doing so, England followed the conventional approach, taken from welfare economics, of determining economic efficiency when the benefit-cost ratio is greater than 1, i.e. when discounted benefits outweigh discounted costs. In contrast, water managers in France chose a cost-benefit ratio below one, which favoured benefits over costs, i.e. more ambitious targets.

Regulators in England interpreted the inability to pay as a "disproportionate burden" (Defra & Environment Agency 2009, p.8). In the first management cycle, EA analysts used this argument to justify exemptions in two cases only. The first one concerns water bodies polluted by abandoned mines. Analysts decided to spread costs over time so that expenditures would match available public funding. The second case relates to water bodies awaiting the installation of fish passes. Deadline extensions then served to gain time with a view to identifying additional sources of funding in the public and private sector (Defra & Environment Agency 2009).

Water managers relied much more extensively on disproportionate burdens in the second cycle. They set the 2021 objectives on the basis of Programmes of Measures that could be delivered with budgets and policies that were already in place. Measures with no reliable and credible funding were not presumed to be deliverable. The authorities did not consider other, insecure funding sources at this stage. This practice is at variance with previous agreements at EU level. So far, the European Commission has not commented on its lawfulness yet. For example, the financial amount that the water industry may spend on environmental protection measures is agreed together with Ofwat, the regulating body of the privatised water and sewerage industry, in so-called periodic reviews. These processes take place every five years and are disconnected from the WFD management cycle (INT-EN07; INT-EN16; INT-EN18). Consequently, it is difficult to anticipate how much the water industry will be able to spend on WFD measures in the future. Likewise, achieving good water status may require additional legislative activities, budgetary reallocations, funding applications to the Treasury, and decisions taken by other ministries and government departments, all having uncertain outcomes. While exemptions based on less stringent objectives relied on economic analyses, exemptions requesting an extension of deadlines were based on affordability tests (INT-EN01). The question of who would pay for those measures was, first and foremost, explored in impact assessments (INT-EN09). Our analysis suggests that a majority of the costs would be borne by the water industry and national government. Consequently, the English approach to affordability was extremely cautious, in line with the British take on WFD implementation. The 2021 objectives set were based on secure funds and existing policies.

In France, water agencies assessed the ability to pay thanks to a set of indicators for each sector and defined thresholds in order to determine when costs would be seen as disproportionate. To illustrate, costs were considered unaffordable for households if the water bill exceeded 3 per cent of their income (Ministère de L'Ecologie de l'Energie du Développement Durable et de la Mer 2009). The Water Agency Rhine-Meuse used a particularly elaborate method to assess affordability: for each sector, economists would assess the costs of protective measures. Several indicators would then be calculated and thresholds applied. Those had been agreed prior to the assessment with the River Basin Committee and affected stakeholders (INT-FR14). A more detailed assessment of the indicators and thresholds used in Rhine-Meuse is available in Appendix F.

Authorities in France assessed affordability in very different ways. Affordability tests did not refer to the availability of funding, but to indicators developed for each sector or stakeholder. This approach was much more ambitious than the British one, particularly in river basins where affordability tests were used in combination with CBA results. In such cases, action would be taken even if the costs were higher than the benefits, as long as there was evidence that stakeholders could afford protective measures. Some water agencies however were not fully convinced by the indicators and thresholds used (see Appendix F for an example on the gross operating surplus of farmers). Those thresholds were often considered to be non-discriminating, i.e. almost all measures would then be above or below the threshold (INT-FR22; INT-FR23; INT-FR27). The case of Rhine-Meuse is thus particularly interesting because the Agency chose indicators and thresholds that were specifically tailored to local circumstances and the stakeholders concerned. Thanks to this analysis, economists in France took into account distributional effects and the impacts of the costs of measures on each sector.

4.5.6 Summary of our findings

Table 5 below summarises our findings for England and France and indicates whether methodological choices resulted in more ambitious (+), more cautious (-) or neutral (0) water quality objectives.

Table 5: Synthesis of findings

Dimension	England	France
Approach	Cautious (-)	Ambitious (+)
Scale	1st cycle: national and river basin (potentially -) 2nd cycle: sub-catchments (0)	Both 1st and 2nd cycle: water body, catchment and river basin level (+/-)
Screening	1st cycle: decision trees, no in-depth analysis 2nd cycle: 'triage' approach consisting of a qualitative description of measures that impact on ecosystem services, stage 1: CBA with NWEBS benefit values, stage 1+: CBA with wider benefits, stage 2: site-specific valuation (overall: potentially -)	Both 1st and 2nd cycle: various criteria used including the ability to pay, cost thresholds, past expenditures and non-priority measure (+)
Costs and benefits data	1st cycle: range of costs not monetised (+), NWEBS benefit values (+) 2nd cycle: more costs assessed (0), NWEBS and qualitative assessment of ecosystem services (+)	Both 1st and 2nd cycle: incomplete database of benefits (-), use of benefit transfers (-), benefit values applied to population densities (-)
Uncertainty	Both 1st and 2nd cycle: uncertainty in favour of deadline extensions (-)	Both 1st and 2nd cycle: uncertainty in favour of good status (+)
Additional parameters	CBA used to justify less stringent objectives Both 1st and 2nd cycle: discount rate 3,5% over 30 years, then 3%; if 0,5<cost-benefit ratio<1,5 in stage 1, perform stage 1+ (2nd cycle) (0) Affordability: disproportionate burdens, 2nd cycle: deadline extensions set when no secure funding was available (-)	CBA used to justify deadline extensions and in a few cases less stringent objectives Both 1st and 2nd cycle: cost-benefit ratio=0,8 (+). Discount rate: 1st cycle: 4% (-), 2nd cycle: 2,5% (+) Affordability: Both 1st and 2nd cycle: criteria and thresholds used (+ when used in addition to CBA to set deadline extensions, in this case, both analyses had to show negative results, 0 when affordability was a sufficient criteria to set a deadline extension)

To sum up, our analysis shows that the above five dimensions do affect the results of disproportionality analyses and may serve to set more or less exemptions:

- Scale influences the number of analyses performed, the risk of double-counting benefits and costs and the robustness of data used in the analysis. In our view, the catchment scale is preferable here.

- Screening procedures determine the depth of the analysis performed and, in doing so, the degree of precision of costs or benefits data. Furthermore, screening procedures, if strictly used, reduce the number of analyses and therefore of potential exemptions.

- The quality and quantity of data related to benefits and costs has, according to our analysis, the greatest impact on the result of CBA. The lack of benefits data and the sensitivity of the analyses to the population living near a water body largely explain the numerous negative CBA results in France. This is independent from the discount rate and the cost-benefit ratio.

- Uncertainties are used in two contradictory ways: as an argument to justify exemptions, with a view to avoiding disproportionally costly measures, or to set ambitious aims for individual water bodies because an exemption cannot be justified on basis of the data available.

- Finally, inability to pay can either be used alone to support deadline extensions, thus making the justification easier, or on the contrary in addition to CBA to diminish the number of possible exemptions.

As argued above, data related to costs and benefits appeared to have the greatest impact on the results of economic analyses. Surprisingly, it is the only dimension where England generally displayed greater ambition than France. Nevertheless, in England, benefits are more likely to be higher than the costs. Because the outcomes of those analyses were not in line with the general approach towards WFD implementation dominant in France, French regulators, favouring ambitious water quality targets, complemented CBA with additional criteria to tilt the scale against the use of exemptions. This includes requirements to identify additional arguments for exemptions, for instance unfavourable natural conditions or technical infeasibility, the

use of thresholds to limit the overall number of water bodies associated with disproportionate costs, and combinations of CBA and affordability tests. Overall, the high number of CBA displaying higher costs than benefits in France has certainly been a cause for distrust towards the use of CBA in WFD implementation in France.

Obviously, decisions taken with regards to the above five dimensions were also subject to more general constraints, i.e. factors unrelated to the WFD. Three factors play a role here and deserve more attention in future studies: first, resource constraints, explaining the poor method used on benefits valuation in France; second, the presence of statutory guidelines on economic analyses in general; and finally, attitudes about the usefulness of economic appraisal methods in public policy more broadly.

4.6 Conclusion

Our article has explored the use of economic analysis to justify exemptions during the implementation of the WFD in England and France. Relying on an analytical framework consisting of five dimensions – scale, screening, benefit and costs data, uncertainty, and additional parameters – we show that the two countries rely on economic analysis, that their operationalisation differs, that these differences reflect, to some extent at least, political ambitions in the field of water policy and, finally, that the usage of economic analysis influences the process of setting water quality objectives. All this suggests that policy appraisal tools have a political dimension and are not, and cannot be, neutral when it comes to aiding decision makers.

This argument departs from the mainstream narrative put forward in environmental economics according to which analytical tools such as CBA are politically neutral, if applied correctly by the textbook (Owens et al. 2004). Economic analyses lose this neutrality only as a result of inaccurate and flawed usages by practitioners. Instead, this article builds on an emerging research agenda in public policy and political science exploring the political dimension of policy appraisal in legislation and programme implementation (McGarity 1991; Turnpenny et al. 2008; Cashmore et al. 2010; Coletti & Radaelli 2013; Fritsch et al. 2017). The specific usage of policy appraisal tools can, intentionally or unintentionally, shape the outputs of political decision-making processes (Dunlop et al. 2012) and, in fact, support almost contradictory political aims.

However, this argument has rarely been spelt out in detail in an interdisciplinary water policy context.

We contribute to extant scholarship by suggesting three pathways – related to *input*, *process*, and *output* - through which economic analyses may influence water policy decisions, thereby bringing in another degree of sophistication to previous work on policy appraisal. First, screening processes are useful examples to highlight the importance of data inclusion rules in economic analysis – they basically alter the range of materials defining the *input* of the analysis, thereby answering the question of *what* is actually analysed. Second, we provide evidence for variance in the interpretation of uncertainties, the choice of the cost-benefit ratio, the discount rate, thresholds in affordability tests, and other *process*-related features of economic analysis. The way data is processed, decisions are taken and key concepts interpreted may tip the scale in one way or another – referring to the *how* question of economic analysis. Finally, tools come with different degrees of *precision* and *soundness* of analysis. Consequently, methodological choices influence the *output* of water policy decisions. This includes various aspects, but most importantly the degree of ambition and the affected parties – the *to what end* and *who*. Examples include the challenges related to benefit transfers and the scale at which analyses are performed. Future research could address these questions in more detail and reflect in more depth upon factors explaining specific methodological choices in economic analyses, both in the water sector and beyond.

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Chapter 5: Theorising different uses of policy appraisal: water regulation in the UK and France

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Abstract

Policy appraisal is typically associated with four functions in public policy making: to control the bureaucracy, to support evidence-based decisions, to help enhance policy coordination and stakeholder consultations, and finally symbolic uses. However, while such classifications provide convincing explanations for individual cases, little attempts are made to link those uses to established theories of the policy process. This article aims to address this gap. Specifically, we rely on theoretical thinking that brings together ideas from the Multiple Streams Approach and the Advocacy Coalition Framework. Our findings suggest that the role reserved for policy appraisal in the politics stream explains any further use in the policy process, in particular in problem definition and policy formulation. To illustrate, our findings we focus on a comparative case study in water regulation: the European Union Water Framework Directive and its implementation in the United Kingdom and France.

Keywords

Policy Appraisal; Impact Assessment; Multiple Streams Approach; Advocacy Coalitions Framework; Environmental Regulation

5.1 Introduction

This article aims to theorise the different uses of policy appraisal. Commonly understood as a "family of ex ante techniques and procedures … that seek to inform decision makers by predicting and evaluating the consequences of various activities according to certain conventions" (Owens et al. 2004, p.1944), policy appraisal has

become an indispensable, and often mandatory, tool in the arsenal of public policy makers across the globe (Radaelli 2005; Renda 2011; De Francesco 2012). Policy appraisal belongs to the formulation stage of the policy-making process.

Policy appraisal is typically associated with four functions in public policy making. First, it is a key instrument in the toolbox of elected policy makers to control the bureaucracy. As one of several administrative procedures, policy appraisal obliges regulators to justify their aims and forms of political intervention (McCubbins et al. 1987; Damonte et al. 2014). Second, policy appraisal integrates, in an ideal world, a range of data, evidence and preferences into the policy-making process (Rissi and Sager 2012; Cairney 2015). Manipulated analyses that support decisions already being made also belong here. After all, these analyses still rely on the idea that policy appraisal is an authoritative tool to structure and inform policy choices (Hertin et al. 2009). Third, policy appraisal represents a useful venue to coordinate intra- and interdepartmental communication and to manage stakeholder consultations (Dunlop et al. 2012; Bozzini and Smismans 2016; Smismans and Minto 2017). Finally, policy appraisal may be used merely perfunctorily and symbolically. In this case, it is not the individual policy appraisal that matters, but the presence of a policy appraisal or impact assessment (IA) system that is able to impress international donor organisations, globally operating auditors or the business community (Radaelli 2010).

While the above four functions of policy appraisal are useful to illustrate its role in public policy making, we know little about *when* and *why* policy makers take recourse to policy appraisal – and how such uses can be conceptualised within established theories of the policy process. Previous works emphasise the importance of legal frameworks and regulations (Radaelli 2005; 2010), political parameters such as ministerial directives and party-political commitments (Hertin et al. 2009; Atkinson 2015), organisational factors, for instance time, human resources, expertise and culture as well as institutions (Turnpenny et al. 2008; Dunlop et al. 2012). This includes the relative strength of the executive and the degree of centralisation in a country (Radaelli 2010).

However, what all these works have in common is that they are relatively theory-free. They provide extensive and convincing explanations for their respective cases, but little attempts are made to link those findings back to theory or to offer new conceptual

frameworks that help us understand the role of appraisal in public policy.

This article aims to address this gap. Specifically, we rely on theoretical thinking that brings together ideas from the Multiple Streams Approach (MSA) and the Advocacy Coalition Framework (ACF). While attempts to bring these approaches together have been around for a while, the contribution of this article is to conceptualise the role of policy appraisal here.

To this end, we use a comparative case study in water regulation: the European Union (EU) Water Framework Directive (WFD) and its implementation in two selected countries: the United Kingdom (UK) and France. The WFD aims to improve the 'status' (i.e. the quality) of water resources in Europe and offers a number of procedural tools to achieve this goal. Policy appraisal, and CBA specifically, plays a critical role in the WFD. This is because the Directive comes with several exemption clauses enabling member states to delay the achievement of good water status or to lower the overall level of protection, in particular if protective measures come with disproportionately high costs. Appraisal tools serve to justify such exemptions to the European Commission (Boeuf et al. 2016). France and the UK represent two contrasting cases when it comes to their use in water policy and therefore enable us to explore and theorise the use of policy appraisal more broadly (Boeuf et al. 2018).

5.2 Theory

The MSA first and foremost seeks to understand the political agenda-setting process (Kingdon 1984). The approach is built on the assumption that three 'streams' co-exist. First, the *problem stream*: policy makers acknowledge that an issue should be addressed. Second, the *policy stream*: actors propose solutions to problems. In reference to the Garbage Can Model (Cohen et al. 1972), Kingdon (1984, p.19) refers to all proposed solutions as the "policy primeval soup". Policy communities develop ideas that "float around" (Kingdon 1984, p.19), waiting to be identified as solutions for specific problems. Third, the *politics stream*: this refers to the political context, such as elections or major changes in public opinion. Policies appear on the political agenda when these three streams converge, creating a "policy window" (Kingdon 1984, p.88).

Whether the MSA may be used to understand parts of the policy process other than agenda setting is disputed (Howlett et al. 2017).

The ACF aims to explain policy change (Sabatier and Weible 2008). It relies on the assumption that stakeholders, for instance government agencies, non-governmental organisations, the business community or the media, form coalitions in order to influence political decisions. These coalitions are built around shared beliefs and compete with other coalitions. However, they also utilise various resources, including a favourable public opinion, policy entrepreneurs, expertise or legal authority, to support their cause. The resulting policy largely represents the beliefs of the winning coalition.

Over the past few years, scholars have been trying to combine these theories. The idea is to use the explanatory power of each and to expand the MSA and the ACF to all stages of the policy cycle. Howlett and colleagues (2015; 2017) thus suggested using a five-streams framework: a *process stream* joins in at the policy formulation phase and a *programme stream* during policy implementation. The *process stream* designates the actual process of tackling the problem, while the *programme stream* focuses on the details of a particular solution (e.g. instruments). Policy stages progress when "critical junctures" occur or "windows" open, i.e. when several streams meet. Within this framework, stakeholders form coalitions to push their own ideas to the forefront (Howlett et al. 2017, p.8).

Originally, the MSA did not apply to the formulation stage and therefore remains somewhat quiet on the role of policy appraisal. That said, Nilsson et al. (2008) argue that the Garbage Can Model, including its 'policy primeval soup' analogy later borrowed by Kingdon, suggests a rather incidental decision-making process. They inferred that the choice of appraisal tools did not result from a rational procedure, but rather from coupled problems, solutions, and tools thrown in the garbage can by various stakeholders, and from the eventual opening of a policy window. Consequently, one could simply argue that choices related to the design and function of policy appraisal merely reflect the evolution of the three streams, how and when they meet.

Likewise, the ACF does not systematically consider policy appraisal. However, the framework pays a great attention to the role of knowledge in the policy process. For example, as a result of scientific information, perhaps provided through policy

appraisal, individuals may change their beliefs (Ellison and Newmark 2010). In fact, advocacy coalitions use knowledge instrumentally to influence decision makers and the public; this includes the use of manipulated information. Generally, information in the ACF tends to reinforce prior beliefs, due to perceptual filters that may influence data selection and interpretation (Sabatier and Weible 2008). Overall, however, the precise location and role of policy appraisal has not yet been theorised adequately in the ACF.

Approaches merging the MSA and the ACF would then imply that the streams identified by Howlett et al. (2017) determine the design and functions of policy appraisal. We will explain in the remainder of the article how this process takes place using the example of the EU's WFD. Before we do so, we will take a short detour to introduce into the cases, data and methods. Once we have presented our empirical material, we will return to theory.

5.3 Cases, data and methods

Adopted in 2000, the WFD aims to achieve good status for all water bodies in the EU and to avoid any further deterioration. The Directive introduced a number of procedural changes to water regulation. It requires member states to draft River Basin Management Plans (RBMPs), outlining general priorities for water protection and setting specific water quality objectives for individual water bodies. Regulatory agencies are then requested to adopt Programmes of Measures, which specify actions likely to result in improved water quality. These two documents are updated every six years. The first RBMPs were published in 2009, the second in 2015. The third and last will be released in 2021. The six-year period during which RBMPs are valid is usually referred to as a management cycle. The WFD is organised around three management cycles, ending in 2015, 2021 and 2027, after which the Directive is supposed to have achieved its goals. Our analysis focuses on the first two cycles.

Exemption clauses, however, enable member states to lower the WFD's ambitious water quality goals. Countries may delay the achievement of good status or lower the ambition of protective measures due to adverse natural conditions, technical infeasibility or disproportionately high costs. In this article, we focus on the latter because the concept of disproportionality requires the use of analytical tools.

Unfortunately, there is no agreement in the EU on how exactly disproportionately high costs may be identified and justified, i.e. where the fine line between proportionately and disproportionately high costs can be drawn (Görlach and Pielen 2007; Dehnhardt 2014; Martin-Ortega et al. 2014). EU guidelines recommend policy appraisal here, and usually member states either resort to CBA, i.e. a comparison of benefits and costs, or the affordability principle, i.e. a comparison of costs with stakeholders' ability to pay (Boeuf et al. 2016).

Using two contrasting case studies, this article compares the implementation of the WFD, and the determination of exemptions, in two EU countries, the UK (more specifically England) and France. In England, the Environment Agency drafts RBMPs, suggests water quality objectives for each water body, and performs policy appraisals. The Department for Environment, Food and Rural Affairs (Defra) oversees this process and issues guidelines to aid regulators. Defra's Secretary of State approved the final plans. The definition of RBMPs therefore tends to be a rather centralised process in England (Boeuf et al. 2018). We analyse the English case at the national, the river basin (Humber), and the catchment (Aire & Calder) level. CBAs were performed consistently across the country, and the Humber and Aire & Calder are largely representative of the rest of England.

In France, water planning is decentralised at the river basin level. River basin committees, i.e. local water parliaments bringing together elected local officials, water users and non-elected local officials, determine the overall level of ambition and adopt RBMPs, which would then be approved by the respective local authorities. Six regional water agencies perform policy appraisals and set the water quality objectives for individual water bodies. Although the Ministry of the Environment issued national guidance for the appraisals, water agencies used them to different degrees, resulting in methodological diversity (Boeuf et al. 2018). We therefore studied all river basins (excluding the overseas territories).

In terms of data sources, we analysed more than 40 policy documents, including RBMPs, official and consultancy reports, guidelines and policy appraisals. A complete list of policy documents is available in Appendix B. Furthermore, we interviewed 48 officials involved in policy implementation or appraisal in England and France - e.g. representatives of central government, departments, and agencies -, as well as

stakeholders. These include representatives of the business community, agriculture, environmental organisations, and water user associations. The 48 interviews conducted were used to obtain results for both Chapter 4 and 5. However, only 34 interviewees provided relevant data for Chapter 5. We identified interviewees through our professional network, Internet searches and snowball sampling. A complete list of interviewees is available in Appendix A (INT-EN and INT-FR).

5.4 Water regulation in England

We will now look into the case of water regulation in England and, in doing so, explore the politics, problem, policy and process streams therein, the role of advocacy coalitions and what all this says about the role of appraisal tools in public policy.

5.4.1 The politics stream: the political context

Generally, public policy making in the UK relies on a basic assumption: that the public interest would be served best if policies maximise the benefits to society and minimise the costs (HM Treasury 2018). The language of Better Regulation is of particular importance here. Adopted in the late 1990s by the first Blair government (Gibbons and Parker 2013), this initiative obliges government departments to prioritise the role of evidence in the decision-making process, to foster economic efficiency in rulemaking, and to display sensitivity towards regulatory burdens for businesses (Department for Business Innovation and Skills 2015). Conservative governments later reinforced this agenda, introducing the ‘one in, one out’ and then ‘one in, two out’ rules, i.e. attempts to offset new cost-increasing regulations through the dismantling of existing regulatory measures. Regular consultations enable businesses to identify unnecessary regulatory burdens (Gibbons and Parker 2013; Lodge and Wegrich 2015).

According to the Better Regulation paradigm, new legislative and regulatory proposals should be financially affordable and prove that benefits justify the costs (HM Treasury 2003; Radaelli 2009). Policy appraisal plays a key role here (Turnpenny et al. 2008). The UK may look back at a long history of assessing the impacts of political interventions, dating back to the early 1980s when compliance cost assessment were used to reduce regulatory burdens for businesses (Renda 2011; Adelle and Weiland 2015). However, policy appraisal was also useful for the Conservatives back then to

break the power of 'club government' in the UK and to open up the policy-making process through meta-regulatory measures (Levi-Faur and Gilad 2004, p.107; Moran 2003). New Labour adopted this line of thinking in 1997 and made policy appraisal mandatory for all new regulations and, since 2007, for almost any type of government intervention, including primary and secondary legislation and the transposition of EU directives (Parker 2016).

As a major element of every policy appraisal, CBA in particular points decision makers to the most efficient policy solution, thereby potentially side-lining other social issues such as fairness or equity (McGarity 1991). Numerous government guidelines issued by the Better Regulation Executive support government departments in preparing IAs, and the Regulatory Policy Committee oversees the quality of IAs in the UK (Adelle and Weiland 2015).

5.4.2 The problem stream: squaring the circle

Kingdon's problem stream relates to an undesirable state or condition. In the case of the WFD, this seems to refer to the poor quality of water in Europe, that the Directive aims to improve. However, the situation may be slightly more complicated. Practically, EU policies impose problem definitions onto member states, but there is no guarantee that a country actually shares that definition. This implies that member states may navigate between honest attempts to address a specific policy problem and a minimum approach only to the implementation of EU law.

Historically, the UK's approach towards environmental policy making relied on consensual relations between regulators and regulatees (Vogel 1986). Inspectors and regulated industries negotiated informally the precise terms of policy implementation, and voluntary measures were mainstream. This reflected the UK's policy style, emphasising club-like interactions between political and economic elites at the expense of civil-societal actors (Moran 2003). However, it also responded to the fact that regulatory agencies usually did not possess the staff and resources to enforce regulatory standards thoroughly. With rules being interpreted in flexible ways and judicial procedures only being used as a last resort, the environmental record of the UK was mediocre at best (Fritsch 2011). While the above-mentioned attempts to open up the policy-making process, from specifically targeted compliance cost assessments to a fully-fledged Better Regulation policy, helped make the policy process more

transparent, things did not become easier for advocates of environmental protection. This is because, after all, environmental policies would now require a positive benefit-cost ratio in order to receive the whole-hearted support of government, a hurdle that is difficult to take as Ackerman and Heinzerling (2002) remind us.

It is these developments that have made, for a long time, the UK an awkward partner in EU environmental policy making. The UK's policy style – club-like and secretive, or rational and technocratic – rarely resonated well with their counterparts in the rest of Europe, resulting in incompatibilities between EU policies and domestic conditions. On the other hand, the level of ambition displayed by environmental policy makers in the UK did not reflect all too well the aspirations at EU level, resulting in the ill-famed, although exaggerated label of 'the dirty man of Europe' (Jordan 2002, p.10).

In the last two decades the UK has adopted a much more positive and, so to speak, pro-active approach to EU environmental policy making. Initially a 'foot-dragger', "blocking or delaying costly policies in order to prevent them altogether or achieve at least some compensation for implementation costs", the UK became a leader in various ways, not the least in order to reduce implementation costs through the upload of domestic practices to the EU level (Börzel 2002, p.194). Nevertheless, the UK still aims to square the circle and to achieve three objectives at once when implementing EU environmental law: to adopt policies they may have adopted anyway (i.e. to solve a specific problem, if at all), to maintain the prerogative of CBA and its underlying assumption of cost-beneficial decisions, and to implement EU policies such that infringement procedures will be avoided at all costs (Fritsch 2011). Government departments are therefore requested to minimise the 'gold-plating' of EU directives, i.e. to avoid overimplementation and unnecessary costs to the business community (Department for Business Innovation and Skills 2015). How this will look like after Brexit remains to be seen.

Regulators in the UK, and more specifically England, used this line of thinking too during the implementation of the WFD. They certainly aimed to achieve good water status and, in doing so, made sure they fulfil the minimum requirements of the Directive – a "best effort approach" (Bourblanc et al. 2013, p.1457). However, at the same time they subjected any measure to a thorough CBA, in particular as the WFD provides the opportunity to delay or put aside entirely measures not supported by a positive benefit-

cost ratio – in line with the WFD's exemption clauses explained earlier. One Defra official explained: "Our philosophy in other words, is based on the idea that maybe it's not sensible to seek to achieve good status everywhere, it could be too expensive, and not worth doing, and maybe there are better things to do … So you have to make choices about what to do." (INT-EN01) Water regulators hereby stroke a careful balance between political demands made by various interest groups. While environmental movements tried to achieve higher levels of protection and, through the Word Wide Fund for Nature and the Angling Trust, even took legal action against the government (INT-EN10), business representatives such as the Country Land and Business Association argued that Defra already went too far (INT-EN17).

All this is to suggest that key assumptions made in the politics stream dominate the framing of problems. Issues related to water pollution are only framed as problems if they could be solved through a cost-beneficial solution – or if failure to address them may result in legal action on the side of the European Commission. Because of the importance of CBA here, policy appraisal essential becomes a tool to determine which issues are problems that deserve political attention – and which do not.

5.4.3 The policy stream: finding a solution

The policy stream identifies solutions to policy problems. The WFD already comes with a set of legally-binding solutions which respond to the problem defined by the Directive. The WFD suggests that poor water quality is a problem in Europe and obliges member states to adopt, in six-year cycles, RBMPs and Programmes of Measures to address it. RBMPs are strategic documents outlining specific environmental objectives for individual water bodies; this includes the possibility of doing nothing, if justified. Programmes of Measures then provide detailed lists of actions to achieve those objectives. However, all this is purely procedural: the Directive provides few indications as to how ambitious the objectives should be and what measures should be taken to achieve them. The overall goal of the WFD is of little help here: the Directive requires member states to "aim to achieve good status", but not to "achieve good status" (2000/60/EC) – something that may be relatively easier to do.

It is therefore up to environmental regulators to decide which water bodies should be subject to protective measures – and which not. Although the law did not require the use of policy appraisal here, the Environment Agency produced CBAs for two reasons: to

distinguish ‘problematic’ (receiving full regulatory attention), ‘less problematic’ (receiving partial regulatory attention, characterised by the adoption of less ambitious water quality objectives) and ‘unproblematic’ ones (no regulatory attention) – and to justify their decisions to the Minister, Parliament, the public, and important organisations and businesses (INT-EN01; INT-EN09). ‘Problematic‘ water bodies are characterised by a positive benefit-cost ratio, would receive a water status objective in the RMBP and be associated with various activities in the Programmes of Measures (INT-EN05); ‘unproblematic’ ones would be subject to exemptions, i.e. would be ignored for the duration of the six-year cycle. Later, however, water regulators also exempted water bodies if their benefit-cost ratio was positive, but no funding available to kick off the necessary measures (INT-EN01).

So far, the ambition displayed in England is low. Since 2009 water regulators aimed to increase the number of water bodies in good ecological status by only 4 per cent from 17 per cent to 21 per cent, if we use the latest figures. More than 79 per cent of all water bodies were subject to exemptions (Environment Agency 2015).

5.4.4 The process stream: justifying water policy decisions

The process stream describes formal aspects, as opposed to substantive ones, of measures taken to address the policy problem. As we have argued above, implementing the WFD in England means squaring the circle: improve water quality wherever justifiable; comply with key domestic policy-making principles and budgetary constraints, including the efficiency paradigm and requirements to take political action only if the benefits outweigh the costs; and to implement EU law to the minimum. Policy appraisal plays a major role here. It helps achieve these three goals, and it helps communicating their achievement to domestic and European stakeholders.

First, policy appraisal is necessary to distinguish ‘problematic’, ‘less problematic’ and ‘unproblematic’ water bodies and, once this is out of the way, to set the budget and justify to the Treasury actions necessary to improve ‘problematic’ water bodies. The Treasury is a powerful ministry that tends to restrict public spending, especially in the absence of visible yields. Therefore, many projects aiming to protect or improve the environment have been rejected over the years, especially since environmental benefits were difficult to establish (Weale 1997). The government considers the outcome of

CBA as the main criteria for judging whether new measures justify the costs (HM Treasury 2003; INT-EN01; INT-EN08).

Second, policy appraisals served to justify the selected measures and, more importantly, their absence, i.e. if the benefit-cost ratio was negative and no protective measures were taken. English water regulators targeted two audiences here. On the one hand, they were used to report water status objectives and exemptions to the European Commission. Essentially, these reports confirmed the correct implementation of the WFD with a view to avoiding an infringement procedure (INT-EN08). The English water authorities were quite successful here: some domestic stakeholders even felt that the RBMPs were reporting devices for the Commission rather than roadmaps for action (INT-EN07; INT-EN21). On the other hand, policy appraisals were meant to pacify domestic opposition, not the least from environmental movements, and to avoid legal action at the home front. After all, environmental organisations such as the World Wildlife Fund and the Angling Trust have already threatened Defra with lawsuits, among others due to the extensive, and in their view unjustified, use of exemptions (INT-EN18).

CBA was generally widely accepted. Although support for this tool varied, complete opposition was scarce. Defra was particularly in favour of CBA: it is a tool commonly used within government (INT-EN04), enjoys particular support within the Treasury (INT-EN03; INT-EN06), and is mandatory to justify new political interventions (INT-EN01). Likewise, representatives from environmental movements and consumer associations showed little hostility. They agreed that public funds should be invested efficiently (INT-EN10; INT-EN12), and environmental groups were pleased to see that protective measures could be proved to be cost-beneficial in 75 per cent of all cases. They were however disappointed with the more political use of affordability to justify exemptions (INT-EN10; INT-EN 18).

5.5 Water regulation in France

We now apply our framework to the case of WFD implementation in France. Once again we look at four streams, related to politics, problems, policies and process.

5.5.1 The politics stream: the political context

Shortly after his election in 2007, President Nicolas Sarkozy initiated a major public event in Paris: the *Grenelle de l'environnement*, a roundtable bringing together representatives from local and national authorities, environmental movements, trade unions, and the business community to discuss environmental policy priorities for the next five years. Although originally designed to respond to the concerns of the environmentalist electorate, the *Grenelle* became an effective consultation device and adopted a number of ambitious environmental targets that would later become national law (INT-FR12).

The resolutions passed by the *Grenelle* had a major impact on the way policy makers and stakeholders thought about future water policy in France (Boeuf et al. 2018). Moreover, they highlight an important feature of French policy making: the prerogative of politics over economic considerations, including questions of efficiency. This is not to say that French politics is free of budgetary concerns - in the contrary. Over the following years, local and national governments systematically reduced the funding available for environmental protection (and many other issues) in response to the economic crisis and subsequent austerity policies (INT-FR02). Consequently, public officials often side-lined environmental issues in favour of problems perceived to be more urgent (INT-FR02). Since 2014, the national government also diverts money away from the water agencies towards the national budget, thereby reducing the amount of funding available for water protection measures (INT-FR17). However, this merely suggests that political prerogatives may find their limit in the national budget. It does not mean that, contrary to the UK, political priorities in France are defined and formulated in response to, or on basis of, economic principles such as efficiency and benefit-cost ratios.

Consequently, policy appraisal plays a much less prominent role in France's water regulation. A late adopter, France began to use policy appraisal in the 1990s only (Renda 2011), probably as a result of the influence of the Organisation for Economic Co-operation and Development (OECD) (De Francesco 2016). However, its application often remained perfunctory, if not symbolic (Radaelli 2005). Usually, decisions were taken mainly on political grounds and then justified ex-post by a policy appraisal (Wiener 2006). Things changed slowly after 2009, when policy appraisal became a

constitutional requirement. With a view to improving the quality of legislation, all draft bills must now come with an appraisal assessing the economic, financial, social and environmental impacts, all this supported by a CBA (Renda 2011; Lianos et al. 2016).

However, the degree of economic literacy is limited within national government, in particular within the Ministry of Environment, which tends to recruit engineers rather than social scientists or economists (INT-FR21). Nevertheless, a few environmental economists have found their niche in the regional water agencies. This is because the national water laws provided that expenses on water protection be covered, to a good extent, by water taxes. In order to establish and justify the contributions of polluting industries, a number of economists were appointed in the 1990s (INT-FR05). However, CBAs sometimes produced on top of these analyses were usually ignored and generally did not inform decisions (Laurans et al. 2001).

5.5.2 The problem stream: the ambitions of French water policy

France played a crucial role in the integration of Europe, and this had a major impact on the country's self-image. France has never been an environmental pioneer and has regularly been described as a "fence-sitter", i.e. "neither systematically pushing policies nor trying to block them at the European level" (Börzel 2002, p.194). This has much to do with the strong role of non-state actors during policy implementation. Environmental politics in France is often characterised by meso-corporatism, "a mode of interest intermediation in which private interest groups, operating on a basis of concentration, monopolisation and social closure, actively participate in both policy formulation and implementation" (Szarka 2000a, p.90). For instance, the field of water regulation in France provides plenty of opportunities for non-state actors to influence policy implementation, not the least through river basin committees where industries and farmers have long managed to defend their sectorial interests (Szarka 2000b). Consequently, policies often lost some of their sharpest teeth during the implementation phase, and the European Commission initiated a good number of infringement procedures against the country (Buller 2004; Bourblanc et al. 2013).

Things were different when French policy makers faced the transposition of the WFD. Regulators were, on the one hand, more ambitious anyway, aiming to remain thorough during the implementation phase. On the other hand, the resolutions adopted by the *Grenelle* provided a powerful mandate for more ambitious environmental policy goal

and enabled regulators to take a harder stance vis-à-vis sectoral interest groups. The overall consensus therefore was to implement the WFD not only by the letter, but also to put into practice the spirit of the Directive (Boeuf et al. 2018).

This not only meant to 'aim to achieve good status', but to really achieve good water quality (INT-FR01). This ambition, deeply rooted in France's self-image as a 'good' EU member state, found support from an unexpected side: the above-mentioned resolutions adopted by the *Grenelle de l'environnement*. As argued above, this public roundtable acted entirely independently from any European developments; its goal was to define domestic priorities in the field of environment and sustainable development for the next five years. However, the *Grenelle's* resolutions were very well compatible with the ambitious stance taken by French water regulators. Specifically, the *Grenelle* decided that no more than one third of all water bodies may be subject to WFD exemption clauses in the first implementation cycle from 2009 to 2015, thereby reflecting the political will to achieve one-third of the remaining effort required during each of the three six-year management cycles up until 2027 (INT-FR12; INT-FR24). These ambitions were transposed into national law, thereby mobilising state and non-state actors stakeholders around common goals (INT-FR04; INT-FR22).

The implication is that the French problem stream was characterised by two major discourses: the challenge related to the WFD's ambitious water quality goals – and the challenge associated with the high-flying environmental policy resolutions adopted by the *Grenelle*. This is not to say that there was no opposition to these ambitious water policy goals. Various advocacy coalitions, spearheaded by farmers and the business community, partly stood in opposition, requesting a farther-reaching use of exemption clauses (INT-FR17; INT-FR24) and occasionally taking legal action (INT-FR06).

However, efficiency and cost-benefit considerations, and therefore policy appraisal tools such as CBA, were largely absent from these two discourses. In other words, problem definitions referred to political identities and publicly made resolutions rather than technocratic calculations of the common good.

5.5.3 The policy stream: a preference for a specific solution

Despite the ambitious water policy objectives set in the first management cycle from 2009 to 2015, under the influence of the *Grenelle* (INT-FR10; INT-FR12; INT-FR24;

Bourblanc et al. 2013), the level of ambition was somewhat lower after 2015. The overall level of ambition was not decided through a public roundtable. The momentum was gone. The enduring financial crisis, but also technical problems, made it difficult to achieve the levels of protection identified for individual water bodies (Levraut 2013; INT-FR04). Consequently, the Ministry suggested to set targets that were still ambitious, but slightly more 'realistic' – and made sure that the amount of funding for protective measures remained high (INT-FR03; INT-FR04; INT-FR17).

In order to work effectively towards these targets, three strategies were used. First, water managers limited the use of exemptions (Levraut 2013; INT-FR01; INT-FR17). Second, regulators did not apply for exemptions in cases of uncertainty. In the UK, uncertainty as to whether good water status could be achieved at all and uncertainty as to the presence of a negative benefit-cost ratio was a major reason to apply for exemptions. Water regulators in France, in contrast, turned the burden of proof: they would only apply for exemptions when they were certain that measures would be ineffective. Overall, water regulators in France aimed to increase the proportion of water bodies in good ecological status from 41 to 64 per cent – a figure set politically which stands in sharp contrast to the UK which aimed to achieve good water status for 30 per cent of all water bodies in the first cycle.

Due to the political nature of the overall process, policy appraisal played a marginal role only. Technical criteria, financial considerations and local expertise formed the basis for decisions about the levels of protection for individual water bodies (INT-FR02; INT-FR04; INT-FR05; INT-FR06; INT-FR09; INT-FR23; INT-FR24). Ministerial guidelines suggested using CBAs at local level, mainly in order to comply with EU guidelines, but they rarely informed decisions. Figures related to the costs caused by diffuse pollution were sometimes used to persuade polluters of the necessity to take action, but other than that policy appraisal played no major role (INT-FR03; INT-FR04; INT-FR05; INT-FR24; INT-FR25). The reason is twofold. First, water regulators simply had no interest in tools that could potentially encourage discussions about exemptions which would largely stand in contrast to the politically goals set by the *Grenelle*. Second, regulators had already received the necessary funding for protective measures. Using CBA to exempt water bodies from further action would leave regulators with a budget larger than necessary – something very unhealthy in light of

future budgetary negotiations. Some water regulators in France thus perceived CBA as a tool that could provide undesirable information (INT-FR22).

5.5.4 The process stream: justifying water policy decisions

We have argued that French water regulators aimed to use much less exemptions than their British counterparts, the political goal initially was 33 per cent of all water bodies maximum. Decisions upon exemptions were taken on political or technical grounds, and policy appraisal played no major role here. This is because water regulators were bound by the *Grenelle* and its politically set environmental resolutions anyway.

At the same time, the political mainstream in France, and this includes officials in the Ministry of the Environment and regulators in water agencies, displayed a notable level of distrust when it comes to the use of CBA. Ministry officials were slightly more sympathetic towards CBA in the first management cycle, from 2009 to 2015. However, they always had a preference for budgetary considerations in water regulation and even attempted to strengthen the role of the affordability principle at EU level (INT-FR24). After 2015, however, the Ministry took distance from existing EU guidelines, legally non-binding anyway, and did not praise the potential merits of CBA (INT-FR13), not the least in response to the critical views held in the water agencies at regional level (Feuillette et al. 2016).

Water regulators criticised CBA for two reasons. On the one hand, they identified a number of methodological weaknesses, in particular with regards to benefit valuation. Officials simply were in doubt whether the method would really provide the basis for sound analyses and robust results (INT-FR04; INT-FR09; INT-FR20; INT-FR24). On the other hand, many members of staff, in particular those with backgrounds other than economics, remained unconvinced of the merit of the Kaldor-Hicks criterion in CBA – i.e. the hypothetical assumption that winners of specific actions could compensate the losers (Pearce et al. 2006). Most officials preferred to think in terms of spending and redistribution rather than benefit-cost ratio and efficiency. One regulator explains: “If we conclude [on the basis of a CBA] that the action is feasible while costs are not financially acceptable for the payer, the fact that another stakeholder gets benefits will not help. This stakeholder will not give money to the payer. In other words, because the costs and benefits are not going to the same stakeholders, it is complicated to use [CBA] as a criteria to know if we should pursue [the measure] or not” (INT-EN04). Thinking

along the lines of ethics, social justice and distribution here comes with many advantages: "There are aspects of acceptability … that are locally very strong, political, psychological, change acceptability that have to be taken into account. … In reality, when you take a decision … you take into account other values, including your quality of life or well-being" (INT-FR06). Water regulators here respond to the simple fact that many important decisions in French water regulation are taken by river basin committees, which bring together a range of stakeholders – all of them concerned with 'who pays how much' rather than 'who gains what'.

Nevertheless French water regulators do occasionally exempt water bodies – up to 33 per cent as we argued above. These exemptions must be justified to the European Commission, and this is where CBA takes a stronger role. The European Commission promotes the tool in various guidance documents, and although these guidelines are legally non-binding, French water regulators preferred to couch their justifications for exemptions in the language of CBA. However, those decisions were already made earlier on the basis of technical, political or financial considerations. These CBAs were therefore often perfunctory: decisions were rarely taken on the basis of them, and their quality was generally questionable (Levraut 2013).

5.6 Discussion

The political environment in Britain is dominated by three key values: the efficient use of public funds, the desirability of cost-beneficial policy decisions, and the goal to minimise burdens to the business community. Policy appraisal, ideally an impact assessment with a CBA section, is *a*, if not *the*, tool to put these values into practice. Although it has no constitutional foundation, a good number of policies, practices and organisations, couched into the language of Better Regulation, ensure its authority in British policy making.

In terms of theory, this suggests that policy appraisal takes a prime role in the British politics stream. Looking at water regulation in the UK, we have demonstrated that policy appraisal, and more importantly CBA, played a significant role in distinguishing 'problematic', 'less problematic' and 'unproblematic' issues, which would then receive more, less or no regulatory attention. These decisions were taken on the basis of

calculations provided by CBAs, supported by specific assessments of how target groups such as small and medium enterprises or internationally trading companies are affected. This implies that policy appraisal contributed, first of all, to evidence-based policy making. In other words, problems and policy solutions were structured, if not created, by policy appraisal. Consequently, key ideas in the politics stream dominated developments in the other three streams, in particular the problem stream. The actual CBAs were then used to communicate decisions to various audiences. This way policy appraisal became, although to a lesser degree, also a tool of political control whereby principals, notably the Better Regulation Executive, the Treasury and Defra, but also the wider stakeholder community, ensured that the agent, i.e. the Environment Agency, complied with the predominant paradigm.

Policy making in France, in contrast, is much more than in the UK dominated by the prerogative of politics. Procedurally, this gives parliament, government, interest groups or deliberative forums such as the *Grenelle* a central role. Until recently, when appraisal tools became a constitutional requirement for legislative proposals, these tools rarely made it into the dictionaries of the political mainstream. CBA, in particular, enjoys little legitimacy; policy makers and regulators alike question its underlying methodology as well as efficiency as the key value to be maximised.

Consequently, appraisal tools in France do not possess the standing to structure the problem or the policy stream to the extent that we observe in England. Key water policy decisions, in particular with regards to overall levels of protection were taken during the *Grenelle*, a public consultation forum, supported by considerations within the Ministry of the Environment and environmental agencies, and in view of budgetary concerns. The number of exemptions was restricted by the *Grenelle*, and decisions on individual water bodies objectives usually referred to technical or budgetary arguments, scarcely to benefit-cost ratios. Policy appraisal, and specifically CBA, mainly entered the picture, first, to couch justifications for exemptions into a language preferred by EU policy makers and, second, to communicate to and receive the buy-in of stakeholders. In both cases, appraisals were mainly used in symbolic ways and usually reflected decisions already being made.

In addition, appraisal tools are not mere technical “neutral devices”: they influence public policy making following their “own logic”, i.e. they carry social, political and

economic preferences (Lascoumes and Le Gales 2007, p.1; Owens et al. 2004). Therefore, they sometimes produce unforeseen consequences. The values in England's politics stream are in accordance with the efficiency goal underlying CBA. In this context, CBA can easily inform decisions, since the outcome of the appraisal will point towards the most efficient solution, a result that is sought politically. This is however not the case in France. The outcome of the CBA will not give a solution that is compatible with the beliefs in the politics stream. In this context, CBA cannot easily be a basis for decision-making, as opposed to affordability, financial or distributional tools. This situation leads to a perfunctory and symbolic use of appraisal. Consequently, when the underlying logic and principles of the appraisal tool used conflict with the values in the politics stream, policy appraisal cannot inform and support policy ex-ante. It serves as a political instrument to support the beliefs in the politics stream. In other words, the use of policy appraisal for evidence-based decision-making also depends on whether the beliefs in the politics stream match with the underlying principles of the appraisal tool used.

5.7 Conclusion

This article set out to theorise functions and uses of policy appraisal. Previous work has come up with a number of frameworks (McCubbins et al. 1987; Hertin et al. 2009; Radaelli 2010; Dunlop et al. 2012; Damonte et al. 2014). Accordingly, policy appraisal may serve four functions: to help elected policy makers control the bureaucracy, to bring evidence into political decision making, to enhance coordination and manage stakeholder interactions during policy formulation, and to merely implement an important element of the better regulation or good governance discourses, thereby appealing to a critical domestic or international audience. However, we know little when and why policy makers take recourse to policy appraisal – and how such uses can be conceptualised within established theories of the policy process. Focusing on the MSA and the ACF, this article contributes to this literature.

Our analysis of two cases, water regulation in England and France, suggests that, when it comes to policy appraisal, the politics stream seems to dominate the remaining streams. To rephrase, it is the politics stream that defines the presence and importance

of appraisal tools in the policy process and narrows down their specific role in the problem, policy and process streams. Four scenarios are possible.

First, the politics stream assigns a major role to policy appraisal, with a particular emphasis on evidence-based policy making. As we have demonstrated, this may influence the problem stream because appraisal tools may help determine which 'issues' actually deserve the label 'problem' and therefore political attention. However, evidence may also be required to establish which policy option is most (cost-) beneficial, thereby taking a key role in the policy stream. No constitutional foundation is necessary here, the British case shows that a combination of institutions and organisations may be sufficient, if enforced effectively at highest government levels. Nevertheless, constitutional provisions such as in France may certainly contribute to the adoption of evidence-based policy making in countries with no established track record of policy appraisal.

Second, the politics stream emphasises the importance of appraisal tools in the policy process, but with a particular focus on control. This scenario is not covered all too much in our case studies, but obviously reflects the well-known situation in the United States. Here policy appraisal is, first and foremost, a tool of the presidential administration (Kagan 2001) to hold regulatory agencies to account, whereby control tools can both take the role of 'police patrols' and 'fire alarms' (for a classic discussion, see McCubbins et al. 1987).

Third, the politics stream gives an important role to policy appraisal as a way to manage stakeholder consultation and coordinate policy internally. This scenario is less reflected in our case studies. It is however dominant within the European Commission, where policy appraisal primarily aims to coordinate policies across the various Directorates-General (Bozzini and Smismans 2016; Smismans and Minto 2017). The OECD also recommends using policy appraisal so as to improve the consultation of stakeholders (Radaelli and Fritsch 2012).

Fourth, policy appraisal does not take a major role at all in the politics stream. Politics may still influence the rules of the game in the problem and policy streams. However, these rules would then reflect discourses, ideas and values other than evidence or control, and would therefore not call for policy appraisal as a key tool to structure those

streams. It may still be that appraisal tools will be used in problem definition or policy formulation. However, their use is much more likely perfunctory or symbolic, i.e. in response to domestic or international expectations, if not pressures, and never been endorsed wholeheartedly at domestic level.

Future research could explore the use of policy appraisal in non-EU countries, for example in the United States, where the control function is historically dominant (Dunlop et al. 2012). Such case studies could enrich the theoretical framework developed in this research. In addition, future work could focus on a policy where advocacy coalitions and lobbying processes are more active, thus deepening the role of the ACF in explaining functions of policy appraisal.

This research also contributes to the literature on the diffusion of policy appraisal (Radaelli 2004; De Francesco 2012). Radaelli (2005, p.924) in particular notices that although appraisal tools are increasingly adopted across the EU, their implementation diverges significantly, i.e. a common "bottle" has produced different "wines". Consequently, our work lays a new stone in this research area: the politics stream may account for the adoption of policy appraisal and for the differences observed in its implementation across countries.

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Chapter 6: Conclusion

The scale of environmental degradation requires urgent action from both governments and society. Of all natural resources, water is particularly endangered due to its intensive use. Sustainable public policies protecting aquatic ecosystems and ensuring an equitable and efficient sharing of water between conflicting uses are needed now more than ever (Ward 2012; European Commission 2017). However, environmental policies often fail to protect natural resources and ecosystems sufficiently (Jordan 1999; Blühdorn 2000; Newig 2007). In order to improve such policies, we first need to better understand the decision-making processes that lead to particular policy choices and designs, as well as how policy appraisal tools are used as part of those processes (Turnpenny et al. 2015).

Rationality and evidence-based policy making are often presented as key to reaching optimal decisions (Brunsson 2007). However, environmental policy decisions are rarely taken on the basis of policy appraisal (Hahn 2000; Bromley & Paavola 2002; Paavola 2002). Consequently, how and why are policy appraisal tools used in decision-making processes? Political scientists argue that environmental policy making is in fact complex and chaotic (Cairney 2011; Adelle & Weiland 2015) and that appraisal often plays a political and strategic role (Hertin et al. 2009). Extant scholarship discusses some constraints and factors that may explain uses of policy appraisal that depart from evidence-based policy making e.g. political impediments, legal restrictions and institutional frameworks (Turnpenny et al. 2008; Hertin et al. 2009; Radaelli 2010). This PhD builds on those works to provide, from a political science perspective, a broader explanatory framework for the uses of policy appraisal tools in environment policy making.

In particular, this PhD has aimed to answer the following research question: *How can we explain the different uses of policy appraisal - in particular of economic analysis – beyond evidence-based policy making in water decision making?* To this end, I studied the case of the EU Water Framework Directive (WFD) (2000/60/EC), the most ambitious piece of EU legislation in the field of water. Economic principles are key aspects of the WFD implementation (Laurans 2006), and play a particularly important role in justifying exemptions.

In order to address the research question, I pursued several objectives.

The *first objective* was to unveil the motives, beyond evidence-based policy making, of the various EU institutions for recommending a specific economic analysis. I thus aimed to explore the relationship between the political goals pursued and the support for a specific type of economic analysis at EU level. I studied the negotiations and disagreements that occurred at EU level on the policy appraisals to perform during the process of setting objectives and exemptions, but also on the Directive's political ambition. I then explored the extent to which diverging interpretations of the WFD could explain the apparent lack of progress on WFD implementation at EU level.

The *second objective* was to determine whether and how the choices made for the economic appraisal impacted the decision-making process domestically. This was achieved through the exploration and comparison of the economic analyses performed in two member states - i.e. the tools used as well as the details of their operationalisation - and to assess the extent to which they impacted the process of setting WFD objectives. I also identified potential divergence with EU guidelines or recommendations. To this end, I studied in-depth the situation in England and France.

Finally, the *third objective* consisted in unveiling the processes underpinning decision making and the role of appraisal tools therein. I thus identified the various functions that economic analysis plays during the process of setting objectives and highlighted differences between England and France. Using a combination of the Multiple Streams Approach (MSA) and the Advocacy Coalition Framework (ACF) developed by Howlett et al. (2015; 2017), I explained the perfunctory and symbolic uses of economic appraisal observed in the case study.

These objectives were addressed in three empirical chapters, preceded by one that set the academic context through a meta-analysis of the social science literature on the WFD implementation in EU member states. In the present chapter, I first synthesise my findings and explain how they responded to the objectives detailed above. Second, I specify the contributions of this work to the policy appraisal and WFD literatures and the insights it provides for policy makers. Finally, I detail its limitations and suggest avenues for future research.

6.1 Synthesis of findings

6.1.1 Academic context: the existing social science literature on WFD implementation in member states

The WFD has motivated numerous scholarly works. However, a systematic review of existing scholarship on the implementation of the Directive revealed many research gaps. Based on a meta-analysis of 89 social-science articles studying empirically the WFD implementation in EU member states, Chapter 2 has provided a comprehensive literature review on this topic.

Findings show first a strong imbalance in the countries analysed. While there is a cluster of very well-researched countries, including the United Kingdom, the Netherlands and Germany, member states that joined the EU after 2004 and Mediterranean countries such as Italy, Greece and, most importantly in the context of this PhD project France, are under-represented. This imbalance is unfortunate; according to EU reports, WFD implementation is suboptimal (European Commission 2012). Current research thus provides an incomplete picture and can only support the improvement of the implementation of WFD provisions in member states to a limited extent. In addition, a majority of publications focused on public participation, while there is little literature on transboundary aspects, economic analyses (especially CBA), exemptions, and policy integration. Consequently, a few areas of research are well documented, whereas others remain blind spots. Moreover, although we observe a significant increase of WFD-related publications since 2011, there are few works only studying the second management cycle or comparing management cycles over time.

Consequently, despite an impressive number of articles published on the Directive, many WFD aspects and countries remain understudied. Chapter 2 was an important first step here that helped refine the research strategy to be used and to identify research gaps in the literature.

6.1.2 Objective 1: unveil the motives, beyond evidence-based policy making, of the various EU institutions for recommending a specific economic analysis

Chapter 3 looked at the debates that arose at the EU level on setting objectives and exemptions in WFD water planning - from the negotiation of the Directive to guideline drafting and subsequent discussions in the CIS. Results showed that, from the very start of the WFD negotiation, EU institutions had diverging perceptions on the Directive's ambition and on the nature of and conditions for using exemptions. Consequently, they failed to come to an agreement on the political aspects of the WFD – i.e. on the Directive's ambition - and on the methodological aspects – that is, the economic analysis required to support decisions on exemptions.

In fact, opposition on the choice of appraisal tools was not merely technical but also political. First, this opposition reflected the disagreements related to the overall ambition of the WFD: the European Commission argued that the use of CBA rather than the ability to pay would prevent member states from downplaying environmental objectives. Second, this opposition reflected political values, such as economic efficiency or social concerns. Consequently, methodological and political aspects are interrelated; the use of appraisal tools cannot be separated from the political dimension of setting objectives and exemptions.

In addition, due to the lack of political consensus on WFD ambition, some countries have relied on exemptions to a greater extent than the European Commission or environmental non-governmental organisations had expected. This situation has been interpreted as a lack of political will to fully implement the WFD.

6.1.3 Objective 2: determine whether and how the choices made for the economic appraisal impacted the decision-making process domestically

The ambiguity of exemption clauses has led to various approaches in EU countries. Political objectives - i.e. the overall ambition and the degree of reliance on exemption clauses - differ, as well as methodological choices - i.e. the appraisal tools used - when setting objectives for the WFD implementation. Chapter 4 explored the economic tools used during the process of setting objectives in two member states: England and France.

I found that both England and France used economic tools, mainly CBA and affordability tests. The analyses performed were generally consistent with European

requirements, although the Court of Justice could potentially challenge parts of them in the future. However, I identified notable differences with regards to the details of the economic analyses undertaken in the two countries. These differences reflect, to some extent, the political ambition of each country in the field of water policy: a cautious and pragmatic approach in England and rather ambitious water quality goals in France. Conversely, methodological choices have influenced the objectives developed for water bodies, sometimes unintentionally. In this part of my project I consequently highlighted the political dimension of policy appraisal tools that cannot be neutral when it comes to aiding decision makers. Political and methodological aspects influence each other.

6.1.4 Objective 3: unveil the processes underpinning decision making and the role of appraisal tools therein

Chapter 5 compared the uses of policy appraisal tools during the process of setting WFD objectives in England and France. In each country, water managers relied on economic analyses for very different purposes. Practitioners were rather open on their motives: mainly evidence-based decision making and accountability, control, or justification of political goals. I also identified less conscious uses of appraisal through a study of the role of economic analysis in the decision-making process (whether it supported decisions or not, at which stage of the process it was performed – in particular before or after objectives were already decided –, what were the criteria decisions were based on), the recipients of analyses (in particular whether they served internal or external use) and the guidelines for appraisal.

In England, results showed that evidence-based decision making is the dominant use of economic appraisal. It was used to rationally inform decisions on less stringent objectives and to reduce costs on economic sectors. Practitioners also undertook economic analyses so as to increase accountability and transparency towards stakeholders, and to some extent for central government to exert political control over departments. In France, CBA mainly had a perfunctory and symbolic use. Analyses, to a large extent, did not inform decisions, which were often taken based on other criteria or considerations. They often served to provide justifications for exemptions to the European Commission, the main recipient of economic appraisals. Practitioners also used them so as to depoliticise controversial topics, in order to respond to stakeholders' critiques or to increase the acceptability of measures.

The application of policy-making theories showed that the politics stream, which embodies specific values depending on the member state considered, influences the role of appraisal tools in the policy process. In England, main values in the politics stream are the efficient use of public funds, the desirability of cost-beneficial policy decisions, and the goal to minimise burdens to the business community. Policy appraisal is well suited to put these values into practice and plays a key role in the various streams. In France however, the politics stream is dominated by negotiation between stakeholders and key political events such as the *Grenelle*. Policy appraisal does not play a major role here and does not structure the various streams. Furthermore, because the values pursued in the politics stream are not in line with the underlying logic of the appraisal tools used – in this case CBA -, the outcome of the analyses can be in contradiction with the objectives decided politically. In this case, CBA cannot easily serve as a basis for evidence-based decision making and is rather used in a perfunctory and symbolic way.

This article thus theorises the functions and uses of policy appraisal, in relying on theories of the policy process, more specifically the MSA and the ACF. The politics stream defines the presence and importance of appraisal tools in the policy process and narrows down their specific role in the problem, policy and process streams. As such, the politics stream may assign a major role to policy appraisal for evidence-based policy making, to control the bureaucracy or to improve coordination. Reversely, policy appraisal may not have a major role in the politics stream. In this case, policy appraisal, if used at all, rather has a symbolic or perfunctory function.

6.2 Contributions of this study

By exploring and explaining the various functions, uses and political dimensions of economic appraisal in water decision making, this research has contributed to the broader literature as follows.

First, I clarified the relationship between political objectives and appraisal tools. Political objectives consist of political values (e.g. economic efficiency, social justice or equity), which are specific to each country. They are shaped by various cultural and

historical factors, such as a member state's history of environmental policy or its relationship towards the EU. Political objectives are then translated into a particular environmental policy ambition – in this case the WFD ambition and the degree of reliance on exemptions. Appraisal tools may reflect those objectives and ambitions in two ways: firstly in the choice of the appraisal tool itself; appraisal tools are not neutral and follow their own logic (Lascoumes & Le Gales 2007) (e.g. maximise economic efficiency in the case of CBA, see McGarity 1991). Consequently, decision makers may choose an appraisal tool that is in line with a country's political values – i.e. the tool will follow a logic that is compatible with the political objectives. Secondly, in the operationalisation of the tool: analysts may choose to set various parameters and other dimensions of the tool (e.g. the discount rate, the benefits taken into account) so as to reflect the country's political ambition to some extent. In the case studied, the WFD ambition partly influenced the content of the economic analysis performed.

I also identified several pathways through which appraisal influences the decision-making process. When the logic of the tool used is compatible with the political beliefs or when the operationalisation of the tool is influenced by the political ambition – as described above - the result of the appraisal intentionally reflects political objectives, at least in part. However, the choices made for the appraisal may also unintentionally influence the result of the analysis. This situation may occur when the appraisal tool selected follows a logic that does not necessarily match with the political objectives, or when the choices made for the operationalisation of the tool depend on practical constraints (e.g. lack of data or resources). In this case, the output of the analysis is disconnected from political goals, and can even be in contradiction with them.

The role of policy appraisal as a tool for evidence-based decision making can then be explained, partly at least, by the discrepancy between the output of the appraisal and the political objectives pursued. When both match to some extent, policy appraisal may then serve as a basis for decision making. The remaining divergence may be overcome thanks to additional criteria or analysis. When the outcome of the analysis and the political goals are contradictory, other uses of appraisal tools may be observed, such as symbolic or perfunctory uses. Why then use appraisal tools at all? First, analysts may conclude that their results are not in contradiction with the political objective. This result may be unintentional or the consequence of choices in the operationalisation of

the appraisal tool. In this case, the result may strategically serve as an additional argument to justify a policy (Hertin et al. 2009). Second, the requirement to perform an economic assessment may result from external pressures, the example in our case study being the European Commission and fear of infringement, or local stakeholders that have a vested interest in the outcome of a policy.

In addition, even when the logic underlining the appraisal tool matches with the political beliefs, the use of the appraisal tool will still be influenced by the beliefs in the politics stream. In other words, appraisal seems to be always performed in pursuit of a political goal or strategy. As an illustration, I showed in the case studied that the European Commission supported the use of CBA so as to be able to better control the use of exemptions in member states and prevent them from downplaying water quality objectives, i.e. for political reasons. Moreover, water managers in England resorted to CBA in pursuit of efficiency and in order to avoid a 'waste' of public money, which are political objectives. Even here, budgetary considerations prevailed, as shown through the extensive reliance on deadline extensions justified on the basis of 'disproportionate burdens'. Consequently, the politics stream explains the use of appraisal tools in the policy process.

I thus built this study on an emerging research agenda in public policy and political science, exploring the political dimension of policy appraisal in legislation and programme implementation. First, I emphasised two political aspects of appraisal tools: the choice of the tool itself, which follows a particular logic, and the operationalisation of the tool selected, which may be influenced by political goals. Second, I contributed to the theoretical understanding of the use of policy appraisal in environmental decision making by innovatively relying on policy-making theories. In particular, I explored in this study the context in which appraisals are performed. This includes Howlett et al.'s streams (Howlett et al. 2017) and countries' political beliefs and values. In doing so, I encompassed the various factors influencing the use of appraisal tools previously identified in the extant literature. In addition, I applied the combination of the ACF and MSA as suggested by Howlett et al. (2015; 2017) to two contrasting case studies. In conclusion, I contributed to a better understanding of decision-making processes and therefore decisions outcomes in the field of environmental policies.

While the aim of this thesis was to further the broader understanding of policy appraisal, this research also contributed to the WFD literature more specifically.

First of all, I provided new insights into the Directive's negotiation process and the functioning of the Common Implementation Strategy (CIS). In particular, I showed some dysfunctional elements in the CIS, and a lack of political support and trust. Although the CIS was specifically created for WFD implementation, it was later extended to other EU directives (e.g. the 2007 Flood Risk Management Directive and the 2008 Marine Strategy Framework Directive). Therefore, the results of this research are also relevant for other European environmental policies.

In addition, I provided an empirical contribution to the knowledge on WFD implementation in member states. In particular, I addressed a major research gap in the literature: the politics of exemptions and the role of economic analysis therein. In spite of their fundamental importance, exemptions based on disproportionate costs have attracted limited scholarly attention so far. In this research, I explained the process of setting objectives and exemptions in two member states, and the role that economic analysis played in the decision-making process. I also offered explanations for the differences observed in these two countries. I showed that their ambitions related to the implementation of the WFD partly shaped the analytical tools used and that choices made in the operationalisation of these tools influenced to some extent the protection standards of individual water bodies.

Finally, this research differed from most scholarly works on WFD implementation published previously, as it provided a cross-country comparison. Comparisons do not play a major role in WFD research which, as I have shown in a systematic review of the literature, mainly relies on single-country studies. However, by comparing two countries, it is possible to differentiate independent variables - such as the countries' historic use of policy appraisal, its environmental culture, or its degree of integration in the EU - and analyse their impact on the object of study. Moreover, through this research, I strengthened the use and application of theory in the WFD body of literature, a feature widely neglected in most previous works – another finding of the systematic review.

6.3 Insights for policy

Besides its academic value, this study also provided insights to policy makers on EU environmental policies and on the WFD implementation more specifically.

First, precisely because appraisal tools are not neutral and cannot be separated from political ambitions, one may question the relevance of seeking an agreement on the technical and methodological aspects of an EU directive at the European level while the political dimensions – ambition and costs involved - remain unaddressed. In particular, if subsidiarity is acknowledged as the best way to achieve a directive's objectives, in particular due to the provisions on exemptions, it seems contradictory to look for common means and tools to reach them.

Second, I highlighted that CBA may not be the best appraisal tool to use in all countries, as it might conflict with predominant political values and beliefs. If practitioners wish to use economic appraisal as a real support for informing decisions, instead of justifying them ex-post, it may seem desirable to adapt the appraisal tool to the political objectives. The outcome of the appraisal can then actually point to the most politically desirable solution, not a predefined politically chosen option but one that actually optimises the political beliefs and values pursued. For example, multi-criteria analysis, that would require negotiation and weighting within river basin committees, might well be best adapted to the French case. This however requires a different mindset, accepting that decisions might be driven by political values and processes instead of technical calculations of costs and benefits. This also implies that political goals be publicly debated rather than hidden behind technical tools.

Likewise, there is a contradiction: while the European Commission recommended one specific type of economic analysis to prevent member states from downplaying the WFD objectives – in this case CBA – water managers in France had to use CBA perfunctorily and symbolically, precisely because the outcome of the CBA performed prevented France from being more ambitious. This paradoxical situation questions again the pertinence of prescribing specific tools rather than specific ambitions and objectives.

Decision makers should thus be aware that appraisal tools and economic analysis might convey a false impression of neutrality and objectivity (McGarity 1991). This situation may lead to several issues. One risk is the depoliticisation of policy making, i.e. a

concealment of ethical and fundamentally political stakes behind technical judgements (McGarity 1991; Owens et al. 2004; Lascoumes & Le Gales 2007). Another is repoliticisation, i.e. the replacement of political values by those of the analyst, through the use of economic and appraisal tools (McGarity 1991). Finally, relying on such tools to reach decisions might question the legitimacy of decisional outcomes and complicate the achievement of consensual agreements (Owens et al. 2004).

Finally, I underlined the issues that provisions on exemptions in EU directives may raise. If the European Commission wish to limit the use of such provisions and avoid future infringement procedures, it seems crucial to better define exemptions during the negotiation process, or at least to ensure that adequate means are implemented in order to specify them at a later stage. Discussions on exemptions should leave the expert sphere and consider the political implications in open debates. In particular, addressing whether and how the protection of the environment can be prioritised vis-à-vis other social or economic policies seems crucial.

6.4 Research limitations

This research had several limitations. Firstly, the findings of this work may not be fully generalisable. Although I chose extreme-case studies so as to provide good contrasting evidence and to maximise the scope of the knowledge produced, studying more countries would have provided a richer picture. Moreover, the research relies on a specific EU policy. This work nonetheless aimed to propose new theoretical suggestions on the reasons explaining the uses of policy appraisal tools, based on the in-depth comparison of two cases. Its general breadth would deserve to be further tested on other case studies and various environmental policies. In particular, the research undertaken is very much EU focused. Consequently, further work could look at the use of policy appraisal in water management outside Europe for a more general comparison.

Secondly, practical considerations also had an influence on the outcome of this work. I limited my researches to Francophone and Anglophone sources. Therefore, I may have missed information that was formulated in other languages. Nevertheless, I am rather positive that the impact was negligible on my research: all official EU documents are available either in English or French, all interviewees could understand and express

themselves in at least one of these two languages, and the countries that I studied in detail were England and France. In addition, it may be argued that using the snowballing technique to identify interviewees might not be comprehensive. However, I took great care to interview representatives of all the relevant organisations involved in the process of setting objectives. In fact, several interviews did not directly serve data collection but were useful for a better understanding of the political, historical and governance context, e.g. on the catchment-based approach in England, or on the role of various state and non-state actors in France.

6.5 Future research directions

Future research could look more closely at the influence of a country's relationship with the EU and its fear of infringement procedure on its use of policy appraisal. As revealed by my work, this factor played a particularly important role. Although England and France had different positions here, more extreme cases on this precise aspect would better enable researchers to isolate this independent variable. In this respect, non-EU countries such as Switzerland or Norway would be interesting to analyse. Similarly, future work on the use of economic appraisal in the UK in the third WFD management cycle would be particularly useful in order to study the influence of Brexit on the use of appraisal tools and the process of setting objectives.

Future work could also explore the use of economic analysis in setting objectives and exemptions in other countries. Based on the European Commission's assessment reports and existing literature, I discarded EU countries that did not rely extensively on exemptions and disproportionality assessments before 2009. Nevertheless, the reliance on disproportionate costs was expected to increase in the second management cycle (European Commission & WRc 2015). Therefore, some member states that I cast aside for the analysis may well have made an extensive use of exemptions based on disproportionate costs in 2015. Similarly, the three clusters of countries identified at the start of this research, based on practitioners' attitudes towards economic analysis, may have changed since 2015. This might especially be true when it comes to Eastern European member states, on which very little research has been conducted.

In addition, I suggested that different tools might be desirable depending on a country's political beliefs. Therefore, future research could classify member states depending on their political values and priorities, e.g. the greater importance given to economic efficiency, environmental effectiveness, political legitimacy or equity (Adger et al. 2003). Specific appraisal tools could then be recommended for each cluster of countries. For example, researchers could conduct experiments on France to see which tool would be best suited to this member state.

Finally, this research focused on the role of appraisal tools and economic analysis in decision-making processes in the field of environmental policies. What this research did not study is the suitability of such tools for reaching sustainable decisions. Exemptions based on disproportionate costs are in fact cases of trade-offs between environmental goals and economic constraints. The WFD encourages a sustainable use of water resources (European Commission 2000). The extent to which it requires sustainable decisions when it comes to exemptions is not explicit and would require further investigation. Some scholars criticize CBA for not taking into account sustainability aspects (Messner 2006; Steyaert & Ollivier 2007). Therefore, future research could focus on how appraisal tools could better be in line with the sustainability requirements of the WFD. This could include adapting existing CBA, developing alternative tools, such as multi-criteria analysis (Lahdelma et al. 2000; Buehler 2013), sustainability indicators (Briguglio 2003; Nardo et al. 2005; Rametsteiner et al. 2011), or human-scale development methods (Jolibert et al. 2009), or even considering alternative decision-making processes. Consequently, future work could test experimentally these tools and see to which extent they could support more sustainable water quality goals.

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Appendix A: List of interviewees

Table 6: Interviewees

Interview Code	Organisation
INT 01	European Commission (2009-2015)
INT 02	European Commission (2009-2015)
INT 03	Academic (2000-2009)
INT 04	European Environmental Bureau (2009-2015)
INT 05	Member State (FR) and European Commission (2000-2009)
INT 06	Member State (FR) (2000-2009)
INT 07	Member State (Spain) (1996-2000)
INT 08	Member State (Spain) (2000-2009)
INT 09	Academic (2009-2015)
INT 10	European Commission and Consultant
INT 11	Member State (2000-2009)
INT 12	European Commission (1996-2000)
INT 13	European Commission (1996-2000)
INT 14	Academic (2000-2009)
INT 15	European Commission (2009-2015)
INT 16	European Commission (2009-2015)
INT-EN01*,°	Defra
INT-EN02	Environment Agency
INT-EN03*,°	Formerly Environment Agency
INT-EN04*,°	Formerly Environment Agency
INT-EN05*,°	Environment Agency
INT-EN06*,°	Environment Agency
INT-EN07*,°	Aire Rivers Trust
INT-EN08*,°	Formerly Environment Agency
INT-EN09*,°	Environment Agency
INT-EN10*,°	World Wildlife Fund UK
INT-EN11	National Farmer Union
INT-EN12*,°	Consumer Council for Water
INT-EN13	Natural England
INT-EN14	Catchment Based Approach Support Group
INT-EN15*	Independent Consultancy and Catchment Based Approach Support Group
INT-EN16*	Yorkshire Water
INT-EN17°	Country Landowner Association
INT-EN18*,°	Royal Society for the Protection of Birds
INT-EN19	Yorkshire Wildlife Trust
INT-EN20	Water UK
INT-EN21*,°	Environment Agency
INT-FR01°	Ministry of Environment, Sustainable Development and the Sea
INT-FR02*,°	Water Agency Artois-Picardy
INT-FR03*,°	Water Agency Artois-Picardy
INT-FR04*,°	Water Agency Artois-Picardy
INT-FR05*,°	Water Agency Artois-Picardy
INT-FR06*,°	Water Agency Seine-Normandy
INT-FR07*,°	Water Agency Seine-Normandy
INT-FR08	Water Agency Seine-Normandy
INT-FR09*,°	Water Agency Rhine-Meuse

INT-FR10*,°	Water Agency Rhine-Meuse
INT-FR11	Water Agency Rhine-Meuse
INT-FR12*,°	Formerly Ministry of Environment, Sustainable Development and the Sea
INT-FR13*,°	Ministry of Environment, Sustainable Development and the Sea
INT-FR14*,°	Formerly Water Agency Rhine-Meuse
INT-FR15	ASCA
INT-FR16	National Office for Water and Aquatic Environments, University Paris 1
INT-FR17*,°	Ministry of Environment, Sustainable Development and the Sea
INT-FR18	Regional and Interdepartmental Directorate for Environment and Energy
INT-FR19*	Water Agency Rhine-Meuse
INT-FR20°	Sustainable Development Institute and International Relations
INT-FR21°	National Office for Water and Aquatic Environments / French Agency for Biodiversity
INT-FR22*,°	Water Agency Adour-Garonne
INT-FR23*,°	Water Agency Loire-Brittany
INT-FR24*,°	Water Agency Rhone and Coastal Mediterranean Corsica/ Formerly Ministry of Environment, Sustainable Development and the Sea
INT-FR25*,°	Water Agency Rhone and Coastal Mediterranean Corsica
INT-FR26°	Water Agency Rhone and Coastal Mediterranean Corsica
INT-FR27*,°	Water Agency Rhone and Coastal Mediterranean Corsica

INT 01 to INT 16 were conducted for research at EU level (Chapter 3).

INT-EN and INT-FR were performed for research at member states level (Chapter 4 and 5). Interviewees marked with * provided relevant data for Chapter 4. Interviewees marked with ° were used in Chapter 5. Other interviewees helped to understand the research context (e.g. water governance in France and England, historical background, political framework and priorities, existing water laws).

Appendix B: List of policy documents

Table 7: Documents used in Chapter 3

Author	Date	Title	Type of document	Source
Negotiation phase (Time period: 1997-2000)				
Committee of the Regions	1997-02-01	Opinion of the Committee of the Regions on the 'Communication to the Council and the European Parliament on European Community Water Policy'	Opinion	EUR-Lex[1]
Committee of the Regions	1998-03-12	Opinion of the Committee of the Regions on the 'Proposal for a Council establishing a framework for Community action in the field of Water Policy'	Opinion	EUR-Lex
Conciliation Committee	2000-05-23	1997/0067(COD) – 23/05/2000 Formal meeting of conciliation committee	Minutes	EUR-Lex
Conciliation Committee	2000-06-29	Parliament-Council Conciliation Committee, Agreement on Water Framework Directive, Conseil/00/232	Press release	EUR-Lex
Conciliation Committee	2000-07-18	Joint text approved by the Conciliation Committee provided for in Article 251(4) of the EC Treaty	Legal text	EUR-Lex
Council	1998-06-16	2106th Council meeting – ENVIRONMENT	Minutes	Consilium[2]
Council	1999-02-19	Amended proposal for Council Directive establishing a framework for Community action in the field of water policy - common position, from General Secretariat to Permanent Representatives Committee	Common Position	Consilium
Council	1999-03-02	Amended proposal for Council Directive establishing a framework for Community action in the field of water policy - common position, from Permanent Representatives Committee to Council	Common Position	Consilium
Council	1999-03-11	2165th Council meeting –ENVIRONMENT	Minutes	Consilium

[1] eur-lex.europa.eu
[2] consilium.europa.eu

Council	1999-09-30	Common Position adopted by the Council with a view to the adoption of a Directive of the European Parliament and of the Council establishing a framework for Community action in the field of water policy - Draft statement of the Council's reasons	Statement	Consilium
Council	1999-10-22	Common Position (EC) No… /1999 adopted by the Council on 22 October 1999 with a view to the adoption of a Directive 1999… /EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy	Common Position	Consilium
Council	2000-02-09	Proposal for a Directive of the European Parliament and of the Council establishing a framework for Community action in the field of water policy - Second reading of the European Parliament, Outcome of proceedings of the Environment Working Party	Outcome of proceedings	Consilium
Council	2000-03-03	Proposal for a European Parliament and Council Directive establishing a framework for a Community action in the field of water policy - examination of EP amendments (second reading), Introductory note from general secretariat to permanent representatives committee	Note	Consilium
Council	2000-03-22	Directive of the European Parliament and of the Council establishing a framework for Community action in the field of water policy - Interpretation of the second and fourth indent of Article 1 of the Water Framework Directive, Opinion of the legal service	Opinion of the legal service	Consilium
Council	2000-04-18	Proposal for a Directive of the European Parliament and of the Council establishing a framework for Community action in the field of water policy – Convening of the Conciliation Committee, from General Secretariat of the Council to the Council	Note	Consilium
Council	2000-06-27	Directive of the European Parliament and of the Council establishing a framework for Community action in the field of water policy (97/0067/COD) - Article 9(4), CONTRIBUTION OF THE LEGAL SERVICE TO THE PROCEEDINGS OF THE COMMMITTEE OF PERMANENT REPRESENTATIVES	Opinion of the legal service	Consilium

Council	2000-07-14	Proposal for a Directive of the European Parliament and of the Council establishing a framework for Community action in the field of water policy (97/0067/COD) – Article 4, Contribution of the legal service to the preparation of the conciliation committee by the representatives of the members of the council	Opinion of the legal service	Consilium
Council	2000-08-25	Adoption by the written procedure of a Directive of the European Parliament and of the Council establishing a framework for Community action in the field of water policy, from General Secretariat of the Council to the Permanent Representative Committee (Part I) / Council	Note	Consilium
Council	2000-08-25	Adoption by the written procedure of a Directive of the European Parliament and of the Council establishing a framework for Community action in the field of water policy – Commission statement, from General Secretariat of the Council to the Permanent Representative Committee / Council	Note	Consilium
Economic and Social Committee	1997-01-30	Opinion of the Economic and Social Committee on the 'Proposal for a European Parliament and Council Decision creating a network for the epidemiological surveillance and control of communicable diseases in the European Community' (97/C 30/01)	Opinion	EUR-Lex
Economic and Social Committee	1997-10-01	Opinion of the Economic and Social Committee on the 'Proposal for a Council Directive establishing a framework for Community action in the field of water policy' (97/C 355/16)	Opinion	EUR-Lex
European Commission	1996-02-21	Communication from the Commission to the Council and the European Parliament, European Community Water Policy	Communication	
European Commission	1997-02-26	Proposal for a Council Directive establishing a framework for Community action in the field of water policy	Proposal	EUR-Lex
European Commission	1998-02-17	Amended proposal for a Council Directive establishing a framework for Community action in the field of water policy (COM(97) 49 final) (98/C 108/17)	Amended proposal	EUR-Lex
European Commission	1999-06-17	Amended proposal for a European Parliament and Council Directive establishing a framework for Community action in the field of water policy (COM(97) 49 final) (1999/C 342 E/01)	Amended proposal	EUR-Lex

European Commission	1999-10-26	1997/0067(COD) - 26/10/1999 Commission communication on Council's position	Communication	EUR-Lex
European Commission	2000-06-05	OPINION OF THE COMMISSION pursuant to Article 251 (2) (c) of the EC Treaty, on the European Parliament's amendments to the Council's common position regarding the Proposal for a EUROPEAN PARLIAMENT AND COUNCIL DIRECTIVE establishing a framework for Community action in the field of water policy (COM (97)49 final, COM(97)614 final, COM(98)76 final and COM(99)271 final) AMENDING THE PROPOSAL OF THE COMMISSION pursuant to Article 250 (2) of the EC Treaty	Opinion	EUR-Lex
European Commission	2000-07-26	COMMUNICATION FROM THE COMMISSION TO THE COUNCIL, THE EUROPEAN PARLIAMENT AND THE ECONOMIC AND SOCIAL COMMITTEE, Pricing policies for enhancing the sustainability of water resources	Communication	EUR-Lex
European Commission	2000-07-26	1997/0067(COD) - 26/07/2000 Document attached to the procedure	Note	EUR-Lex
European Parliament	1998-06-24	1997/0067(COD) - 24/06/1998 Vote in committee, 1st reading/single reading	Minutes	European Parliament website[3]
European Parliament	1998-07-08	REPORT on the proposal and the amended proposals for a Council Directive on establishing a framework for Community action in the field of water policy (COM(97)0049 - C4-0192/97, COM(97)0614 - C4-0120/98 and COM(98)0076 - C4-0121/98 - 97/0067(SYN)), Committee on the Environment, Public Health and Consumer Protection	Report	European Parliament website
European Parliament	1999-02-11	Legislative resolution embodying Parliament's opinion on the proposal and amended proposals for a Council Directive establishing a framework for Community action in the field of water policy (COM(97)0049 C4-0192/97, COM(97)0614 C4- 0120/98 and COM(98)0076 C4-0121/98 97/0067(SYN)) (Cooperation procedure: first reading)	Legislative resolution	European Parliament website
European Parliament	1999-02-11	1997/0067(COD)-11/02/1999 Text adopted by Parliament, 1st reading/single	Minutes	European

[3] europarl.europa.eu

		reading		Parliament website
European Parliament	2000-01-25	1997/0067(COD) - 25/01/2000 Vote in committee, 2nd reading	Minutes	European Parliament website
European Parliament	2000-02-02	RECOMMENDATION FOR SECOND READING on the common position adopted by the Council with a view to the adoption of a European Parliament and Council directive on establishing a framework for Community action in the field of water policy (9085/3/1999 – C5-0209/1999 – 1997/0067(COD))	Recommendation	European Parliament website
European Parliament	2000-02-15	Debates - Community policy in the field of water	Debates (transcript)	European Parliament website
European Parliament	2000-02-16	European Parliament legislative resolution on the common position adopted by the Council with a view to the adoption of a European Parliament and Council directive establishing a framework for Community action in the field of water policy (9085/3/1999 ! C5-0209/1999 ! 1997/0067(COD)) (Codecision procedure: second reading)	Legislative resolution	European Parliament website
European Parliament	2000-02-16	1997/0067(COD) - 16/02/2000 Text adopted by Parliament, 2nd reading	Minutes	European Parliament website
European Parliament	2000-08-29	REPORT on the joint text approved by the Conciliation Committee for a European Parliament and Council directive establishing a framework for Community action in the field of water policy (C5-0347/2000 – 1997/0067(COD)), European Parliament delegation to the Conciliation Committee	Report	European Parliament website
European Parliament	2000-09-06	Debates – Water Policy	Minutes	European Parliament website

Preparation phase (Time period: 2000-2009)				
Common Implementation Strategy	2001-05-02	STRATEGIC DOCUMENT AS AGREED BY THE WATER DIRECTORS UNDER SWEDISH PRESIDENCY	Strategic Document	CIRCABC[4]
Common Implementation Strategy	2003-06-17	Carrying forward the Common Implementation Strategy for the Water Framework Directive -Progress and Work Programme for 2003 and 2004- AS AGREED BY THE WATER DIRECTORS	Work Programme	CIRCABC
Common Implementation Strategy	2004-12-02	Moving to the next stage in Common Implementation Strategy for the Water Framework Directive. Progress and work programme for 2005 and 2006 AS AGREED BY THE WATER DIRECTORS	Work Programme	CIRCABC
Common Implementation Strategy	2006-12-01	Improving the comparability and quality of the Water Framework Directive implementation, Progress and work programme for 2007-2009 AS AGREED BY THE WATER DIRECTORS	Work Programme	CIRCABC
Common Implementation Strategy, Working Group 2.6 - WATECO	2003	Guidance document n° 1 Economics and the environment, The implementation challenge of the Water Framework Directive	Guidance document	CIRCABC
Common Implementation Strategy, Working Group 2.2 - HMWB	2003	Guidance document n° 4, Identification and Designation of Heavily Modified and Artificial Water Bodies	Guidance document	CIRCABC
Common Implementation Strategy, Working Group 2B: Drafting Group ECO1	2004	Information Sheet on River Basin characterization: Economic analysis of water uses (Art 5 Annex III)	Information sheet	CIRCABC
Common Implementation Strategy, Working Group 2B: Drafting Group ECO2	2004	Assessment of Environmental and Resource Costs in the Water Framework Directive	Information sheet	CIRCABC

[4] circabc.europa.eu

Common Implementation Strategy	2005	ENVIRONMENTAL OBJECTIVES UNDER THE WATER FRAMEWORK DIRECTIVE, POLICY SUMMARY AND BACKGROUND DOCUMENT	Background document	CIRCABC
Common Implementation Strategy, CEA Drafting Group	2006	Cost Effectiveness Analysis document	Policy Summary	CIRCABC
Common Implementation Strategy	2007	Policy Paper, EXEMPTIONS TO THE ENVIRONMENTAL OBJECTIVES UNDER THE WATER FRAMEWORK DIRECTIVE, Article 4.4 (extension of deadlines), 4.5 (less stringent objectives) and 4.6 (temporary deterioration)	Policy paper	CIRCABC
Common Implementation Strategy	2007	Policy paper, EXEMPTIONS TO THE ENVIRONMENTAL OBJECTIVES UNDER THE WATER FRAMEWORK DIRECTIVE allowed for new modifications or new sustainable human development activities (WFD Article 4.7)	Policy paper	CIRCABC
Common Implementation Strategy	2009	Guidance Document No. 20, GUIDANCE DOCUMENT ON EXEMPTIONS TO THE ENVIRONMENTAL OBJECTIVES	Guidance document	CIRCABC
European Commission	2002	The Water Framework Directive Tap into it!	Communication document	CIRCABC
European Commission	2007-03-22	COMMISSION STAFF WORKING DOCUMENT Accompanying document to the Communication From The Commission To The European Parliament And The Council, 'Towards Sustainable Water Management in the European Union' First stage in the implementation of the Water Framework Directive 2000/60/EC	Communication document	CIRCABC
European Commission	2007-03-22	Water Policy: Member States must do more to achieve good water quality	Synthesis	CIRCABC
Institute for Integrated Water Management and Wastewater Treatment/RIZA	2004	Environmental and Resource Costs and the Water Framework Directive, An overview of European practices	Workshop proceedings	CIRCABC
Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit	2004-08-15	European workshop on WFD implementation – Status of IMPRESS and economic analysis, 16 – 18 June 2004 in Mannheim, Germany	Workshop proceedings	CIRCABC
Bundesministerium für	2005	Water Framework Directive Objectives Workshop 26th – 27th of May 2005 in	Workshop	CIRCABC

Umwelt, Naturschutz und Reaktorsicherheit		Berlin, Germany	proceedings	
VITO	2006	First Workshop on Cost Benefit Analysis on the implementation of the Water Framework Directive, Brussels, 20 November 2006	Workshop Minutes	CIRCABC
VITO	2007	Costs and Benefits associated with the implementation of the Water Framework Directive, with a special focus on agriculture: Final Report, Study for DG Environment	Report	CIRCABC
Ecologic	2008	Input Paper for the workshop on 10/11 April 2008 in Copenhagen, DK	Input paper	CIRCABC
Danish Ministry of the Environment	2008	Workshop on Disproportional Costs and Exemptions to the Environmental Objectives under the Water Framework Directive, Article 4.4 – 4.6 , 10/11 April 2008 in Copenhagen, DK	Workshop proceedings	CIRCABC
European Commission	2009	Plunge Into The Debate, 2nd European Water Conference 2-3 April 2009	Conference Report	CIRCABC
Water Directors	2001-05-02	Informal meeting of water directors of the European Union Sweden, May 2 & 3, 2001	Minutes	CIRCABC
Water Directors	2001-11-08	Informal meeting of Water Directors of the European Union Ghent - Belgium, November 8 & 9, 2001	Minutes	CIRCABC
Water Directors	2002-06-11	Informal meeting of Water Directors of the European Union, Norway, Switzerland and Candidate Countries, Valencia - Spain, 11 and 12 June 2002	Minutes	CIRCABC
Water Directors	2003-11-24	Informal meeting of Water Directors of the European Union, Acceding, Candidate and EFTA Countries, Rome - Italy, 24 and 25 November 2003	Minutes	CIRCABC
Water Directors	2003	Final conclusions of the Water Directors (WD) on the agreement of the economic guidance documents to be included in the foreword of the guidance	Agreement	CIRCABC
Water Directors	2004-12-02	Informal meeting of Water Directors of the European Union, Candidate and EFTA Countries, Amsterdam - Netherlands, 02-03 December 2004	Minutes	CIRCABC
Water Directors	2005-06-20	Informal meeting of Water Directors of the European Union, Candidate and EFTA Countries, Mondorf-les-Bains, Luxembourg, 20 June 2005	Minutes	CIRCABC
Water Directors	2006-06-01	Informal meeting of Water Directors of the European Union, Candidate and EFTA	Minutes	CIRCABC

		Countries, Salzburg, 1/2 June 2006		
Water Directors	2006-11-30	Informal Meeting of Water Directors of the European Union, Candidate and EFTA Countries, Inari, 30 November /1 December 2006	Minutes	CIRCABC
Water Directors	2007-06-18	Informal meeting of Water Directors of the European Union, Candidate and EFTA Countries, Dresden, 18/19 June 2007	Minutes	CIRCABC
Water Directors	2007	Towards a common understanding on disproportionate costs, Conclusions of discussions under on agenda item 2.3 in relation to disproportionality	Agreement	CIRCABC
Water Directors	2008-06-17	Conclusions on Exemptions and Disproportionate Costs, Water Directors' meeting under Slovenian Presidency, Brdo, 16-17 June 2008	Minutes	CIRCABC
Water Directors	2008-11-24	Informal meeting of Water Directors of the European Union, Candidate and EFTA Countries, Paris, 24-25 November 2008	Agreement	CIRCABC
Water Directors	2009-05-28	Informal meeting of Water and Marine Directors of the European Union, Candidate and EFTA Countries, Brno, 28-29 May 2009	Minutes	CIRCABC
WWF, EEB	2004	'Tips And Tricks' For Water Framework Directive Implementation	Report	
WWF, EEB	2005	EU Water Policy: Making The Water Framework Directive Work The Quality Of National Transposition And Implementation Of The Water Framework Directive At The End Of 2004	Report	
WWF, EEB	2009	What future for EU's Water? Indicator based assessment of the draft River Basin Management Plans under the EU Water Framework Directive	Report	

Implementation phase (Time period: 2009-2015)				
Common Implementation Strategy	2009	Work Programme 2010-2012 As agreed by the Water Directors – 30 November 2009, 'Supporting the implementation of the first river basin management plans'	Work Programme	CIRCABC
Common Implementation Strategy	2010-10-19	Background paper to the workshop: "CIS-Workshop on WFD-economics: taking stock and looking ahead" 19-20 October 2010 – Palais des Congrès, Liege (Belgium)	Background paper	CIRCABC
Common Implementation Strategy	2010	Report on project to gather SCG members' views of the experience in the implementation of the economic aspects of the WFD – questionnaire and	Questionnaire results	CIRCABC

		interview results		
Common Implementation Strategy	2011-09-13	Water management, Water Framework Directive & Hydropower, Common Implementation Strategy Workshop Brussels, 13-14 September 2011	Issue Paper	
Common Implementation Strategy	2012	Work Programme 2013-2015, 'Strengthening the implementation of EU water policy through the second river basin management plans'	Work Programme	CIRCABC
Common Implementation Strategy	2014-03-20	Working group WATECO- Meeting minutes	Minutes	CIRCABC
Common Implementation Strategy	2014-10-17	Draft document on affordability-version 2	Draft document	CIRCABC
Common Implementation Strategy	2014-10-20	Working group WATECO- Meeting minutes	Minutes	CIRCABC
Common Implementation Strategy	2015-02-17	Draft document on affordability-version 3	Draft document	CIRCABC
Common Implementation Strategy	2015-02-23	WG Economics – 3rd meeting - 23 February 2015	Minutes	CIRCABC
Council	2011-06-21	3103rd Council meeting Environment	Press Release	Consilium
European Environment Agency	2012	European waters — current status and future challenges, EEA Report No 9/2012	Report	European Agency Website
European Court of Justice	2013-08-22	Request for a preliminary ruling from the Bundesverwaltungsgericht (Germany) lodged on 22 August 2013 – Bund für Umwelt und Naturschutz Deutschland e.V. v Bundesrepublik Deutschland (Case C-461/13)	Request	CURIA[5]
European Court of Justice	2014-10-23	OPINION OF ADVOCATE GENERAL JÄÄSKINEN delivered on 23 October 2014 (1) Case C-461/13, Bund für Umwelt und Naturschutz Deutschland e.V. v Bundesrepublik Deutschland	Opinion	CURIA
European Court of Justice	2015-08-21	Judgment of the Court (Grand Chamber) of 1 July 2015 (request for a preliminary	Judgment	CURIA

[5] http://curia.europa.eu

		ruling from the Bundesverwaltungsgericht — Germany) — Bund für Umwelt und Naturschutz Deutschland e.V. v Bundesrepublik Deutschland (Case C-461/13)		
European Court of Justice	2015-09-03	CONCLUSIONS DE L'AVOCAT GÉNÉRAL Mme Juliane Kokott présentées le 3 septembre 2015 (1) Affaire C-346/14 Commission européenne contre République d'Autriche	Conclusions	CURIA
European Commission	2011	Support to Fitness Check Water Policy	Report	CIRCABC
European Commission	2012	COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS, A Blueprint to Safeguard Europe's Water Resources	Communication	CIRCABC
European Commission	2012	COMMISSION STAFF WORKING DOCUMENT EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT Accompanying the document COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS, A Blueprint to Safeguard Europe's Water Resources	Communication	CIRCABC
European Commission	2012	COMMISSION STAFF WORKING DOCUMENT IMPACT ASSESSMENT Accompanying the document COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS, A Blueprint to Safeguard Europe's Water Resources	Communication	CIRCABC
European Commission	2012	REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL on the Implementation of the Water Framework Directive (2000/60/EC) River Basin Management Plans	Report	CIRCABC
European Commission	2012	COMMISSION STAFF WORKING DOCUMENT European Overview (1/2), Accompanying the document, REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL on the Implementation of	Report	CIRCABC

		the Water Framework Directive (2000/60/EC) River Basin Management Plans		
European Commission	2012	COMMISSION STAFF WORKING DOCUMENT European Overview (2/2), Accompanying the document, REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL on the Implementation of the Water Framework Directive (2000/60/EC) River Basin Management Plans	Report	CIRCABC
European Commission	2012	COMMISSION STAFF WORKING DOCUMENT The Fitness Check of EU Freshwater Policy	Report	CIRCABC
European Commission	2015	Screening Assessment of Draft Second Cycle River Basin Management Plans	Report	CIRCABC
European Commission	2015	COMMISSION STAFF WORKING DOCUMENT, Report on the progress in implementation of the Water Framework Directive Programmes of Measures, Accompanying the document, COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL, The Water Framework Directive and the Floods Directive: Actions towards the 'good status' of EU water and to reduce flood risks	Report	CIRCABC
European Commission	2015	COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL, The Water Framework Directive and the Floods Directive: Actions towards the 'good status' of EU water and to reduce flood risks	Report	CIRCABC
European Commission	2015	SPEECH - 19 NOVEMBER 2015 European Parliament Water Group Dinner	Speech	CIRCABC
European Commission	2015	4th European Water Conference Brussels, 23-24 March 2015	Conference report	European Commission website
Eftec	2010	Scoping Study on the Economic (or Non-Market) Valuation Issues and the Implementation of the Water Framework Directive, Final report	Consultancy report	European Commission website
EPI Water	2013	ECONOMIC POLICY INSTRUMENTS in European water policy	Consultancy report	European Commission website

Acteon	2012	Comparative study of pressures and measures in the major river basin management plans in the EU, Task 4 b: Costs & Benefits of WFD implementation, Financing Water Management and the Economic Crisis – A review of available evidence, Final report	Consultancy report	European Commission website
Acteon	2012	Comparative study of pressures and measures in the major river basin management plans in the EU, Task 4 b: Costs & Benefits of WFD implementation, Recommendations for filling the (economics) knowledge gap	Consultancy report	European Commission website
Acteon	2012	Comparative study of pressures and measures in the major river basin management plans in the EU, Task 4 b: Costs & Benefits of WFD implementation, Guidance note on the assessment and reporting of costs and benefits	Consultancy report	European Commission website
Acteon	2012	Comparative study of pressures and measures in the major river basin management plans in the EU, Task 4 b: Costs & Benefits of WFD implementation: Final Report	Consultancy report	European Commission website
Water Directors	2009-05-28	Informal meeting of Water and Marine Directors of the European Union, Candidate and EFTA Countries, Brno, 28-29 May 2009	Minutes	CIRCABC
Water Directors	2009-12-01	Informal meeting of Water and Marine Directors of the European Union, Candidate and EFTA Countries, Malmö, 30 November – 1 December 2009	Minutes	CIRCABC
Water Directors	2012-03-29	Extraordinary informal meeting of EU Water Directors, 29 March, 2012, Borschette Centre, Brussels	Minutes	CIRCABC
Water Directors	2012-06-04	Informal meeting of Water and Marine Directors of the European Union, Candidate and EFTA Countries, Copenhagen, 4-5 June 2012	Minutes	CIRCABC
Water Directors	2013-12-04	Informal meeting of Water and Marine Directors of the European Union, Candidate and EFTA Countries, Vilnius, 4th and 5th of December 2013	Minutes	CIRCABC

Table 8: Documents used in Chapter 4

Doc N°	Author	Date	Title
1	ACTeon, ABP mer, The Andersons Centre, & RPA	2015	Assessing affordability of measures to meet Water Framework Directive requirements in England
2	Agence de l'eau Adour-Garonne	Undated	Synthèse de l'étude coûts disproportionnés réalisée pour le second cycle de la DCE.
3	Agence de l'eau Adour-Garonne, IREEDD, & Cereg	2015	Analyse des Couts Disproportionnes pour les Masses D'eau Impactees par des Pollutions Industrielles et / ou Domestiques, Rapport de phase 2, Analyse détaillée de 4 masses d'eau
4	Agence de l'eau Adour-Garonne, & SCE	2009	Analyse du coût disproportionné pour les masses d'eau impactées par des pollutions industrielles et/ou domestiques, Rapport provisoire.
5	Agence de l'eau Adour-Garonne, & SCE	2009	Analyse du coût disproportionné pour les masses d'eau impactées par des pollutions industrielles et/ou domestiques, Synthèse.
6	Agence de l'eau Artois-Picardie	Undated	Synthèse de la justification des dérogations utilisées sur le bassin Artois Picardie
7	Agence de l'eau Artois-Picardie, DIREN Nord-Pas-de-Calais, EcoWhat, & EcoDecision	2009	Les avantages économiques au bon état écologique de l'eau.
8	Agence de l'eau Artois-Picardie, & EcoLogique Conseil	2015	Réalisation d'une analyse coûts-bénéfices des mesures complémentaires prévisionnelles 2016-2021 sur des groupes de masses d'eau cohérents du bassin Artois-Picardie, susceptibles de faire l'objet de demandes de dérogations dans le cadre de la mise à jour du programme de mesures du SDAGE (2016-2021), Rapport final.
9	Agence de l'eau Rhin-Meuse	2010	Note méthodologique relative aux analyses économiques menées dans le cadre du programme de mesures.
10	Agence de l'eau Rhin-Meuse	2015	Note méthodologique relative aux analyses économiques menées dans le cadre du programme de mesures et de la détermination des objectifs environnementaux.
11	Agence de l'eau Rhin-Meuse	2015	Note méthodologique de justification des objectifs moins stricts pour le deuxième cycle
12	Agence de l'eau Rhin-Meuse	2016	Note méthodologique de définition des objectifs environnementaux assignés aux

			masses d'eau de surface
13	Agence de l'eau Rhône-Méditerranée Corse	2009	Bassin Rhône Méditerranée, SDAGE 2010-2015, Exemptions pour coûts disproportionnés, Méthodes et résultats
14	Agence de l'eau Rhône-Méditerranée Corse	2016	Note de justification des demandes d'exemptions a l'echeance 2015 pour les masses d'eau du bassin Rhône-Mediterranee, Documents et données techniques pour l'élaboration du SDAGE 2016-2021 du bassin Rhône-Méditerranée
15	Agence de l'eau Seine-Normandie, Commission Géographique vallées d'Oise, & Direction Régionale de l'Environnement Picardie	2007	Commission Géographique des vallées d'Oise, estimation financière du programme de mesures, propositions d'objectifs.
16	Bassin Rhône-Méditerranée	Undated	SDAGE 2010-2015, Exemptions pour coûts disproporitonés, Méthode et résultats.
17	Bureau du Comité de Bassin Rhône-Méditerranée	2014	Préparation du SDAGE 2016-2021, Analyses économiques dans le cadre de l'élaboration du SDAGE / PDM 2016-2021
18	Catchment Based Approach	2017	CaBA (http://www.catchmentbasedapproach.org/about)
19	Chegrani, P.	2005	Document de travail, Evaluer les bénéfices environnementaux sur les masses d'eau.
20	Chegrani, P.	2007	Evaluer les bénéfices issus d'un changement d'état des eaux, Collection « Etudes et Synthèses », Etudes économiques et évaluation environnementale
21	Chegrani, P.	2007	Evaluer les bénéfices issus d'un changement d'état des eaux - Annexe, Collection « Etudes et Synthèses », Etudes économiques et évaluation environnementale
22	Comité de bassin Artois Picardie	2009	Schéma Directeur d'Aménagement et de Gestion des Eaux 2016-2021. Bassin Artois-Picardie.
23	Comité de bassin Artois Picardie	2015	Schéma Directeur d'Aménagement et de Gestion des Eaux 2016-2021. Bassin Artois-Picardie. Documents d'accompagnement districts Escaut et Sambre.
24	Comité de bassin Loire-Bretagne	2015	Bassin Loire-Bretagne. Documents d'accompagnement du SDAGE 2016-2021.
25	Comité de bassin Rhin-Meuse	2015	SDAGE 2016-2021, Objectifs de qualité et de quantité des eaux du district Rhin, Tome 2
26	Comité de bassin Seine-Normandie,	2014	Programme de mesures 2016-2021

	Commission permanent des programmes et de la prospective		
27	Commissariat Général au Développement Durable	2012	Mise en oeuvre de la directive cadre sur l'eau: position de la France en Europe en 2009. Chiffres & statistiques(367): 1-10
28	Commissariat Général au Développement Durable	2014	Évaluer les bénéfices issus d'un changement d'état des eaux (actualisation en vue du 2ème cycle DCE).
29	Courtecuisse, A.	2005	Water Prices and Households' Available Income : Key Indicators for the Assessment of Potential Disproportionate Costs – Illustration from the Artois-Picardie Basin (France), IWG-Env, International Work Session on Water Statistics, Vienna, June 20-22 2005
30	Defra	2009	Impact Assessment of 1st Cycle of River Basin Plans developed to implement the EC Water Framework Directive, Summary: Interventions & Options.
31	Defra	2011	Defra Statement of Position. Defra statement on the principles of River Basin Planning Guidance and the future direction of Water Framework Directive implementation.
32	Defra	Undated	Overall Impact Assessment for the Water Framework Directive (2000/60/EC), adopted by the European Union Council and European Parliament on 22 December 2000, Summary: intervention and options.
33	Defra, Environment Agency	2009	Water for life and livelihoods, River Basin Management Plan, Humber River Basin District, Annex E: Actions appraisal and justifying objectives.
34	Defra, Environment Agency	2015	Water for life and livelihoods, Part 1: Humber river basin district, River basin management plan.
35	Devaux, J.	2008	Atteinte du bon état des eaux en Seine-Normandie. Analyses coûts bénéfices à différentes échelles.
36	Direction Régionale de l'Environnement Picardie, Comité de bassin Seine-Normandie, Commission Géographique vallées d'Oise	2007	Estimation financière du programme de mesures. Propositions d'objectifs.
37	Environment Agency	2009	Water for life and livelihoods, Impact Assessment, Impact Assessment of the River Basin Management Plan for the Western Wales River Basin District.

38	Environment Agency	2009	Water for life and livelihoods, Impact Assessment, Impact Assessment of the River Basin Management Plan for the Western Wales River Basin District. Appendix 2.
39	Environment Agency	2009	Water for life and livelihoods, Impact Assessment, Impact Assessment of the River Basin Management Plan for the Western Wales River Basin District. Appendix 3.
40	Environment Agency	2009	Water for life and livelihoods, River Basin Management Plan, Humber River Basin District, Document submitted to Secretary of State for approval. Bristol.
41	Environment Agency	2013	Updating the National Water Environment Benefit Survey Values: summary of the peer review.
42	Environment Agency	2013	Valuing Environmental Benefits, External Briefing Note.
43	Environment Agency	2014	A consultation on the draft update to the river basin management plan, Part 3: Economic analysis – extended report.
44	Environment Agency	2014	Water Appraisal Guidance; Assessing Costs and Benefits for River Basin Management Planning.
45	Environment Agency	2015	Update to the river basin management plans in England, National Evidence and Data Report.
46	Environment Agency	Undated	Environmental Economics: A tool for river basin management planning.
47	Environment Agency, Defra	2009	Water for life and livelihoods, River Basin Management Plan Northumbria River Basin District. Bristol.
48	Environment Agency, Defra	2009	Water for life and livelihoods, River Basin Management Plan, North West River Basin District. Bristol.
49	Environment Agency, Defra	2015	Impact Assessment, Update to the river basin management plans for England's water environment.
50	Environment Agency, Dorset Wildlife Trust, Nottinghamshire Wildlife Trust	Undated	Improving Water Quality Guidance for Local Authorities.
51	European Commission	2012	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A Blueprint to Safeguard Europe's Water Resources COM(2012) 673 final.

52	European Commission	2012	Report from the Commission to the European Parliament and the Council on the Implementation of the Water Framework Directive (2000/60/EC), River Basin Management Plans, Commission Staff document, Member State: France, Accompanying the document, European Commission.
53	European Commission	2012	Report from the Commission to the European Parliament and the Council on the Implementation of the Water Framework Directive (2000/60/EC), River Basin Management Plans, Accompanying the document.
54	European Commission	2012	Report from the Commission to the European Parliament and the Council on the Implementation of the Water Framework Directive (2000/60/EC), River Basin Management Plans, Commission Staff document, Member State: United Kingdom, Accompanying the document, European Commission.
55	European Commission	Undated	Common Implementation Strategy For The Water Framework Directive (2000/60/EC) And The Floods Directive (2007/60/EC), Strengthening the implementation of EU water policy through the second river basin management plans, Work Programme 2013-2015.
56	European Commission, WRc	2015	Screening Assessment of Draft Second Cycle River Basin Management Plans.
57	HM Government	2011	The Natural Choice: securing the value of nature
58	HM Treasury	2003	THE GREEN BOOK, Appraisal and Evaluation in Central Government, Treasury Guidance, London
59	House of Commons	2015	Water Framework Directive: achieving good status of water bodies.
60	Kouyoumdjian, C.	2014	Justification économique des reports de délais d'atteinte du bon état pour les masses d'eau du bassin Seine-Normandie dans le cadre de la DCE.
61	Large, A.	2008	Justification des dérogations économiques à l'atteinte du bon état des eaux en Seine-Normandie. Approche à différentes échelles. Mémoire de fin d'étude.
62	Levraut, A-M.	2013	Évaluation de la politique de l'eau.
63	Metclafe, J.	2013	The National Water Environment Benefits Survey Values, A briefing note.
64	Ministère De L'Ecologie, De L'Energie et Du Développement Durable	Undated	Retour d'expérience sur l'économie dans les SDAGE

65	Ministère De L'Ecologie, De L'Energie et Du Développement Durable	2009	Guide méthodologique de justification des exemptions prévues par la directive cadre sur l'eau.
66	Ministère De L'Ecologie, Du Développement Durable Et De L'Energie.	2012	Mise en œuvre de la directive-cadre sur l'eau, Pour un bon état des eaux en 2015.
67	Ministère De L'Ecologie, Du Développement Durable Et De L'Energie	2014	Guide méthodologique de justification des dérogations prévues par la directive cadre sur l'eau.
68	Ministère De L'Ecologie, Du Développement Durable Et De L'Energie	2014	Guide Programme de Mesures
69	Ministère De L'Ecologie, Du Développement Durable Et De L'Energie	2014	Instruction du Gouvernement du 22 avril 2014 relative à la mise à jour des schémas directeurs d'aménagement et de gestion des eaux et des programmes de mesures associés.
70	Ministère De L'Ecologie, Du Développement Durable Et De L'Energie	2015	Guide DCE Programme de Mesures, Guide pour l'élaboration, la mise en œuvre et le suivi du programmes de mesures en application de la Directive Cadre sur l'Eau.
71	Ministère De L'Ecologie Et Du Développement Durable	2005	Evaluer les bénéfices environnementaux sur les masses d'eau.
72	Ministère de l'Ecologie et Du Développement Durable	2006	Circulaire DCE 2006/17 relative à l'élaboration, au contenu et à la portée des programmes de mesures
73	Nera, Accent	2007	Collaborative Research Programme On River Basin Management Planning Economics, Report on The Benefits of Water Framework Directive Programmes of Measures in England and Wales.
74	Regulatory Impact Unit	2003	Better Policy Making: a Guide to Regulatory Impact Assessment.
75	Secrétariat Technique de Bassin Loire-Bretagne	2014	Programme de mesures 2016-2021 : principes d'élaboration, Note de cadrage
76	Secrétariat Technique de Bassin Seine-Normandie	2013	Méthode de construction du programme de mesures 2016-2021
77	Stanley, K., Depaoli, G., Strosser, P.	2012	Comparative study of pressures and measures in the major river basin management plans in the EU, Task 4 b - Costs & Benefits of WFD implementation, Financing Water Management and the Economic Crisis – A review of available evidence, Final report.

Table 9: Documents used in Chapter 5

Author	Date	Title
ACTeon, ABP mer, The Andersons Centre, & RPA	2015	Assessing affordability of measures to meet Water Framework Directive requirements in England
Agence de l'eau Adour-Garonne	Undated	Synthèse de l'étude coûts disproportionnés réalisée pour le second cycle de la DCE.
Agence de l'eau Adour-Garonne, IREEDD, & Cereg	2015	Analyse des Couts Disproportionnes pour les Masses D'eau Impactees par des Pollutions Industrielles et / ou Domestiques, Rapport de phase 2, Analyse détaillée de 4 masses d'eau
Agence de l'eau Adour-Garonne, & SCE	2009	Analyse du coût disproportionné pour les masses d'eau impactées par des pollutions industrielles et/ou domestiques, Rapport provisoire.
Agence de l'eau Adour-Garonne, & SCE	2009	Analyse du coût disproportionné pour les masses d'eau impactées par des pollutions industrielles et/ou domestiques, Synthèse.
Agence de l'eau Artois-Picardie	Undated	Synthèse de la justification des dérogations utilisées sur le bassin Artois Picardie
Agence de l'eau Artois-Picardie, DIREN Nord-Pas-de-Calais, EcoWhat, & EcoDecision	2009	Les avantages économiques au bon état écologique de l'eau.
Agence de l'eau Artois-Picardie, & EcoLogique Conseil	2015	Réalisation d'une analyse coûts-bénéfices des mesures complémentaires prévisionnelles 2016-2021 sur des groupes de masses d'eau cohérents du bassin Artois-Picardie, susceptibles de faire l'objet de demandes de dérogations dans le cadre de la mise à jour du programme de mesures du SDAGE (2016-2021), Rapport final.
Agence de l'eau Rhin-Meuse	2010	Note méthodologique relative aux analyses économiques menées dans le cadre du programme de mesures.
Agence de l'eau Rhin-Meuse	2015	Note méthodologique relative aux analyses économiques menées dans le cadre du programme de mesures et de la détermination des objectifs environnementaux.
Agence de l'eau Rhin-Meuse	2015	Note méthodologique de justification des objectifs moins stricts pour le deuxième cycle
Agence de l'eau Rhin-Meuse	2016	Note méthodologique de définition des objectifs environnementaux assignés aux masses d'eau de surface
Agence de l'eau Rhône-Méditerranée Corse	2009	Bassin Rhône Méditerranée, SDAGE 2010-2015, Exemptions pour coûts

		disproportionnés, Méthodes et résultats
Agence de l'eau Rhône-Méditerranée Corse	2016	Note de justification des demandes d'exemptions a l'echeance 2015 pour les masses d'eau du bassin rhone-mediterranee, Documents et données techniques pour l'élaboration du SDAGE 2016-2021 du bassin Rhône-Méditerranée
Agence de l'eau Seine-Normandie, Commission Géographique vallées d'Oise, & Direction Régionale de l'Environnement Picardie	2007	Commission Géographique des vallées d'oise, estimation financière du programme de mesures, propositions d'objectifs.
Bassin Rhône-Méditerranée	Undated	SDAGE 2010-2015, Exemptions pour coûts disproporitonés, Méthode et résultats.
Bureau du Comité de Bassin Rhône-Méditerranée	2014	Préparation du SDAGE 2016-2021, Analyses économiques dans le cadre de l'élaboration du SDAGE / PDM 2016-2021
Catchment Based Approach	2017	CaBA (http://www.catchmentbasedapproach.org/about)
Chegrani, P.	2005	Document de travail, Evaluer les bénéfices environnementaux sur les masses d'eau.
Chegrani, P.	2007	Evaluer les bénéfices issus d'un changement d'état des eaux, Collection « Etudes et Synthèses », Etudes économiques et évaluation environnementale
Chegrani, P.	2007	Evaluer les bénéfices issus d'un changement d'état des eaux - Annexe, Collection « Etudes et Synthèses », Etudes économiques et évaluation environnementale
Comité de bassin Artois Picardie	2009	Schéma Directeur d'Aménagement et de Gestion des Eaux 2016-2021. Bassin Artois-Picardie.
Comité de bassin Artois Picardie	2015	Schéma Directeur d'Aménagement et de Gestion des Eaux 2016-2021. Bassin Artois-Picardie. Documents d'accompagnement districts Escaut et Sambre.
Comité de bassin Loire-Bretagne	2015	Bassin Loire-Bretagne. Documents d'accompagnement du SDAGE 2016-2021.
Comité de bassin Rhin-Meuse	2015	SDAGE 2016-2021, Objectifs de qualité et de quantité des eaux du district Rhin, Tome 2
Comité de bassin Seine-Normandie, Commission Permanent des Programmes et de la Prospective	2014	Programme de mesures 2016-2021
Commissariat Général au Développement Durable	2012	Mise en oeuvre de la directive cadre sur l'eau: position de la France en Europe en 2009. Chiffres & statistiques(367): 1-10
Commissariat Général au Développement	2014	Évaluer les bénéfices issus d'un changement d'état des eaux (actualisation en vue du

Durable		2ème cycle DCE).
Courtecuisse, A.	2005	Water Prices and Households' Available Income : Key Indicators for the Assessment of Potential Disproportionate Costs – Illustration from the Artois-Picardie Basin (France), IWG-Env, International Work Session on Water Statistics, Vienna, June 20-22 2005
Defra	2009	Impact Assessment of 1st Cycle of River Basin Plans developed to implement the EC Water Framework Directive, Summary: Interventions & Options.
Defra	2011	Defra Statement of Position. Defra statement on the principles of River Basin Planning Guidance and the future direction of Water Framework Directive implementation.
Defra	Undated	Overall Impact Assessment for the Water Framework Directive (2000/60/EC), adopted by the European Union Council and European Parliament on 22 December 2000, Summary: intervention and options.
Defra, Environment Agency	2009	Water for life and livelihoods, River Basin Management Plan, Humber River Basin District, Annex E: Actions appraisal and justifying objectives.
Defra, Environment Agency	2015	Water for life and livelihoods, Part 1: Humber river basin district, River basin management plan.
Devaux, J.	2008	Atteinte du bon état des eaux en Seine-Normandie. Analyses coûts bénéfices à différentes échelles.
Direction Régionale de l'Environnement Picardie, Comité de bassin Seine-Normandie, Commission Géographique vallées d'Oise	2007	Estimation financière du programme de mesures. Propositions d'objectifs.
Environment Agency	2009	Water for life and livelihoods, Impact Assessment, Impact Assessment of the River Basin Management Plan for the Western Wales River Basin District.
Environment Agency	2009	Water for life and livelihoods, Impact Assessment, Impact Assessment of the River Basin Management Plan for the Western Wales River Basin District. Appendix 2.
Environment Agency	2009	Water for life and livelihoods, Impact Assessment, Impact Assessment of the River Basin Management Plan for the Western Wales River Basin District. Appendix 3.
Environment Agency	2009	Water for life and livelihoods, River Basin Management Plan, Humber River Basin District, Document submitted to Secretary of State for approval. Bristol.

Environment Agency	2013	Updating the National Water Environment Benefit Survey values: summary of the peer review.
Environment Agency	2013	Valuing Environmental Benefits, External Briefing Note.
Environment Agency	2014	A consultation on the draft update to the river basin management plan, Part 3: Economic analysis – extended report.
Environment Agency	2014	Water Appraisal Guidance; Assessing Costs and Benefits for River Basin Management Planning.
Environment Agency	2015	Update to the river basin management plans in England, National Evidence and Data Report.
Environment Agency	Undated	Environmental Economics: A tool for river basin management planning.
Environment Agency, Defra	2009	Water for life and livelihoods, River Basin Management Plan Northumbria River Basin District. Bristol.
Environment Agency, Defra	2009	Water for life and livelihoods, River Basin Management Plan, North West River Basin District. Bristol.
Environment Agency, Defra	2015	Impact Assessment, Update to the river basin management plans for England's water environment.
Environment Agency, Dorset Wildlife Trust, Nottinghamshire Wildlife Trust	Undated	Improving Water Quality Guidance for Local Authorities.
European Commission	2012	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A Blueprint to Safeguard Europe's Water Resources COM(2012) 673 final.
European Commission	2012	Report from the Commission to the European Parliament and the Council on the Implementation of the Water Framework Directive (2000/60/EC), River Basin Management Plans, Commission Staff document, Member State: France, Accompanying the document, European Commission.
European Commission	2012	Report from the Commission to the European Parliament and the Council on the Implementation of the Water Framework Directive (2000/60/EC), River Basin Management Plans, Accompanying the document.

European Commission	2012	Report from the Commission to the European Parliament and the Council on the Implementation of the Water Framework Directive (2000/60/EC), River Basin Management Plans, Commission Staff document, Member State: United Kingdom, Accompanying the document, European Commission.
European Commission	Undated	Common Implementation Strategy For The Water Framework Directive (2000/60/EC) And The Floods Directive (2007/60/EC), Strengthening the implementation of EU water policy through the second river basin management plans, Work Programme 2013-2015.
European Commission, WRc	2015	Screening Assessment of Draft Second Cycle River Basin Management Plans.
HM Government	2011	The Natural Choice: securing the value of nature
HM Treasury	2003	THE GREEN BOOK, Appraisal and Evaluation in Central Government, Treasury Guidance, London
House of Commons	2015	Water Framework Directive: achieving good status of water bodies.
Kouyoumdjian, C.	2014	Justification économique des reports de délais d'atteinte du bon état pour les masses d'eau du bassin Seine-Normandie dans le cadre de la DCE.
Large, A.	2008	Justification des dérogations économiques à l'atteinte du bon état des eaux en Seine-Normandie. Approche à différentes échelles. Mémoire de fin d'étude.
Levraut, A-M.	2013	Évaluation de la politique de l'eau.
Metclafe, J.	2013	The National Water Environment Benefits Survey Values, A briefing note.
Ministère De L'Ecologie, De L'Energie et Du Développement Durable	Undated	Retour d'expérience sur l'économie dans les SDAGE
Ministère De L'Ecologie, De L'Energie et Du Développement Durable	2009	Guide méthodologique de justification des exemptions prévues par la directive cadre sur l'eau.
Ministère De L'Ecologie, Du Développement Durable Et De L'Energie.	2012	Mise en œuvre de la directive-cadre sur l'eau, Pour un bon état des eaux en 2015.
Ministère De L'Ecologie, Du Développement Durable Et De L'Energie	2014	Guide méthodologique de justification des dérogations prévues par la directive cadre sur l'eau.
Ministère De L'Ecologie, Du Développement	2014	Guide Programme de Mesures

Durable Et De L'Energie		
Ministère De L'Ecologie, Du Développement Durable Et De L'Energie	2014	Instruction du Gouvernement du 22 avril 2014 relative à la mise à jour des schémas directeurs d'aménagement et de gestion des eaux et des programmes de mesures associés.
Ministère De L'Ecologie, Du Développement Durable Et De L'Energie	2015	Guide DCE Programme de Mesures, Guide pour l'élaboration, la mise en œuvre et le suivi du programmes de mesures en application de la Directive Cadre sur l'Eau.
Ministère De L'Ecologie Et Du Développement Durable	2005	Evaluer les bénéfices environnementaux sur les masses d'eau.
Ministère de l'Ecologie et Du Développement Durable	2006	Circulaire DCE 2006/17 relative à l'élaboration, au contenu et à la portée des programmes de mesures
Nera, Accent	2007	Collaborative Research Programme On River Basin Management Planning Economics, Report on The Benefits of Water Framework Directive Programmes of Measures in England and Wales.
Regulatory Impact Unit	2003	Better Policy Making: a Guide to Regulatory Impact Assessment.
Secrétariat Technique de Bassin Loire-Bretagne	2014	Programme de mesures 2016-2021 : principes d'élaboration, Note de cadrage
Secrétariat Technique de Bassin Seine-Normandie	2013	Méthode de construction du programme de mesures 2016-2021
Stanley, K., Depaoli, G., Strosser, P.	2012	Comparative study of pressures and measures in the major river basin management plans in the EU, Task 4 b - Costs & Benefits of WFD implementation, Financing Water Management and the Economic Crisis – A review of available evidence, Final report.

Appendix C: Codebook

Table 10: Codebook used for the meta-analysis

NAME	TYPE	DESCRIPTION	COMMENT
REFERENCE	nominal	Short bibliographic reference in 'Author (Year)' format	
PUBLICATION YEAR	numerical	Publication year of article	
NO. OF AUTHORS	numerical	Number of authors of article	
AUTHOR 1 COUNTRY	nominal	Country of first author	
AUTHOR 1 INSTITUTION	nominal	School, department, institute and/or university of first author	
AUTHOR 1 PROFESSION	binary	Professional affiliation of first author, choose from: academic, practitioner	More than one response possible
AUTHOR 2 COUNTRY	nominal	Country of second author	
AUTHOR 2 INSTITUTION	nominal	School, department, institute and/or university of second author	
AUTHOR 2 PROFESSION	binary	Professional affiliation of second author, choose from: academic, practitioner	More than one response possible
AUTHOR 3 COUNTRY	nominal	Country of third author	
AUTHOR 3 INSTITUTION	nominal	School, department, institute and/or university of third author	
AUTHOR 3 PROFESSION	binary	Professional affiliation of third author, choose from: academic, practitioner	More than one response possible
AUTHOR 4 COUNTRY	nominal	Country of fourth author	
AUTHOR 4 INSTITUTION	nominal	School, department, institute and/or university of fourth author	
AUTHOR 4 PROFESSION	binary	Professional affiliation of fourth author, choose from: academic, practitioner	More than one response possible
OTHER AUTHORS COUNTRY	nominal	Country of other authors	
OTHER AUTHORS INSTITUTION	nominal	School, department, institute and/or university of other authors	
OTHER AUTHORS PROFESSION	binary	Professional affiliation of other authors, choose from: academic, practitioner	More than one response possible
JOURNAL NAME	nominal	Journal in which the article was published	
JOURNAL ISI SUBJECT CATEGORY	categorical	ISI subject category of the journal	More than one response possible
CASE STUDY COUNTRIES	nominal	EU country studied	More than one response possible, 'EU27' refers to articles
NO. OF CASE STUDY COUNTRIES	numerical	Number of EU countries studied	
POLICY LEVEL	categorical	Policy levels studied, choose from: national, River Basin District, catchment	More than one response possible
RBD NAME	nominal	If POLICY LEVEL includes River Basin Districts: name of River Basin District	More than one response possible
INTERNATIONAL RBD	binary	If POLICY LEVEL includes River Basin Districts: are these international, shared river basins? Choose from: yes, no	
INTERNATIONAL ASPECT STUDIED	binary	If INTERNATIONAL RBD = yes: was this international dimension studied in the article? Choose from: yes, no	
WFD STAGE	categorical	Temporal stage of WFD implementation, choose from: CIS pilot, transposition, cycle 1, cycle 2	More than one response possible, 'CIS pilot' refers to case studies of
WFD ASPECT	categorical	WFD themes addressed in article, choose from: ecological goals, economic analysis, participation, planning process, policy integration, river basin	More than one response possible
ABSTRACT	nominal	Abstract as found in the article	
KEY WORDS	nominal	Key words as found in the article	
AMBITION	categorical	Nature of research question, choose from: descriptive, evaluative, evaluative adhoc, causal, causal adhoc	
THEORY	nominal	Use of concepts and theory in article	
METHOD SECTION	categorical	Existence of statement on data and methods, choose from: yes, no, part of x	Part of x' refers to statements on data and methods made in
LENGTH METHOD SECTION	numerical	Word count of statement on data and methods	
CITATIONS GOOGLE SCHOLAR	numerical	Number of citations according to Google Scholar	
CITATIONS WEB OF SCIENCE	numerical	Number of citations according to Web of Science	

Appendix D: Update of the meta-analysis

Since Chapter 2 was published as a research paper in early 2016, I provide here an update on the WFD literature until 1/11/2017. The articles added are displayed in Table 11. The new sample is composed of 112 articles.

Table 11: Articles added to the sample

Source articles considered	Countries studied	Key themes
Borrego-Marin & Riesgo 2016	Spain	Planning process
Carlander et al. 2016	Sweden	Participation
Domorenok 2017	Italy	Participation
Feichtinger & Pregernig 2016	Austria	Participation
Francés et al. 2017	Spain	Policy integration
Fritsch 2016	UK	Participation, policy integration
Graversgaard et al. 2016	Denmark	Participation
Graversgaard et al. 2017	Denmark	Participation, economic analysis
Hernandez-Mora et al. 2015	Spain	Participation
Jager 2016	Germany	River basin management, Economic analysis
Jager et al. 2016	Germany, Sweden, Poland, France	Participation, River basin management
Keskitalo 2015	Sweden	Planning process
Kochskämper 2016	Germany	Participation
Maia 2017	Portugal	WFD in general
Matti et al. 2017	Sweden	Participation
Michels 2016	Netherlands	Participation
Newig et al. 2016	Germany	Participation
Robins et al. 2017	Australia	Participation, planning process, policy integration
Rolston et al. 2017	Ireland	Participation
Sevä & Sandström 2017	Sweden	Planning process
Söderberg 2016	Sweden	Planning process, policy integration
Watson 2015	UK	Participation, Planning process
Zingraff-Hamed et al. 2017	Germany	Planning process

The results and trends observed with this new sample are very similar to the ones previously identified. A few changes however deserve to be highlighted. Regarding publication patterns, 43 per cent of first authors now come from the UK or Germany. Authors from Spain and Sweden have now published almost as many papers as those from the Netherlands. This second cluster of authors wrote 32 per cent of all papers. Moreover, the number of articles published per year remains high since 2011 but seems to stagnate around twelve. In this context, 73 per cent of articles were released after 2011 and 51 per cent in the last five years. Regarding the object of study, we still observe a strong imbalance in the choice of countries. Member states from Eastern Europe in particular remain widely understudied. Amongst the most researched countries, the UK and Germany remain ahead with 54 articles on a total of 112. The Netherlands now belongs to the second most studied cluster of countries, along with Spain and Sweden, with a total of 48 publications. Denmark and France slowly emerge as a third cluster with 17 publications. In addition, most studies now focus on the national level, while researches interested in the river basin or catchment level are now equally numerous. Finally, as one could expect, there is an increasing number of publications studying the implementation of the first RBMPs and a few of them the preparation of the second management cycle. Results regarding methods and theory only changed marginally.

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Borrego-Marin M, Riesgo L (2016). Measuring the Sustainability of Water Plans in Inter-Regional Spanish River Basins *Water* 8, 1-14.

Carlander A, von Borgstede C, Jagers S, Sundblad E-L (2016). A bridge over troubled water – public participation as a possibility for success in water management *Water Policy* 18, 1267-1285.

Domorenok E (2017). Traps of multi-level governance. Lessons from the implementation of the Water Framework Directive in Italy *Journal of European Integration* 39, 657-671.

Feichtinger J, Pregernig M (2016). Beyond Mandated Participation: Dealing with hydropower in the context of the water framework directive *Environmental Policy and Governance* 26, 351-365.

Francés GE, Quevauviller P, San Martin Gonzalez E, Vargas Amelin E (2017). Climate change policy and water resources in the EU and Spain. A closer look into the Water Framework Directive *Environmental Science & Policy* 69, 1-12.

Fritsch O (2016). Integrated and adaptive water resources management: exploring public participation in the UK *Regional Environmental Change*, 1-12.

Graversgaard M, Hvarregaard Thorsoe M, Kjeldsen C, Dalgaard T (2016). Evaluating public participation in Denmark's water councils: How policy design and boundary judgements affect water governance! *Outlook on Agriculture* 45, 225-230.

Graversgaard M, Jacobsen B, Kjeldsen C, Dalgaard T (2017). Stakeholder Engagement and Knowledge Co-Creation in Water Planning: Can Public Participation Increase Cost-Effectiveness? *Water* 9, 1-29.

Hernandez-Mora N, Cabello V, De Stefano L, del Moral L (2015). Networked Water Citizen Organisations in Spain: Potential for Transformation of Existing Power Structures in Water Management *Water Alternatives* 8, 99-124.

Jager N (2016). Transboundary Cooperation in European Water Governance – A set-theoretic analysis of International River Basins *Environmental Policy and Governance* 26, 278-291.

Jager N, Challies E, Kochskämper E et al. (2016). Transforming European Water Governance? Participation and River Basin Management under the EU Water Framework Directive in 13 Member States *Water* 8, 1-22.

Keskitalo C (2015). Actors' Perceptions of Issues in the Implementation of the First Round of the Water Framework Directive: Examples from the Water Management and Forestry Sectors in Southern Sweden *Water* 7, 2202-2213.

Kochskämper E (2016). Participation for effective environmental governance? Evidence from Water Framework Directive implementation in Germany, Spain and the United Kingdom *Journal of Environmental Management* 181, 737-748.

Maia R (2017). The WFD Implementation in the European Member States *Water Resources Management* 31, 3043-3060.

Matti S, Lundmark C, Ek K (2017). Managing participation: prospects for learning and legitimacy-creation in Swedish water management *Water Policy* 19, 99-114.

Michels A (2016). Arguments for involving the public in water management: evidence from local and regional water plans in the Netherlands *Water Policy* 18, 918-931.

Newig J, Schulz D, Jager N (2016). Disentangling Puzzles of Spatial Scales and Participation in Environmental Governance—The Case of Governance Re-scaling Through the European Water Framework Directive *Environmental Management* 58, 998-1014.

Robins L, Burt TP, Bracken LJ, Boardman J, Thompson DBA (2017). Making water policy work in the United Kingdom: A case study of practical approaches to strengthening complex, multi-tiered systems of water governance *Environmental Science & Policy* 71, 41-55.

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Söderberg C (2016). Complex governance structures and incoherent policies: Implementing the EU water framework directive in Sweden *Journal of Environmental Management* 183, 90-97.

Watson N (2015). Adaptation through Collaboration: Evaluating the Emergence of Institutional Arrangements for Catchment Management and Governance in England *International Journal of Water Governance* Special Issue, 1-26.

Zingraff-Hamed A, Greulich S, Wantzen KM , Pauleit S (2017). Societal Drivers of European Water Governance: A Comparison of Urban River Restoration Practices in France and Germany *Water* 9, 1-19.

Appendix E: WFD negotiation history

Figure 11: Timeline of WFD history

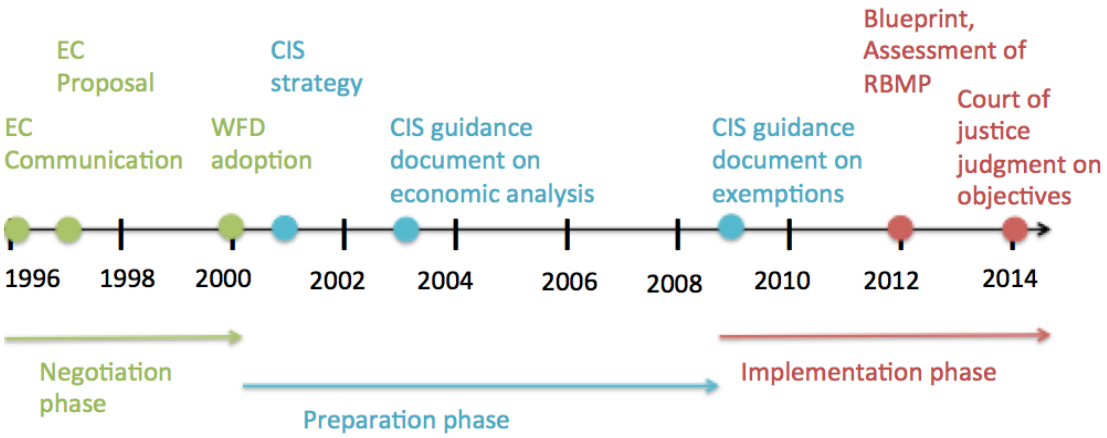


Table 12: Main steps of the WFD negotiation process, Sources: Kaika and Page 2003; Eur-Lex

Date	Institution	Event / Document
21/02/1996	European Commission	Communication on European Water Policy
30/01/1997	Economic and Social Committee	Opinion on the Communication
01/02/1997	Committee of the Regions	Opinion on the Communication
26/02/1997	European Commission	Proposal for a Water Framework Directive
01/10/1997	Economic and Social Committee	Opinion on the proposal for a Water Framework Directive
26/11/1997	European Commission	Amended proposal following consultation
17/02/1998	European Commission	Amended proposal (Annex V)
12/03/1998	Committee of the Regions	Opinion on the proposal for a Water Framework Directive
16/06/1998	Council	Adopts a common position
08/07/1998	European Parliament, Environment Committee	Report: Recommendations for 1st reading
11/02/1999	European Parliament	1st reading
11/03/1999	Council	Agrees on a common position
17/06/1999	European Commission	Amended Proposal
22/10/1999	Council	Adopts a common position
02/02/2000	European Parliament	Report: Recommendations for 2nd reading
16/02/2000	European Parliament	2nd reading
23/05/2000	Conciliation Committee	Formal meeting
05/06/2000	European Commission	Opinion on the European Parliament's 2nd reading
29/06/2000	Conciliation Committee	Agreement on a common text
18/07/2000	Conciliation Committee	Join text approved
07/09/2000	European Parliament	3rd reading
October 2000		Publication of the Water Framework Directive (2000/60/EC)

Appendix F: Detailed analysis of the economic analyses performed in England and France

F.1. Overview of the method used

England	1st cycle CBA were mainly performed at the national and river basin levels in the impact assessment framework. Impact assessments mainly focused on the level of ambition to set for 2015 and the extent to which deadline extensions should be used (INT-EN01). The national impact assessment compared the costs and benefits of the 'do nothing' option with those of achieving good status. The final river basin impact assessments compared the objectives set in the RBMPs for the 1st cycle with a reference case (30). Disproportionate costs were used in three different cases, i.e. when there was: • an unfavourable balance of costs and benefits, • a significant risk that costs be higher than benefits (uncertainty), • disproportionate burdens. The second argument (uncertainty) was the most largely used (39). 2nd cycle In the second cycle, numerous CBA were produced at the "operational" catchment level, leading to over 330 CBA (INT-EN05).

	The EA produced national guidance (44) and spread sheets for its local teams. EA regional staff was trained to perform the appraisals, in particular through an online audio presentation (46). This process was very resource and time consuming (INT-EN01; INT-EN05). The CBA relied on a step-wise process. A qualitative analysis which relied on an ecosystem services framework was first performed. The net present value was calculated based on costs and different possible degrees of benefits monetisation. As a result, less stringent objectives were set when costs outweighed benefits, i.e. when good status was not considered worth achieving (46; 49; INT-EN05). Catchment appraisals were aggregated into river basin and national impact assessments. In particular, the national impact assessment compared two scenarios. The first aimed to reach good status for all water bodies when technically feasible. The second and ultimately adopted scenario only considered implementing cost-beneficial (and technically feasible) measures (49; INT-EN01). This long-term scenario was then proportioned to the six following years (2015-2021) on the basis of available funding. Its costs and benefits were also assessed (49; INT-EN05).

France *(National level)*	1st cycle National guidance recommended using the following process to justify disproportionate costs: • Identify water bodies with potential disproportionate costs, based on a cost-effectiveness analysis and the funding available in the water agency.

	• Perform a CBA on the pre-identified water bodies. If B<0,8C, costs are disproportionate. • If B>0,8C, look at the distribution and affordability of costs between sectors, taking into account subsidies. If costs are unaffordable, set a deadline extension. (65) <u>2nd cycle</u> It was particularly stressed that deadline extensions should serve to spread costs over time. As such, the idea was to: • Assess the funding available in the river basin (water agencies subsidies, stakeholders' ability to pay for the measures, past expenditures…) • Compare different investment scenarios (for different sectors, based on a CBA at the river basin scale) • Prioritise measures • Build a PoM based on priority measures and within the financial amount available • Measures that could not be included in this PoM would then be delayed (a CBA and an analysis of stakeholders' ability to pay should be performed to confirm that costs are disproportionate or to support a local decision) Several criteria could be used to determine the order of priority of measures: • Ecological stakes, • Technical feasibility, • Cost-efficiency, • National political stakes,

	• Gap with good status, • Cost-benefit ratio (67)
Adour-Garonne (AG)	Justifications based on technical feasibility as well as strongly favouring natural conditions. In the 1st cycle, an economic appraisal was only performed on four water bodies, which led to a more in-depth analysis that included local data and a qualitative description. In the 2nd cycle, 20 water bodies were analysed for DC. The analysis consisted in two steps: 1) a qualitative and quantitative territorial analysis (technical analysis, simplified economic analysis, identification of ecological stakes and uses); 2) a monetary CBA, if necessary. When costs were higher than benefits, a less stringent objective was set. Otherwise, affordability was analysed. In case of unaffordability, a deadline extension was set (3; 5; INT-FR22).
Artois-Picardie (AP)	Exemptions were mainly based on natural conditions and technical feasibility (INT-FR03; INT-FR05). 1st cycle Three scenarios with different levels of ambition (no more investments, current investments, investments necessary to implement the WFD) were elaborated to compare the costs, benefits, impacts on jobs and activities of each option at the river basin level (7). Disproportionate cost analyses were mainly based on ability to pay, and more particularly on the impact that the PoM would have on water bills. CBA at the water body level were scarcely used (22; INT-FR05).

	2nd cycle Technically feasible measures were first selected and prioritised based on cost and efficiency criteria (INT-FR02). The overall amount of money that could be spent was assessed (amounts similar to those defined in the 1st cycle, as it was decided to keep expenditures steady for each sector + estimation governments' funds available). The PoM was finalised taking into account this information and costs were spread over several management cycles (23), (INT-FR02; INT-FR03; INT-FR04). A CBA was performed at the river basin level to check the overall ambition. A CBA was also performed for each water body to see if a disproportionality assessment applied (INT-FR02). Affordability of each sector for each water body was also estimated (8).
Loire-Bretagne (LB)	1st cycle Potentially disproportionately costly measures were pre-identified based on local expertise and an assessment of ability to pay at the river basin level. Measures related to hydromorphology and agriculture were identified as particularly expensive. A CBA was then performed on pre-identified groups of water bodies. When the results of the analysis was in contradiction with local expertise, ability to pay was assessed at the water body level (INT-FR23). 2nd cycle Ability to pay was assessed at the river basin level. A CBA was then performed on each water body. Indicators on affordability were calculated for each water body, for discussion with the river basin committee. Costs of measures were also compared to past expenditures (in the 1st cycle) and a priority order was established between measures (75; INT-

	FR23).
Rhin-Meuse (RM)	Costs were considered disproportionate if there was both an inability to pay for the measures and an unfavourable cost-benefit ratio. CBA were only performed at the water body level if there was an inability to pay for the measures (9; INT-FR09; INT-FR10).
Rhône-Méditerranée Corse (RMC)	A pilot study was performed to test the method. The original idea was to choose a cost threshold below which bundles of measures were automatically considered as not disproportionately costly. Above this threshold, a CBA was performed. If 0,65<CBR<0,95, the ability to pay of stakeholders was assessed. However, this last criteria did not discriminate measures and was thus of little help for the decision. Therefore, in the final methodology, it was decided to only perform a CBA (no affordability assessment) (13; INT-FR25; INT-FR27). In the 2nd cycle, the overall amount of the PoM was also compared to usual expenditures in the water sector. The idea was to build a PoM within stakeholders' ability to pay and to show them that the amount of the PoM was not disproportionate compared to usual expenditures and available funding (and thus increase the acceptability of the PoM)(14; INT-FR25, INT-FR27). The water agency also assessed some economic benefits at the river basin level to show stakeholders the positive impacts of environmental restoration on the economy (impacts on jobs, avoided treatment costs for drinking water…) (INT-FR25).
Seine-Normandie (SN)	<u>1st cycle</u> The river basin committee agreed to increase past expenditures by 30%. Remaining costs were spread over the 2nd and

	3rd management cycles (35; 60). A PoM that would reach good status (taking into account technical feasibility and natural conditions) was produced and its cost assessed (61). This cost was compared with average past expenditures and impacts on households, industries and farms (36) (the method differed slightly depending on the locality (INT-FR06)). Water bodies and measures for which costs were excessive were thus pre-identified. For those water bodies, a CBA was performed at the water body level (35; 61). 2nd cycle The river basin committee decided to spend overall similar amount of money on the PoMs from the two cycles (60). Objectives were set based on this financial amount (26). Costs of measures were compared with past expenditures for each sector (waste water, storm water, industry, agriculture, aquatic environment, others) (INT-FR07). Several PoM were proposed. The idea was to gather priority measures within the financial amount agreed and to maximise the number of water bodies that would reach good status. Measures were prioritised based on several criteria (nature of the measure (e.g. national policy), type of pressures (e.g. number, facility to alleviate them), water body status (gap with good status), cost-effectiveness, other technical criteria) (76; INT-FR07). Economic appraisal was performed on water bodies where measures had not been included in the selected PoM. When benefits outweighed costs, the ability to pay was assessed (60).

F.2 Scale of the analysis

England	1st cycle Economic appraisals were performed at the highest possible geographical scale (38), mainly at the national or river basin level (73; INT-EN01). A few site-specific appraisals were performed to assess whether costs outweighed benefits when there was a high certainty on the water body's status, the pressures and the efficiency of measures (33). 2nd cycle In the second cycle, the CBA were performed at the level of operational catchments (34; INT-EN05).

France	National guidance recommended performing the analysis at the most relevant scale (28; 65).
AG	Analyses (CBA and affordability assessments) were performed at the water body scale (3; 5; INT-FR22).
AP	1st cycle The three scenarios were assessed at the river basin level (7). The weight of the water bill on household incomes was assessed at the local level (for each water service) (29). 2nd cycle A CBA for the overall PoM was performed at the river basin level (23; INT-FR02). A CBA was performed for each water body. Affordability was also assessed at the water body level (8; INT-FR02).
LB	1st cycle

	Affordability was assessed at the river basin scale. CBA were performed at the catchment scale (groups of around 10 water bodies). Affordability was assessed again at the water body scale in a few cases (INT-FR23). 2nd cycle Affordability was first assessed at the river basin scale. CBA and ability to pay assessments were performed at the water body level (INT-FR23).
RM	Analyses (CBA and affordability assessments) were performed at the water body scale (10; 25; INT-FR09, INT-FR14).
RMC	CBA were performed at the catchment scale (groups of around 10 water bodies) (13; INT-FR27).
SN	Analyses (CBA and affordability assessments) were performed at the water body scale. A single CBA was undertaken for groundwater (which included all water bodies). In the second cycle, available funding was also assessed at the river basin level and a CBA was performed for the overall PoM (35; 36; 60; 76).

F.3. Screening procedure

England	1st cycle The EA created decision trees for each element and type of water body. The trees helped to set the objective and select the most appropriate justification in case of an exemption. Although they differed from each other in detail, they shared a similar pattern. First of all, appraisals were not undertaken for basic (mandatory) measures. Analyses were also not performed on water bodies

	in good status (an objective of good status for 2015 was then set). When the status was uncertain, a deadline extension was set due to the risk of an unfavourable balance of costs and benefits (disproportionate costs). Otherwise, technically feasible measures and causes of failure were assessed. If unknown or uncertain, a deadline extension was assigned due to technical infeasibility. If known with high certainty, a CBA would then be performed. If the result of the CBA was uncertain, a deadline extension was set due to an unfavourable balance of costs and benefits (disproportionate costs). If there was high confidence in the result, disproportionate burdens and alternative financing were assessed (33). A few site-specific assessments were undertaken, in particular for water industry-related measures. Otherwise, assessments were based on national analyses associated with a specific measure (33). 2nd cycle In the 2nd cycle, CBA were only performed on water bodies that were not in good status or where enough evidence was available (INT-EN05). Then, a step-wise procedure or "triage approach" was applied (44, p.8). The idea was to be strategic in the disproportionality analyses performed, i.e. to perform in-depth analyses only if necessary and where impacts were high (74).

France	1st cycle According to national guidance, economic appraisals were to apply in priority to water bodies where technical feasibility or natural conditions do not apply or had a weak basis for justification (65).

	A step-wise process was to be used for the CBA: in obvious cases, when costs were extremely high or extremely low, a qualitative or quantitative assessment was enough. Otherwise, a monetary assessment would be performed. This would be based on transfers of national benefit values. In a few cases, local studies could be performed if necessary (20). Ability to pay would be assessed only when costs were higher than benefits (65). 2nd cycle Economic appraisal were performed on measures that could not be included in the PoM (non-priority measures with no ability to pay) (67).
AG	1st cycle An economic appraisal was performed on only 4 water bodies due to the water agency's director's reluctance to use disproportionate costs as an argument for exemption (5; INT-FR22). 2nd cycle A simplified analysis was performed on 20 water bodies (description of uses, qualitative assessment of benefits), which were identified locally (cases where costs were particularly high). A monetary CBA was undertaken in three cases where a decision could not be taken based on the qualitative analysis only. When costs outweighed benefits, a less stringent objective was set. When benefits were higher or around costs, stakeholder ability to pay was assessed to set a deadline extension accordingly (2; INT-FR22).
AP	1st cycle

	A CBA at the water body level was performed in very few cases and only when there was an inability to pay for households (64). 2nd cycle Exemptions were only considered for water bodies that were not in good status (INT-FR03). Water body objectives were first estimated based on the current status, technical criteria and thanks to local experts (INT-FRFR 04). A CBA and an analysis of ability to pay were performed on each water body (INT-FR02).
LB	1st cycle Potentially disproportionately costly water bodies were pre-identified through an analysis of ability to pay at the river basin level and through local expertise. The analysis of ability to pay concluded that measures related to hydromorphology and agriculture were potentially disproportionally costly due to their high costs. In the few cases where there was a disagreement between the result of the CBA and local expertise, an analysis of ability to pay at the water body level was performed (INT-FR23). 2nd cycle A CBA and an assessment of ability to pay was performed on each water body (INT-FR23).
RM	Analyses were only performed for water bodies that were not in good status (INT-FR19). Water bodies that could potentially apply for DC were pre-selected based on an analysis of stakeholders' ability to pay. If this first analysis showed an inability to pay, a CBA was performed to confirm whether costs were disproportionate (9; 10). However, an exemption could only apply if the disproportionately costly measure addressed a pressure that significantly

	contributed to the water body's bad status, and that its costs were significantly higher compared to other measures applied to the same water body (above 20% of total costs) (12; INT-FR19). In the second cycle, ability to pay by 2033 and 2039 was also assessed. If this analysis showed an inability to pay by 2039, the water body could qualify for a less stringent objective (12; 25; INT-FR10).
RMC	A cost threshold was set at 10M euros for all the measures at the catchment level. Below this threshold, the bundles of measures were not considered disproportionately costly. A CBA was only performed if the costs were above this threshold (13; INT-FR27). A qualitative analysis was considered sufficient in cases of high costs and low benefits, and if the water body was not of outstanding environmental interest (Natura 2000, Ramsar…). Otherwise, costs and benefits were monetised. An in-depth local analysis could be performed if necessary, but was only undertaken in rare cases (13). In the second cycle, a CBA was only performed on water bodies with an exemption based on DC in the 1st cycle and for a few water bodies with costs that had significantly increased in the 2nd cycle (due to an underestimation of costs in the 1st cycle) (14; INT-FR27).
SN	1st cycle Water bodies that could potentially apply for DC were pre-selected based on past expenditures (costs were considered excessive when above 120% of the average of past expenditures on the river basin) and an analysis of stakeholders' ability to pay. If this first analysis showed an inability to pay by 2015, a CBA was performed to confirm whether costs were disproportionate. (15; 36)

	2nd cycle Analyses were only performed for water bodies that were not in good status (76). The economic appraisal was only performed on pre-identified water bodies. The water bodies selected were those that could not be included in the PoM (due to its constrained financial amount) and that were not considered as a priority. They were pre-identified by local experts. A CBA was then performed. If B>C, affordability was assessed (60; INT-FR06).

F.4. Costs and benefits data

4.1 Costs

England	1st cycle Working groups of stakeholders and representatives of different sectors identified measures and their costs for the preliminary cost-effectiveness analysis (32). They provided a database for the costs of intervention (INT-EN08). Both costs of measures and administrative costs were considered (54). 2nd cycle Thanks to water companies' periodic reviews, there was already strong knowledge on costs related to the water industry. A spreadsheet with national data on costs (from the cost-effectiveness database) was available for EA staff to perform economic appraisals (49) (INT-EN05).

France	The cost values that were used were those calculated for the PoM (28). Costs were allocated according to the polluter-pays principle (67). Only investment costs were taken into account (68).
AG	- Source: Water agency database, expert evaluations, local data - Costs taken into account: investment and maintenance costs (3; 4).
AP	- Source: Water agency database, data from the characterisation process (7; 23) and from existing studies - Costs taken into account: investment and maintenance costs (8)
LB	- Source: Water agency database (INT-FR23)
RM	- Source: Water agency database, INSEE database, studies, expert evaluations (9; 10). - Costs taken into account: investment and maintenance costs
RMC	- Source: Water agency database, expert assessments, studies (13; 17). In the second cycle, costs data were improved. Several studies were performed to assess costs, in particular on hydromorphology (INT-FR25; INT-FR27).
SN	- Source: Water agency database - Costs taken into account: investment and maintenance costs (35; 60)

4.2 Benefits

England	1st cycle The Collaborative Research Programme led by Defra funded the National Water Environment Benefits Survey (NWEBS). The survey used stated preference valuation methods: a payment card contingent valuation question, dichotomous choice question and choice experiment (32). 2nd cycle Regarding benefits, the qualitative assessment (1st step) was based on an ecosystem services framework. The idea was to get a comprehensive overview of the benefits of restoration measures and to better value non-monetised and non-market benefits, in accordance with the Green Book (58) and the Natural Environment White Paper (43; 57). The latter recommends relying on ecosystem services in environmental management so as to better take into account benefits and impacts of programmes (43; 44). This step was also important for identifying whether further benefits could be monetised and added to the stage 1 valuation (46) and provided information on the wider benefits that could not be monetised (INT-EN05). If an important benefit was identified at this stage but could not be monetised, the qualitative assessment could serve as a justification for setting an objective of good status (INT-EN01), especially when the cost-benefit ratio was close to 1 (INT-EN05). This step was completed thanks to local stakeholders, experts and subject specialists (44). The NWEBS survey was updated in 2012 (63), to take into account changes in population density, prices, incomes and the latest knowledge from economic literature (INT-EN01). The NWEBS results were used to monetised recreational, aesthetic

	and non-use values in the stage 1 valuation process (44). EA staff could choose the most appropriate values across a range and apply them to the area where improvements were expected. Thanks to an Excel spreadsheet, they could obtain a cost benefit-ratio and a net present value for each bundle of measures (46). Local benefits and those derived from wetlands were also used at this stage (42). In stage 1+ valuation, another spreadsheet could be used to take into account the non-monetised benefits identified during the qualitative analysis and not included in NWEBS (44). In stage 2 valuation, more in-depth benefit valuations could be performed based on existing research or a local appraisal (46). Separate analyses were performed by specialists for protected areas (shellfish waters, bathing areas…) as their values were not covered by the NWEBS. Those values were included in the RBMPs and local plans if relevant (INT-EN01). Catchment appraisals were aggregated at the river basin and at the national level for the national impact assessment. The latter was completed with national data on the costs and benefits of measures aiming to achieve protected area objectives and non-deterioration (45; 49; INT-EN05; INT-EN09).

France	1st cycle A national database was created based on a review of existing valuation studies (19; 21). It was recommended to perform specific studies only in limited cases, when environmental and economic stakes were important (65). Unitary benefit values would then be applied to the number of users (20). 2nd cycle

	The database on non-market benefits values undertaken in the 1st cycle was brought up to date (67). Existing data were updated so as to take into account inflation. Values from new publications were included, although new studies were not numerous. Most of them were related to wetlands (28).
AG	The ecological value of water bodies was first qualitatively estimated. In particular, the water agency assessed: - whether the water body belonged to a classified natural zone (national park, Natura 2000…) - the ecosystem services provided - whether the classified zone would benefit from an improvement in the water body's status Qualitative data were collected from state regional offices. Monetary benefit values for CBA were taken from the national database (3; 4).
AP	1st cycle The benefits monetised were mainly market benefits. Non-market benefits were only broadly assessed. The benefit values used were transposed from existing studies (7). 2nd cycle Benefit values were taken from existing studies or from the national database (8).
LB	Data from the characterisation process were used. Benefit values were taken from the national database. Some local studies were also performed (24; INT-FR23).

RM	Benefit values were taken from the national database. Some local studies were also performed (9; 10; INT-FR09).
RMC	Market benefits were not included in the CBA. Non-market benefits values (recreation) were taken from the national database. Local studies were performed to complete national data (INT-FR27).
SN	Benefit values were taken from existing studies or from the national database (35; 60; INT-FR13).

4.3 Benefits transfer

France	1st cycle The ministry built an Excel tool to perform the CBA (35). Unitary values from the national database were thus transferred as such. A transfer function was not used, because models from primary studies were not always accessible. Furthermore, the limited number of primary studies meant a meta-analysis could not be built. Conditions for the value transfer were specified (e.g. type of water body, regular users as opposed to occasional users…) (19). 2nd cycle The ministry updated and improved the Excel tool for the 2nd cycle (67). For instance, benefit values were introduced progressively over time. The discount rate could also be changed for sensitivity analysis. It was also possible to perform the appraisal on groups of water bodies instead of individual water bodies (INT-FR13).

AG	The national tool was not used. Benefit values were transferred from the national database (2; 3; 4). Benefit values were applied to different population values, depending on how popular the site was and whether it was classified for its ecological interest (e.g. Natura 2000) (2).
AP	The national tool was not used. Benefit values were transferred from existing studies (7; 8).
LB	The national tool was used in the 1st cycle but not in the 2nd. Benefit values were transferred from national guidance (INT-FR23).
RM	The national tool was not used (INT 09). Benefit values were transferred from national guidance (9; 10).
RMC	The national tool was not used. Benefit values were transferred from national guidance. Benefits were applied to visits rather than population (INT-FR27).
SN	The national tool was used. Benefit values were transferred from national guidance (35; 60).

F.5. Uncertainty

England	A quality assurance was performed on 10% of the catchment appraisals and when aggregated for the national impact assessment. In particular, the consistency of the approach and the right implementation of the national guidance were checked (INT-EN01; INT-EN05). Many investments were also made to improve knowledge on water bodies and reduce uncertainties on the water status. However, they were still taken into account. For example, a 95% confidence level that the water body was below good status was required before considering expensive restoration measures (56).

France	The exemptions set were mainly deadline extensions. The use of less stringent objectives was exceptional. A cost benefit ratio of 0,8 was chosen to take into account potential underestimations of benefits. National guidance recommended using a range of benefit values in case of uncertainty. When benefits could not be valued, this should have been clearly indicated in the CBA. Economic analyses, in particular CBA, were often not the only criteria to decide on disproportionality. Rather, they served to strengthen other considerations (20; 28; 65; 67; INT-FR24). In the first cycle, due to the ambitious objective of reaching good ecological status in 2/3 of water bodies by 2015 (INT-FR24), several water bodies with an uncertain status were granted an objective of good status rather than a deadline extension (62).
AG	In order to take into account uncertainties on costs and benefits values, ranges of costs and benefits were considered. When the range of benefits overlapped the range of costs, benefits were considered as potentially justifying the costs. In this case, the ecological value of the water body was qualitatively estimated, in particular its uniqueness, to decide whether the lower or the upper value of the benefits would be considered (3; 5; INT-FR22).
AP	Uncertainties on status were not taken into account when setting objectives (INT-FR04). However, exemptions were never set on the sole basis of disproportionate costs but were always used with technical feasibility and natural conditions (INT-FR02, INT-FR03). 1st cycle When comparing the three scenarios at the river basin level, uncertainties on costs and benefits were indicated (max-min values). When cost values were too uncertain, they were not taken into account in the analysis (7).

	2nd cycle A range of benefits were used for water body level CBA (max-min values) (8).
LB	CBA were used in combination with affordability analyses, e.g. costs should be both higher than benefits and unaffordable at the river basin level to set an exemption (INT-FR23).
RM	Both inability to pay and an unfavourable cost-benefit ratio were necessary to set an exemption based on DC (9; 10).
RMC	Exemptions were never set on the sole basis of disproportionate costs (they were always used with technical feasibility or natural conditions), due to the uncertainties on the cost-benefit assessment (14; INT-FR25; INT-FR27). Several cost thresholds above which a CBA should be performed were tested. The analysis showed that the threshold chosen had a limited impact on the number of water bodies affected. The impact on costs was even lower. In this river basin, measures were indeed either very expensive or very inexpensive (13).
SN	1st cycle Uncertainty was taken into account when comparing costs to past expenditures: costs were considered excessive when they amounted to over 120% of past expenditures, i.e. a 20% margin was considered. A sensitivity analysis was performed on CBA (comparison of the minimum and maximum values for benefits, changes in the discount rate used) (35). 2nd cycle A range of benefit values (minimum and maximum were taken into account) (60).

F.6 Additional parameters

6.1 Cost-benefit ratio

France	The cost-benefit ratio used was 0,8 (28; 65).
AG	Ranges of costs and benefits were used. Benefits were considered higher than costs when the ranges overlapped or when the range of benefits was higher than the range of costs (5).
AP	1st cycle The costs and benefits of three different scenarios were compared, but their cost-benefit ratio was not calculated (7). 2nd cycle For CBA at the water body scale, the cost-benefit ratio used was 1 (8).
LB	The cost-benefit ratio used was 0,8 (INT-FR23).
RM	The cost-benefit ratio used was 0,8 (9; 10).
RMC	The cost-benefit ratio used was 0,8 (13; 14).
SN	The cost-benefit ratio used was 0,8 (35; 60; 61).

6.2 Affordability

England	1st cycle "Disproportionate burden" was used when costs were too high to be borne by specific sectors or when the measures required

	were in contradiction with the polluter pays principle. In this case, a deadline extension was set due to disproportionate costs (38). 2nd cycle Costs of measures were compared at sector level with available funding (46). When the polluters could not pay, alternative funding was sought towards the beneficiaries and the government (via EU, central or local government) (34). Funding that could be spent or was very likely to be spent included the Environment Agency's environment and flood programmes, the Countryside Stewardship Scheme, water industry national environment programme, or the abandoned metal mines programme (49). Other funding sources will probably be available in the course of the 2nd cycle to fund more measures, but their amount or effects are not certain. For example, funding is available under the CAP Pillar 2 for farming improvements. But because those actions are voluntary, the location and extent of outcomes is unknown (INT-EN01). As another example, the financial amount that water industries can spend on environmental protection, in particular through wastewater treatment, is agreed through a separate process, the periodic review. Every five years, water companies agree with the economic regulator Ofwat on their business plans and customers charges (1). During this process, they have to discuss their business plans with other stakeholders, such as CCWater. Water companies are expected to take into account customers' views and preferences, including their willingness to pay for water companies' proposals (INT-EN01; INT-EN12). They also discuss investment requirements for environmental protection with the environment agency, in accordance with customers' views and

	preferences (INT-EN12). Moreover, this process doesn't coincide with the RBMP schedule (INT-EN01).

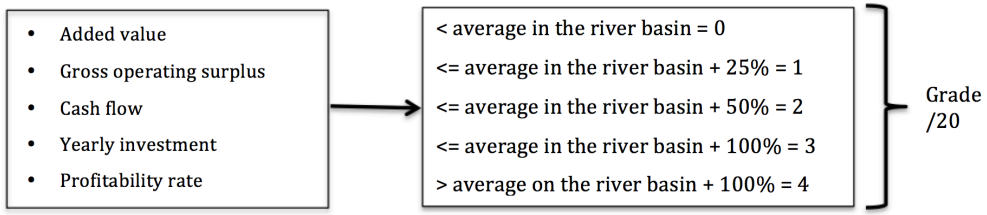
France	According to national guidance, the costs of measures had to be allocated to polluters or users. The following indicators could be used to assess affordability: For households: • Techniques usually implemented • Cost of the measures necessary to achieve the objective and comparison with past expenditures • Price of water and comparison with the average price in the river basin • Household incomes and comparison with the average income in the river basin For industry: • Best available technologies usually implemented • Costs of measures • Turnover • Gross operating surplus For agriculture: • Best environmental practices usually implemented • Costs of supplementary measures

	• Profits before tax • Gross operating surplus In the first cycle, costs were considered unaffordable for households if the water bill exceeded 3% of their income. For industries and farmers, the threshold had to be agreed with the river basin committee. However, if costs were similar to past expenditures in the sector and if there was no obstacle to investment (particularly low income, excessive water price…), measures could not be considered as unaffordable. All forms of subsidies (from water agencies, the State, the EU, local authorities…) had to be taken into account and deducted from the costs (65; 72). In the 2nd cycle, all criteria and thresholds had to be agreed with local stakeholders and the river basin committee. Other criteria could be taken into account, such as the financial amounts planned or spent (67).
AG	1st cycle Indicators used to assess ability to pay for industries: - Costs compared to gross operating surplus - Costs compared to past expenditures (5). 2nd cycle Indicators used to assess ability to pay: - Households: impact on water bills, comparison water bill / income (3% threshold) - Industries: costs compared to gross operating surplus

	Subsidies were deducted from costs (3).
AP	1st cycle Stakeholders' ability to pay for the measures was assessed, in particular for households (impact on the water bill) (INT-FR05) The indicators to use were decided with the river basin committee: - For households: impact on the water bill - For farmer and industries: comparison with the added value (6; INT FR 05). For households, the increase on water bills was assessed and compared with average incomes at the local level. The cost of measures was considered disproportionate when the water bill was above 3% of households' income (29; INT-FR05). Based on this assessment, the costs of measures were spread over the three management cycles (INT-FR05). 2nd cycle The WA commissioned a study that looked at the ability to pay at the water body level. The indicators used were inspired from the AERM method in the first cycle. For each sector, the remaining costs of measures (once subsidies from the water agency deducted) were assessed and compared to various indicators. A threshold was used to determine whether the amount was acceptable or not. - Households: weight of water bill in households' income; threshold: 3% - Tax payers: impact of measures on local taxes; threshold: 2% - Farmers: impact of measures on gross operating surplus; threshold: 2%

	- Industries: impact of measures on added value; threshold: 2% (8; INT-FR02)
LB	1st cycle For households, the cost of water bills was compared with the average income. If above 3%, the cost was considered unaffordable. For farmers, the costs of measures were compared with the average income and gross operating surplus. If above 3%, costs were considered unaffordable. For each type of measures (hydromorphology, agriculture…) costs were also compared with past expenditures. (INT-FR23) 2nd cycle Affordability was first assessed at the river basin scale. At the water body scale, affordability was not assessed per se. Indicators were calculated but not compared to a specific threshold. Indicators were the average income for taxpayers, the price of water for households, and gross operating surplus for farmers. Subsidies (water agency, European funds…) were deducted from costs in the analysis. Costs were also compared to past expenditures to show to the river basin committee that they were affordable. (INT-FR23)
RM	For each sector, the remaining costs of measures (once subsidies from the water agency deducted) were assessed and compared to various indicators. The indicators to use were decided with the river basin committee.

	Indicators used to assess ability to pay: Water and wastewater services • Price of water • % of water bill in household incomes Industries • Added value • Gross operating surplus • Cash flow • Yearly investment • Profitability rate Craftsmen • Turnover • Added value Farms • Added value • Gross operating surplus • Profit before tax

	• Cash flow Hydromorphology: Local taxes For water services and industry, up to four points were attributed for each indicator, depending on its distance from the average in the river basin. A total grade on 20 was calculated. If the grade was above 12, the cost was considered as potentially disproportionately costly for the sector.  Figure 1: example of points attributed to each indicator for industry, source: (9) For agriculture, a threshold of 3% was used for each indicator. For hydromorphology, a total grade of 4 was attributed. Costs were potentially disproportionate if the grade was above 3. In the 2nd cycle, only one indicator was changed for industries: yearly investment was replaced with turnover. Alternative funds were taken into account (9; 10).
RMC	Ability to pay was not used to justify disproportionate costs (13).
SN	1st cycle

	Water bodies were pre-identified as potentially disproportionate based on an assessment of ability to pay for households (more than 1000 euros over 9 years was considered as potentially disproportionately costly) and for industries and farms (more than 30 000€ per installation considered as potentially disproportionately costly) (36). 2nd cycle When B>0,8 C, affordability was looked at. The most expensive measures related to agriculture. Affordability was thus only tested for agricultural measures. Subsidies and alternative financing were deducted from the costs accruing to farmers. Costs were considered disproportionate when they were 2,5% above farms' standard gross production of (60).

6.3 Distributional effects

England	1st cycle In the impact assessments, costs were allocated to the main affected groups (water industry, EA, central government, angling and conservation, industries, navigations and ports, local governments, agriculture and rural land management, urban and transports) (30; 37). 2nd cycle Costs were allocated to the sectors (water industries, other industries, services and infrastructures, rural land management, government) that were responsible for the pressure, although those sectors might not necessarily be paying for the measures (e.g. the Countryside Stewardship Scheme is funded by government but costs were allocated to rural land management) (49;

	INT-EN09).

6.4 Less stringent objectives

England	1st cycle Very few less stringent objectives were set (for only 5 groundwater bodies according to the RBMPs (47; 48)). Deadline extensions were largely preferred. 2nd cycle The proportion of water bodies with a less stringent objective was much higher (25%) (49). Once economic appraisals were performed, bundles of measures with costs higher than benefits were flagged. The measures responsible for the negative ratio and the water bodies, or even the elements, that they were supposed to improve, were identified. A less stringent objective was then set for the water body or the element concerned. The objective set was the highest objective for which the benefits of measures outweighed the costs (34; INT-EN05).

France	Less stringent objectives had to be used exceptionally (deadline extensions were preferred) and only if good status was not achievable by 2027 (65; 67). In the 2nd cycle, water bodies that could apply for a less stringent objective could be pre-identified based on expert judgements and technical criteria, i.e. in cases of:

	• Heavy urbanisation requiring expropriations; • Heavy industrial activity requiring stopping the activity; • Fishponds. (67)
AG	Number of less stringent objectives set based on DC (INT-FR01): 1st cycle: 2 2nd cycle: 5
AP	Number of less stringent objectives set based on DC: 1st cycle: 4 (INT-FR01) 2nd cycle: 13 (23; INT-FR04; INT-FR03)
LB	Number of less stringent objectives set based on DC: 1st cycle: 2 (52) 2nd cycle: 0 (INT-FR01)
RM	Number of less stringent objectives set based on DC: 1st cycle: 0 2nd cycle: 2 In the 2nd cycle, about 30 water bodies were pre-selected for a less stringent objective, i.e. the costs of measures were still

	unaffordable after 2039. Only two water bodies had a less stringent objective based on disproportionate costs in the end, due to a lack of time to perform studies to justify the alternative objective. For these two water bodies, the impact of possible measures on the water body was modelled and the measures with the highest cost-efficiency and cost-benefit ratios were selected to determine the objective to set. (11; 25; INT-FR 9)
RMC	Number of less stringent objectives set based on DC: 1st cycle: 0 (13) 2nd cycle: 0 (14)
SN	Number of less stringent objectives set based on DC: 1st cycle: 0 (36) 2nd cycle: 0 (INT-FR07)