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# Mainstreaming climate policy: the case of climate adaptation and the implementation of EU water policy

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Received 13 May 2011; in revised form 22 February 2012

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**Abstract.** Despite the fact that mainstreaming of climate change into existing EU sectoral policies is a key aim, empirical knowledge of how it works in practice remains scarce. With this paper we explore the degree to which climate considerations are taken into account in the implementation of one of the most influential pieces of European water legislation, the Water Framework Directive and, more importantly, we assess possible explanations for the geographical variability in levels of mainstreaming observed. Our empirical research is based on an analysis of both EU and local policy documents, as well as more than forty in-depth interviews, and shows that, for various reasons, the degree of mainstreaming that has taken place differs widely. We conclude that timely incentives and clear guidance will be necessary to ensure progress is made by all, but that a residual fear that the adaptation agenda is open to abuse by those seeking to rationalise failures to fully implement the Water Framework Directive has put a brake on the mainstreaming agenda.

**Keywords:** adaptation, Catalonia, climate change, European Union, EU Water Framework Directive, Italy, mainstreaming, Poland, Scotland, Sweden

## 1 Introduction

Even in the very unlikely event that greenhouse gas emissions were to cease entirely today, inertia in the climate system is such that a range of negative impacts would still occur. This simple fact, coupled with doubts about the possibilities of swift international progress on mitigation, has led to widespread acknowledgment that adaptation to climate impacts is a key ingredient of any national or international policy to address climate change (see, for instance, Jordan et al, 2010; Keskitalo, 2010). In the European Union (EU), whereas initial emphasis was very much on mitigation, with the publication of dedicated green (EC, 2007) and white papers (EC, 2009a), the European Commission (EC) has relatively recently become active in the field of adaptation as well. Among the four ‘pillars’ constituting its adaptation strategy, perhaps the most prominent is that policies should be reviewed to see how they could be “re-focused or amended” (page 8) to facilitate adaptation in the light of climate impacts, in a process described as ‘mainstreaming’. The white paper reflects acknowledgment that while adaptation is to a large extent a matter for local-level actors and member states, the EU should take responsibility for policy areas where it has competence and take steps to ensure the viability of EU-funded infrastructure investments in a changing climate.

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Mainstreaming is not a new concept. Its origins can be traced to development policy discourse, where mainstreaming has become established as a means to promote poverty reduction and gender equity in development policies (Pollack and Hafner-Burton, 2010). In climate policy the need to mainstream climate change *mitigation* priorities into energy-intensive sectors has been pursued, with varying degrees of success, as part of the broader quest for environmental policy integration (EPI). For climate *adaptation*, however, it was not until the 2002 World Summit on Sustainable Development in Johannesburg that the importance of mainstreaming began to be properly acknowledged (Klein et al, 2005). According to one definition, adaptation mainstreaming involves

“the integration of policies and measures to address climate change in ongoing sectoral and development planning and decision-making, aimed at ensuring the sustainability of investments and at reducing the sensitivity of development activities to current and future climatic conditions” (page 584).

Nowadays, there is widespread agreement on the importance of climate policy mainstreaming, with high-level statements of commitment and guidance documents on the subject proliferating and academic interest increasing. This, however, has not translated into a common terminology or shared understanding of what precisely it entails. A recent stocktaking exercise of adaptation mainstreaming efforts has concluded that:

“It is subsequently not straightforward even for experts within the field of climate change adaptation and development ... to establish a clear picture of what mainstreaming is, let alone how it can be made operational, supported, and strengthened” (Olhoff and Schaer, 2010, page 7).

In practice, the terms climate mainstreaming and climate policy integration (CPI) are often used interchangeably—hardly surprising when mainstreaming is actually *defined as integration*. Therefore, in this paper we treat the two terms as synonymous. By doing so, policy makers and researchers alike are able to learn from the much longer history of EPI (see, inter alia, Ahmad, 2009; Mickwitz et al, 2009; Persson and Klein, 2009).

The EPI and CPI literature proposes, broadly, that integration (and, by extension, mainstreaming) implies that environmental or climate policy goals need to be taken into account in other policy fields, with inconsistencies between sectoral goals being recognised and addressed. The concept of policy coherence is often used to describe a condition of synergy between different policy areas, where incentives and signals to target groups do not conflict (see, for instance, Van Bommel and Kuindersma, 2008) or, even better, where mutual benefits are realised (Collier, 1994).

In our opinion, much conceptual work, as well as empirical research, remains to be done. In particular, empirical evidence of how mainstreaming works in practice is scant. With this paper we address this gap by providing a first analysis of the way the EU climate mainstreaming agenda is beginning to work in practice in the water sector, with an emphasis on institutional and governance aspects. We feel the water sector is particularly interesting, since it is one on which climate change is expected to have the biggest influence (EEA, 2009), and because the EC has identified water management as a priority area for mainstreaming (EC, 2009b). We analyse how, and to what degree, climate adaptation considerations are mainstreamed in the implementation of one of the most influential pieces of European water legislation, the Water Framework Directive (WFD) (EC, 2000). More importantly, our paper explores which factors are at play in causing the varying degrees of climate mainstreaming found. The remainder of this paper is organised into seven sections. A short introduction to the goals and innovations of the WFD, as well the relationship between climate change and water management, are presented in section 3. In section 4 we expand on the research design of this study. In section 5, we elaborate on EU policy on water management and climate

mainstreaming. Our findings on the current degree of mainstreaming and the underlying motivations are presented in sections 6 and 7, respectively. In section 8 we reflect on the explanations for the variations in climate mainstreaming observed. But before we delve into (implementation of) the WFD, in section 2 we elaborate on the concept of mainstreaming itself and the methodological choices we made in examining it.

## 2 Mainstreaming theory: environmental policy integration revisited

Although the literature ranges widely, for present purposes a number of key questions need to be addressed. Firstly, how shall we recognise mainstreaming when we see it? By what criteria can it be empirically measured? Secondly, what factors account for its greater presence in some spatial areas or policy sectors than others? Concerning the first question, given the complexities of simply *defining* mainstreaming, it should be no surprise that assessing the degree to which climate considerations are incorporated is an area of disagreement in the literature. Even in the longer-established area of EPI, Jordan and Lenschow lament a “virtual absence of agreed yardsticks to measure the degree of ... integration achieved” (2010, page 115). For the purposes of this paper, a fairly limited set of criteria should suffice, as presented in table 1. These are inspired by the work of Mickwitz et al (2009), whose analytical framework is designed to be applied to both policy *processes* and the *outputs* from them (ie, plans, legislation, and related guidance documents).

**Table 1.** Summary of the criteria used to assess mainstreaming (based on Mickwitz et al, 2009). While Mickwitz et al also suggest criteria of reporting and resources, we see the former as a tool to achieve mainstreaming, not an indicator of its extent, and the latter as a potential explanation for the degree of mainstreaming, and therefore not a suitable measuring criteria. While Mickwitz et al treat climate policy as a unified whole, we distinguish between adaptation and mitigation agendas, which may not always be in harmony.

Criterion	Key question	Scores
Inclusion	To what extent have climate policy objectives and/or impacts been considered?	Climate change impacts ignored. Climate change impacts partially considered. Climate change impacts extensively considered.
Consistency	Have the contradictions between policy goals been identified and have there been efforts to minimise any contradictions revealed? (Contradictions may be between climate-related and sectoral goals or between mitigation and adaptation goals.)	Contradictions are ignored. Contradictions are considered but disregarded. Contradictions are considered and addressed in certain instances. Contradictions are considered and addressed across the board. After careful consideration, no contradictions are found; climate change is seen as an integral part of the agenda.
Weighting	Have the relative priorities of climate change mitigation and adaptation impacts compared with other policy aims been decided?	Relative priorities are not decided. Relative priorities are decided, nonclimate considerations are most important. Relative priorities are decided, climate change considerations are taken on board when they overlap with other goals. Relative priorities are decided; climate change considerations take precedence.

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This framework is, of course, not without its problems. According to Persson and Klein (2009), *any* attempt at measuring mainstreaming is compromised by the absence of a sound theoretical foundation on which to evaluate adaptation mainstreaming in terms of ultimate outcomes. This is because the ‘required’ level of adaptation is determined relative to the risk of climate change and variability in a given time and space, as well as society’s willingness to accept those risks, both of which are difficult to establish. However, in this study we are not intending to pass normative judgments on ultimate outcomes. A second caveat about the application of the framework is that judgments on the extent of mainstreaming are somewhat subjective, and depend on our perspective. Urwin and Jordan (2008) and Van Bommel and Kuindersma (2008) suggest that it is worth examining the compatibility of policies from the perspectives of both high-level policy makers and more locally based implementers, respectively, since what appears inconsistent from a ‘top-down’ perspective may not be so when viewed ‘bottom up’, and vice versa. Therefore, in the analysis that follows we assess not only EU-level policies but also the regional-level plans by which such legislation is implemented.

The EPI and mainstreaming literature also offers a number of hypotheses that might account for the variable degree of effort that can be seen in an EU context. From an actor-centred institutionalist perspective, Hey (2002) suggests that two institutional characteristics seem to be essential: “a certain regulatory capacity of public authorities, and at least a balance of power and resources between environmental, and sector stakeholders and authorities” (page 128). Regulatory capacity depends on the resources (finances, legal competencies, legitimisation, target group support, and information) to achieve change in the sector. According to Hey, it is problematic when just one of these two conditions is met. In the case of river basin management, this may be often the case given that the high consumption of some sectors, such as agriculture, can be difficult to challenge by administrative actors in charge of water protection (Deloitte and IEEP, 2011).

Focusing on the Commission bureaucracy, Pollack and Hafner-Burton (2010) adopt a rationalist approach to the prospects of mainstreaming. They find that the Commission is more successful in achieving mainstreaming objectives when it provides ‘hard’ incentives for relevant bureaucrats to implement reforms, whether they be positive (carrots) or negative (sticks). Soft incentives, such as persuasion and socialisation of the relevant bureaucrats,

“will be successful only insofar as a proffered policy frame resonates with officials’ existing world-views ... or produces ‘win-win’ outcomes in which the acceptance of a cross-cutting mandate coincidentally delivers benefits to sectoral policymakers” (page 286). Such outcomes are often difficult to achieve, particularly in the EU, which encompasses a large number of sectoral policies, often deeply ‘pillarised’.

Persson (2004), whose focus was on the various types of instruments for achieving integration, acknowledges that instrument characteristics are not the only factor in explaining the degree of mainstreaming. Her analysis indicates that the potential for acceptance of climate considerations in a target policy sector depends on the technological potential for win-win solutions. In addition, the competencies of such a target sector, and its proximity to environmental processes, are important variables in determining how much is accomplished by winning over another policy sector, in our case to an adaptation agenda. Table 2 provides an overview of hypotheses derived from the literature on factors explaining the degree of climate mainstreaming.

In section 7 we return to, and elaborate on, these hypotheses in relation to our empirical findings on the EU water sector. To gain more insight in this specific sector, we first take one step back, to examine further the relationship between climate change and water policy.

**Table 2.** An overview of hypotheses on mainstreaming (based on Hey, 2002; Persson, 2004; Pollack and Hafner-Burton, 2010).

Types of explanation	Hypotheses
Institution related	A capacity to regulate is a prerequisite for achieving change in a target sector. A balance of power and resources between environmental regulators and the target sector helps achieve mainstreaming.
Instrument related	‘Hard’ incentives work better than ‘soft’ in stimulating mainstreaming.
External factors	The greater the technological potential for win–win solutions, the greater the chance of integration/mainstreaming success. Policy developments in the target sector that coincide with a climate agenda enhance the chance of mainstreaming success.

### 3 Climate change and water

Water is intricately linked with climate through a large number of connections and feedback cycles. According to current research and predictions, the most important impacts of climate change on European water resources are due to increases in temperature, sea-level rise, and precipitation variability, although specific effects will differ by region (EEA, 2009; Wright et al, 2011). Despite significant uncertainty, at a general level most models agree that the South and Southeast of Europe—which already suffer water stress—will experience higher temperatures, decreased precipitation in summer, as well as more frequent and longer dry spells. In Eastern and Northern Europe the largest threat is increased flood risk, especially in winter and spring. More flood events in winter are also expected for Western Europe, as are drought periods in summer. In mountainous regions, particularly in the Alps, a loss of snow and ice might lead to an increase in winter flows and a decrease in summer flows (EEA, 2009; Wright et al, 2011). Coastal areas will more frequently encounter the effects of a sea-level rise, possibly resulting in flooding and saline intrusion (Kundzewicz, 2007; Wilby et al, 2006).

Besides the predicted effects on water quantity, climate change will most probably also affect water *quality* by causing chemical, biological, and hydromorphological changes. Changes in water temperature and river flow (annual and seasonal) might, for example, lead to deterioration of water quality. During low flow the concentration of pollutants might increase due to a reduced dilution, whereas the higher frequency of extreme rainfall and flooding events might increase both diffuse pollution (eg, increased flushing of nutrients or toxic substances) and point-source pollution (eg, storm water overflow and emergency discharges from wastewater treatment plants) (EEA, 2009; Wilby et al, 2006). In short, there are many indicators that climate change will be an additional pressure on many of the EU’s already stressed water resources.

The EU’s most important vehicle to protect its freshwater resources is the WFD. The WFD establishes a framework for the protection of inland surface waters (including rivers, lakes, transitional waters, and coastal waters) and ground waters (Kaika, 2003; Page, 2003). All water bodies must be classified as ‘natural’, ‘heavily modified’, or ‘artificial’. A distinction is made between the ecological and chemical status of surface water. The ecological quality scale has five levels, which vary from high to bad, and uses biological, hydromorphological, and chemical indicators. Chemical status refers to the most polluting substances and has only two classes, ‘good’ or ‘failing to achieve good’ (Dworak et al, 2009). For ‘natural’ water bodies the goal is to achieve a ‘good’ status in 2015; artificial and heavily modified ones should achieve a good ecological *potential*, although member states can give reasons as to

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why obligations are postponed to 2021 or 2027 (Dworak et al, 2009; Meijerink and Wiering, 2009).

A key element of the WFD is that it combines previously separate water-related directives. More than that, it represents an attempt to understand water quality within the broader notion of an integrated system. Whereas, in the past, water management was mostly organised around political-administrative boundaries, under the WFD it is organised around hydrological units, the so-called river basin districts (RBDs) (Page, 2003). Other important shifts marked by the WFD are, among others, the introduction of the principle of cost recovery, the requirement for public participation, and the amalgamation of environmental quality standards (Page, 2003; Wilby et al, 2006). As a framework directive, the WFD does not contain detailed regulations on policy objectives or measures, but leaves a considerable degree of freedom to member states in how they 'translate' the directive to their national and 'local' (RBD) contexts. To provide guidance, however, the Common Implementation Strategy (CIS) of the WFD was agreed, within which specialist groups of national experts produce practical and nonlegally binding documents (Page and Kaika, 2003). Under the WFD, member states are required to draft so-called river basin management plans (RBMPs), the first to be in place by 2009, which subsequently undergo six yearly cycles of updating. The plans should include a programme of measures (POM) by which their objectives are to be reached, to be operational by 2012. The final deadline for the achievement of WFD objectives is 2027.

Although the WFD introduces several novel components to European water legislation and embraced the concept of integrated river basin management, arguably the directive is not as integrated as it could have been, in that it largely focuses on quality and ecological aspects of water management, and not on flooding or other quantity issues. Instead, a separate Flood Directive (FD) (EC, 2007) was subsequently adopted, requiring member states to identify the river basins and associated coastal areas at risk of flooding. For areas with a potential significant risk, flood risk maps and flood risk management plans (FRMPs) focused on prevention, protection, and preparedness are required by 2013 and 2015, respectively. Moreover, the FD establishes a cyclic review of its core elements, to be synchronised with the schedule of the WFD. What is perhaps even more striking, however, in terms of integrative shortcomings, is that climate change is not explicitly referred to in the text of the WFD. In section 5 we elaborate on the reasons why this coupling is missing, and how the Commission subsequently dealt with this issue. In section 4 we first explain how we conducted our research.

#### **4 Research design**

As already noted, for this paper we not only assessed relevant EU policy documents but also paid attention to the local level, where the implementation of the WFD and FD takes place. Adopting a most different systems design (Hopkin, 2002), we needed to guarantee a geographical spread and to illustrate a wide range of situations with respect to the hydrological regimes, the nature of climate risk, governance system, and environmental policy tradition, five different RBDs in five different countries were taken as case-study areas (see figure 1): Catalonia (Spain), the Po (Italy), the Warta (Poland), Scotland (UK), and the Northern Baltic Sea (Sweden). Each case is depicted and briefly described below.

The Spanish region of Catalonia is divided into approximately two equal parts, one consisting of river basins that are entirely within the Catalan territory and another consisting of rivers included in the Ebro River Basin shared with other regions of Spain. The basins located entirely in Catalan territory, which is about 16 500 km<sup>2</sup>, are joined in the Catalan RBD, in which the Catalan Water Agency is responsible for the RBMP. The main water problems in Catalonia are related to a structural water deficit of 80 cubic hm/year (Agència Catalana de



**Figure 1.** Overview of the river basin district selection as the cases presented.

l'Aigua, 2008), which led to the highly publicised incidence of water shortage in 2008 when water had to be brought in by tanker ship. Further population growth could increase pressure on its water availability. As the Spanish government had not finalised and submitted any RBMP to the Commission at the time of our research,<sup>(1)</sup> the following analysis of the RBMPs is based on the Catalan *Pla de gestió de l'aigua de Catalunya*, which includes the RBMP for the Catalan RBD and proposes measures for the Catalan parts of the Ebro Basin, with the aim that they can be taken into account by the Ebro Basin authorities (Agència Catalana de l'Aigua, 2008; 2009a). The RBMP for the Catalan RBD was directly submitted to Brussels in 2010 by the Catalan government to show its progress. It does mean, however, that formal submission, which goes through Madrid, has not been completed.

The Po RBD covers around 71 057 km<sup>2</sup>, of which 95% is in Italy. The basin extends from the Alps in the west to the Adriatic Sea in the east, with Milan and Turin as the main urban and industrial agglomerations. The basin is economically very important for Italy: 38% of the country's GDP, 46% of the national hydroelectric production, and 36% of agricultural production is generated in the basin (Bazzani et al, 2004). Meteorological records indicate that in the Po RBD rainfall has decreased by 20% since 1975. In addition, temperature increased which accelerated the melting of the glaciers in the Alps (UNESCO, 2009). This, in combination with the high level of development, has led to a deficit in water availability and a degradation of both surface and groundwater quality. The Po RBA, established in 1989, is responsible for basin-wide planning, while other institutions (including regions, provinces, city councils, and drainage authorities) are in charge of implementing the plans. In effect, although regulations for water use and protection are in place, implementation is generally poor.

<sup>(1)</sup>Formally, member state central governments submit plans to Brussels.

The Warta RBD covers about one sixth of Poland (around 55 193 km<sup>2</sup>) and is the biggest subbasin of the international Oder RBD. Land use in the basin is 70% agriculture and forestry and 30% urban and industrial, with Poznań as the biggest city. Despite Poland's willingness and need to catch up with Western European environmental standards, the legacy of decades of inadequate wastewater management and industrial and agricultural concentration mean that water pollution remains a serious problem. Other major water-related problems in the Warta basin are water stress during the vegetation season and occasional severe floods (Krysanova et al, 2006; Kundzewicz, 2011; Tonderski, 2004). Additional difficulties include the overlapping responsibilities and poor coordination between different institutions in the water sector and sectors such as spatial planning (Blomquist et al, 2005; Lindblom, 2007; Tonderski, 2004).

The Scotland RBD covers around 113 920 km<sup>2</sup> of land and water. The district contains some of the highest-quality water environments in Europe: 65% of its water bodies are in a good or better condition. Water pollution is concentrated in the main urban agglomerations, as well as around the productive agricultural areas along the east coast (SEPA, 2009a). Prior to the WFD, no comprehensive system of river basin planning existed in Scotland. However, as discussed below, Scotland has subsequently been very proactive in WFD implementation. The Scottish Environment Protection Agency is responsible for coordinating the river basin planning process (Blackstock et al, 2009).

The Northern Baltic Sea RBD encompasses 36 700 km<sup>2</sup> and 7000 km<sup>2</sup> coastal waters. It is Sweden's smallest but most populated RBD. Nonetheless, land use in the basin is 61% forests, 12% lakes and wetlands, 22% agriculture, and only 5% built area, with Stockholm as the biggest city. Eutrophication and overexploitation of freshwater resources are the two main water problems in the district. Finally, this district also experiences climate change as a challenge. For instance, part of the Lake Mälaren area is believed to be at risk of flooding caused by seasonal and spatial changes in precipitation patterns (Hammer et al, 2011). The Water Authority is responsible for decisions on environmental objectives, the POMs and RBMPs. Although Sweden is traditionally seen as a leader in environmental policy (Keskitalo, 2010), until very recently it took a 'wait-and-see' attitude towards the implementation of the WFD. Today, however, the directive is considered a major tool to reach national environmental targets.

In all selected RBDs we conducted a systematic review of relevant policy documents, principally the most recent versions of the RBMPs. More importantly, we conducted forty-one semistructured, face-to-face interviews with relevant policy makers and experts (see table 3 and appendix A for a full list of interviewees). Interviewees were selected to represent, firstly, local administrative bodies with a role in the implementation of the WFD and/or climate change adaptation according to policy documents and, secondly, experts on the subject.

All interviews were conducted between August and December 2010, and lasted between one and four hours. They were focused on implementation of the WFD in general, the

**Table 3.** Distribution of forty-one respondents over countries, organisations, and positions.

Country	Position
Italy: Po RBD (7)	Water director (2)
Poland: Warta RBD (8)	Executive level public official (7)
Scotland: Scotland RBD (6)	Civil servants (15)
Spain: Catalonia (8)	Researcher (11)
Sweden: Northern Baltic Sea RBD (12)	Consultant (3)
	Programme manager NGO (3)

Note: RBD = river basin district.

vulnerability to climate change, as well as ‘entry points’, opportunities for and limits to climate mainstreaming (see appendix B for a set of sample questions). In section 5 we provide a first analysis of EU policy documents. This analysis is deepened in sections 6 and 7, where we present the combined findings of the document analysis and interviews.

## 5 Mainstreaming climate change in EU water policy

To understand the lack of attention to climate change in the WFD, one needs to take into account that the directive was adopted in 2000, a year before publication of the Intergovernmental Panel on Climate Change’s Third Assessment Report. At that time the relationship between climate change and water was not yet such a prominent concern at the EU level, and relatively little knowledge was available about potential climate effects via the hydrological cycle on water quality (Veraart and Westein, 2005). In fact, it was only with the launch of the second European Climate Change Programme in 2005 that EU water experts began to look seriously at the implications of climate change (Massey et al, 2010). In 2007 a Strategic Steering Group (SSG) was launched to explore the relationship between the WFD and climate change adaptation (CIS, 2008). Under the joint chairmanship of Germany and the Commission, the CIS SSG on Climate Change and Water published “Guidance document no. 24: ‘river basin management in a changing climate’” (EC, 2009c) (hereafter referred to as the Guidance or the Commission’s Guidance) in November 2009 (Wright et al, 2011).<sup>(2)</sup> In this document, endorsed by the EU water directors, key guiding principles are provided for RBAs on how to incorporate considerations of climate variability and change in the RBMPs.<sup>(3)</sup>

Close reading of the Guidance reveals a somewhat mixed message. On the one hand, it clearly states that future RBMPs should take climate change into account, as it may place an extra pressure on water resources, and because a large potential for synergies between WFD objectives and adaptation aims is foreseen. Accordingly, it urges member states to at least conduct a ‘climate check’ of proposed measures in the first round of RBMPs and to include a chapter on climate change to increase awareness, facilitate public consultation, and pave the way for future action. From the second RBMPs (due in 2015), measures—which can range from wetland restoration to wastewater treatment upgrades—should be flexible and robust enough to be viable under changing climate conditions and not run counter to adaptation objectives. At the same time, however, the Commission’s Guidance maintains that

“apart from exceptional circumstances, it is not expected that, within the timeframe of WFD implementation (i.e., up to 2027), and within the metrics used for status assessment, a climate change signal will be statistically distinguishable from the effects of other human pressures at a level requiring reclassification of sites” (EC, 2009c, page 41).

In line with this thinking, the Commission maintains that the structure, objectives, timetable, and cyclical approach of the WFD provide sufficient opportunities to incorporate climate change into the WFD planning and implementation processes. However, several scholars do not concur with this rather defensive vision, and urge structural revisions of the directive itself as a way of mainstreaming. Wilby et al (2006), for example, foresee problems with the fact that the WFD does not consider climate change when defining and evaluating the status of water bodies and argue that ignoring climate risks within the ongoing process of implementation eventually could result in failure to meet the environmental objectives.

<sup>(2)</sup> Water directors are the most senior national representatives of the water industry.

<sup>(3)</sup> The document covers: how to handle available scientific knowledge and uncertainties about climate change; how to develop strategies that build adaptive capacity for managing climate risks; how to integrate adaptive management within key steps of producing an RBMP; how to address the specific challenges of managing future flood risk; and how to address the specific challenges of managing future water scarcity.

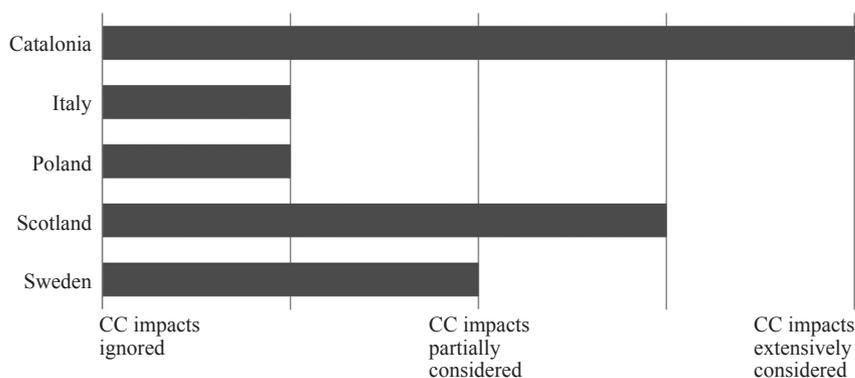
The impression of a defensive tone in the Guidance is reinforced by its statement that: “There is a danger that anthropogenic climate change could be used as an excuse to set lower objectives for water bodies, even though formal attribution of a detected trend to anthropogenic climate change is unlikely at the scale of RBDs for several decades to come” (EC, 2009c, page 42).

In other words, it seems that the authors of the Guidance fear that climate considerations might be ‘misused’ to justify a relaxing of objectives. As the directive permits ‘temporary’ deterioration in water quality, not only in the case of disproportionate costs but also in unforeseen or exceptional circumstances, such as floods or droughts, such fears may have some basis (Veraart and Westein, 2005). However, how permanently such derogations can be applied remains to be seen and depends on how the European Institutions (the Commission and, ultimately, the European Court of Justice) view such actions (Urwin and Jordan, 2008). Given that the Guidance is meant for local water managers working on the implementation of the WFD directive, we deepen our analysis of it in section 7, where we delve into the factors that explain degrees of mainstreaming. In section 6 we first turn our analysis to how this demand for climate mainstreaming is taken onboard in the current RBMPs.

## 6 Climate mainstreaming in practice

Congruent with our theoretical discussion, we now analyse the mainstreaming of climate change in the various RBDs, paying attention to inclusion, consistency, and weighting criteria. Starting with the first aspect distinguished above, inclusion, we assessed the extent to which climate policy objectives and/or impacts have been considered and whether climate change projections informed the RBMP making, including the design of measures.

Regarding inclusion, we find large differences between the five RBMPs, as reflected in figure 2. At one end of the spectrum, the management plans of the Italian Po and the Polish Warta refer to climate aspects in a rather abstract manner and by statements of intent. This does not necessarily mean that climate change is perceived as unimportant. In the Italian case, for example, climate change is explicitly defined as a key theme (Autorità di bacino del fiume Po, 2010, page 128). In the RBMP of the Swedish Northern Baltic Sea district, climate change is dealt with as mainly a side issue. When mentioned, the search for climate-proof and win–win measures is referred to as actions to be undertaken *in future* (Länsstyrelsen Västmanlands län, 2009). Again, this is not to say that climate change impacts are totally ignored; in Sweden the level of knowledge and awareness of the impacts of climate change are relatively high and, accordingly, as pointed out by the Swedish interviewees, climate mainstreaming often “went without saying”. In effect, climate change impacts are at present partially integrated, as reflected in its position in figure 2.

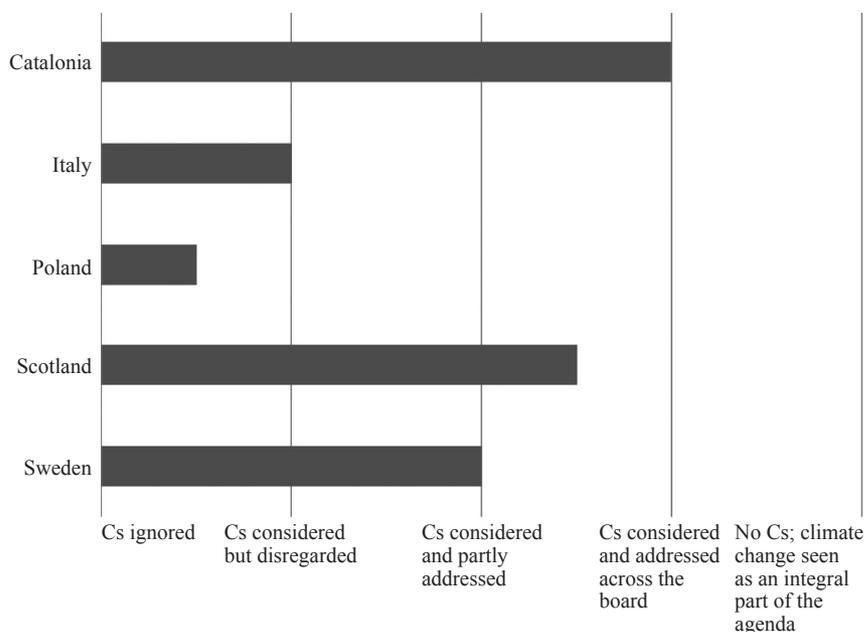


**Figure 2.** Degree of climate change (CC) impacts inclusion in the different river basin management plans.

The picture of integration looks much brighter in the Scotland RBD, where climate change impacts are fairly extensively considered. As noted above, Scotland is relatively advanced in the overall WFD implementation process, giving what has been called “effect to the spirit, rather than the letter, of the law” (Hendry, 2008, page 150). It is only because climate change was taken onboard *after* the design of measures, instead of during the process, that we conclude that the inclusion of climate change impacts is not yet fully complete. The other RBD where the implementation of the WFD is taken up fairly quickly and vigorously is Catalonia. Here, although climate change is not listed among the top fifteen issues, it is seen as a ‘meta-problem’ reinforcing the impact of other problems. This, combined with the fact that as much work as current scientific insights and models allow has been done to assess that impact (Agència Catalana de l’Aigua, 2009b, page 332), justifies our decision to score this RBD as giving the fullest degree of consideration to climate impacts.<sup>(4)</sup>

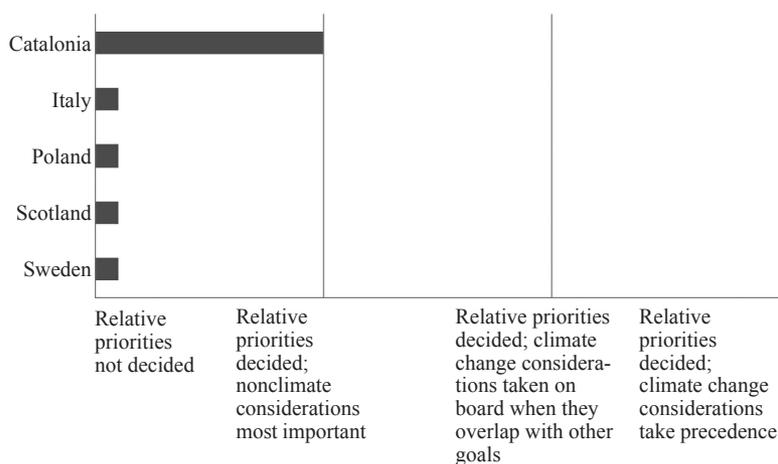
The key question for the second aspect of mainstreaming is whether the contradictions between the aims related to climate change mitigation and adaptation and other policy goals have been assessed, and whether efforts have been made to minimise them. Here too, as shown in figure 3, we found significant differences between the different RBMPs.

In keeping with our findings on inclusion, we find that Italy and Poland lag somewhat behind regarding consistency. The latter RBD has considered contradictions the least, while the former considered them only partially. Once more, Sweden holds a ‘middle position’: contradictions are addressed only in certain instances. Catalonia and Scotland are again the front-runners. Scotland, to a large extent, and Catalonia, completely, addressed all evident contradictions. In addition, both RBDs made serious efforts to minimise the contradictions. Scotland, for example, has included observed and predicted climate change impacts throughout its RBMP and has undertaken a ‘structural climate assessment’ of the measures.



**Figure 3.** Degree to which contradictions (Cs) between the aims related to mitigation and adaptation and other policy goals been assessed in the different RBMPs and efforts have been made to minimise revealed contradictions (consistency).

<sup>(4)</sup>This is not to say that water quality goals have been amended (see discussion below). In fact, ambitious water quality goals have been set, even in the knowledge that further climate change in the future might make them unattainable. To be more precise, the predicted reduction in water availability makes it, according to some local policy makers, very likely that several of the ambitious goals that are now embedded in the Catalan Water Plan may not be attainable by 2027.



**Figure 4.** Degree to which relative priorities of climate change mitigation and adaptation impacts compared with other policy aims have been decided (weighting).

This assessment gives a general indication of any likely significant implications of the different on-the-ground actions in terms of: (1) the impact of the measure on greenhouse gas emissions; (2) whether the measure will help to adapt for a changing climate; and (3) the action's continued effectiveness under a changing climate (SEPA, 2009b).

Adaptation and mitigation strategies have the potential to conflict with one another (Swart and Raes, 2007), and it is important to include consideration of such issues under the criterion of consistency. In all basins the respective authorities reported several contradictions. In Catalonia, for example, one of the adaptation measures taken to cope with water stress is desalination—a highly energy-intensive measure that typically increases greenhouse gas emissions, and hence conflicts with mitigation targets. For their part, Swedish policy makers report facing a situation where mitigation goals constrain WFD goals: in their efforts to enhance water quality by reconstructing flow patterns, they are frustrated by claims from the hydropower sector that the EU Renewable Energies Directive has primacy.

The third indicator for mainstreaming is weighting. As reflected in figure 4, we found that all but one district have so far not decided on the relative priorities of climate change mitigation and adaptation impacts either between themselves or compared with the policy aims of the WFD. The impasse between hydropower and water sectors in Sweden is just one of many examples. The only RBD where relative priorities have apparently been decided is Catalonia. Here, as we have seen with the example of desalination, water availability considerations are clearly given priority over greenhouse emission reductions. A similar example from Catalonia concerns the trade-off between the water quality goals of the WFD and hydropower production. Minimum ecological flows, implying lower water availability for hydropower generation, are in most cases accepted as a price worth paying for increased water quality. There are thus significant differences in the degree to which climate considerations have been mainstreamed in the river basin plans of various authorities. But what explains these differences?

## 7 What factors explain degrees of mainstreaming?

Perhaps the most intuitive explanation for the differences observed would be the severity of the projected climate change in the different RBDs. This appears not, however, to be the key explanatory variable. In Scotland, for example, we noted a relatively high degree of climate mainstreaming, while the predicted effects are relatively mild (SEPA, 2009a). In the Po RBD, where climate change might have very serious impacts, it has to a large extent been disregarded. Interestingly, in Sweden the projected climate change, or at least

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the perception of it, might in part explain its relatively *low* degree of climate mainstreaming. Since they perceive themselves, one local official put it, “approaching climate change in business class”, the prevailing assumption is that sufficient time for mainstreaming is left. In Catalonia, however, the prediction in the Commission’s Guidance that up to 2027 a climate change signal will not be statistically distinguishable (EC, 2009c, page 41) does not ring true. There, existing problems with water availability may contribute to a greater awareness and interest in the effects of climate change and a desire to mainstream climate change in the RBMPs (Agència Catalana de l’Aigua, 2009a). Overall, however, we can conclude that the (perceived) gravity of climate change, although not key, is certainly one of the factors that explain varying degrees of mainstreaming. But to gain a deeper understanding, we have to return to the hypotheses derived from the literature as discussed in section 2.

Recall that, according to Hey (2002), the capacity to regulate is an important prerequisite for achieving change in a target sector, alongside the balance of power and resources between regulatory authorities and the sector. In our research we found support especially for the first premise. In Scotland, for instance, the relatively high degree of climate mainstreaming can to a large extent be attributed to the Climate Change Scotland Act (Scottish Parliament, 2009) and to the Environmental Assessment Scotland Act (Scottish Parliament, 2005). In Catalonia the water sector could embrace a climate agenda and benefit from an advanced water quality monitoring system which was already largely in line with the requirements of the WFD. At the same time we find that their water managers have limited possibilities (regulatory capacity) to intervene in the largest water-consuming sector (agriculture) and land-use planning. A relatively weak capacity to regulate appears to have especially repercussions on Italy and Poland, both showing a relatively low degree of mainstreaming. In Italy this can mainly be explained by its complicated national and regional institutional set-up, characterised by complex relationships and relatively poor coordination. Poland suffers from a relatively weak capacity to regulate primarily due to limited investment in data collection and economic resources.

According to Pollack and Hafner-Burton (2010), soft incentives, of the kind that the Commission’s nonbinding guidance document provides, tend not to advance mainstreaming significantly. Our results very clearly show that, where climate mainstreaming got more attention, this cannot be attributed to the EU Guidance. Despite the fact that this Guidance is meant for water directors and those working on local implementation of the directive, it is striking that none of our interviewees was familiar with its content. In fact, the majority did not even know of its existence. This, of course, does not necessarily provide evidence for the proposition that the hard incentives work better. In actual fact, as we have seen above, especially in Catalonia, climate change is to a large degree already integrated in water management in the absence of hard national or EU incentives. We found that local policy makers and experts across the basins are divided on the question of what kind of EU role would be justified and feasible. One group believes that without hard EU incentives little will happen, while another expressed concerns that by imposing additional requirements, the EU could overplay its hand, possibly resulting in resistance and stagnation.

Our research also established evidence in support of Persson’s (2004) hypotheses. In Catalonia, Scotland, and Sweden, for instance, we found several policy developments in the water sector that coincide with a climate (adaptation) agenda and that have enhanced mainstreaming efforts. Just one of the many examples is the ambition to integrate the WFD and flood risk management through natural flood management, thereby improving both water quality and the system’s adaptive capacity. Regarding Persson’s second premise—that the greater the technological potential for win–win solutions, the greater the chance of mainstreaming success—we found somewhat mixed evidence. In Catalonia effort was made despite a lack of win–win solutions. In the other districts, however, the potential for win–win solutions in

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fact did play a role. In Scotland, for example, relatively many (potential) win–win measures were identified and a relatively high degree of climate mainstreaming achieved. In Italy, by contrast, various authorities are pushing for technical instead of natural flood protection measures, thereby accepting the risk of a worsening in water quality (win–lose); and in line with this we identified a lower degree of climate mainstreaming. We would like to emphasise, however, that the differences are marginal, and that win–win measures were sought in nearly all basins.

In this connection it is worth noting that many interviewees asked for more EU guidance and worked examples on how to integrate climate change within their plan making. Ironically, to a large degree, this kind of information is included in the ‘unknown’ Guidance. At the same time, as noted above, it became evident that attaining synergy is not always possible, making weighing of policy objectives necessary. Except for Catalonia, where we encountered little or no desire for more central guidance, we have seen that RBDs have not explicitly decided on the relative priorities. While the Guidance largely lacks advice on solving inconsistencies and setting priorities, our research suggests that this is one issue where local policy makers desire a much more active EU role. This apparent desire could raise concerns that local policy makers prefer simply to hide behind EU politics, rather than taking independent initiatives and decisions. However, the call for more guidance on weighting also comes from ‘external’ experts we interviewed, such as researchers and consultants. The literature notes that high-level policy makers often consciously leave the task of ironing out inconsistencies and dilemmas in policies to local-level actors, thought to be better placed to identify and resolve inconsistencies. While this may indeed be the case, leaving everything to be resolved at local level may not be effective either (Urwin and Jordan, 2008).

Finally, and in addition to the aforementioned explanations, our research suggests that another aspect is important in this case, which is related to the political will to act in the field of climate change. In Catalonia, for example, the fact that the *Agència Catalana de l’Aigua* was led by a representative of the Green Party, and the fact that the autonomous regions in Spain are very keen on showing their ‘added value’, both worked in favour of a high degree of mainstreaming. And according to most of our interviewees in Scotland, a latent wish to do ‘better’ than the rest of the UK cannot be neglected here as an explanatory element. This is in line with recent scholarship on ‘water transitions’ (Meijerink and Huitema, 2010) that highlights the importance of leadership in water policy change. Moreover, this factor was not only relevant in RBDs with a relatively high degree of mainstreaming. The widespread climate change scepticism in Poland, for instance, provides at least part of the explanation for its relatively low degree of mainstreaming. In Italy we found that some policy makers argue that their organisational culture is more geared to reacting to changes and disasters than to prevention, adaptation, and thus mainstreaming. In fact, just as the WFD has been accused of being a “Northern European Directive” (Kaika, 2003), these policy makers maintain that mainstreaming is a rather North European concept.

## 8 Conclusion

In this paper we have analysed how, and if so to what degree, climate adaptation considerations are mainstreamed in the implementation of the most influential pieces of European water legislation: the WFD. We have demonstrated that the degree to which climate considerations are taken onboard in different river basins displays significant variation. Regarding inclusion and consistency, we have seen wide variation between the different RBDs, ranging from the Polish Warta, where climate change impacts and contradictions are mostly ignored, to Catalonia where climate change impacts are extensively considered and most contradictions are revealed. Regarding inclusion and consistency, we found that Scotland has achieved a level of mainstreaming which is close to that of Catalonia, Sweden is somewhat in the middle,

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whereas Italy does only slightly ‘better’ than Poland. The differences between the RBMPs are much sharper regarding weighting. Only in Catalonia have relative priorities been decided—and nonclimate (mitigation) considerations given priority. Before interpreting these results further, we acknowledge that this current case-study research has some caveats and limitations. For increased validity, future research should include a larger set of respondents. Further, despite careful application of the most different system selection as to enhance the generalisability, we encourage future research to include more RBDs.

Besides the issues of how, and if so to what degree, climate adaptation considerations are mainstreamed in the implementation of the WFD, this paper also analysed which factors are at play in causing the climate mainstreaming patterns observed. We are led to the conclusion that there is a greater chance of mainstreaming being vigorously pursued when the policy context in the target sector coincides with a climate agenda (for example, if there is an existing concern regarding water scarcity, as in Catalonia), and in most cases when there is significant technological potential for win–win solutions. Hence, we established evidence in support of Persson’s (2004) hypotheses. Likewise, we found support for Hey’s (2002) suggestion that the capacity to regulate is an important prerequisite for achieving change, and that this varies across relevant sectors. The powerful agricultural sector, for example, has yet to be forced into significant change to its current water-intensive practices. We also found partial support for Pollack and Hafner-Burton’s (2010) premise that soft incentives are insufficient to stimulate much mainstreaming. Additional research is needed to establish whether hard incentives in practice really work better. Finally, we conclude that the (perceived) gravity of predicted climate change, as well as political will, hold some explanatory power.

Interestingly, we suggest that the majority of these variables are difficult, if not impossible, to influence by the EU, at least for the time being. At the same time we find that local policy makers’ call for more EU guidance on mainstreaming, especially weighting aspects, has not been heeded. In fact, we find that the Guidance ducks inconvenient aspects in general, including, to a certain extent, the impacts of climate change itself. While urging the integration of climate change into plan making, at the same time it states that climate change effects are generally not expected within the time frame of the WFD, and warns against the ‘misuse’ of climate change consideration to lower water quality ambitions. This rather defensive and in places confusing message, we suggest, originates from a long-standing suspicion among EU water policy makers that the adaptation to climate change agenda risks undermining hard-won policy gains regarding water quality in particular (Rayner and Jordan, 2010).

Nevertheless, our research suggests that it is very likely that in most member states more specific action on climate change adaptation will take place in future WFD implementation cycles. To some degree it appears that this will occur regardless of the approach taken by the Commission. After all, we have seen that in some basins climate mainstreaming has to a considerable degree already taken place in the absence of hard EU incentives or functional guidance. Besides, awareness and knowledge of both direct and indirect climate change impacts on the water quality are growing, and the search for synergies and win–win measures is intensifying. Hence, we support the view expressed in recent research for the Commission that the real challenge for the EU will be to bring along the foot-draggers (Deloitte and IEEP, 2011). In contrast to the front-runners, progress here will likely depend on the extent to which the EU manages to give the right incentives and guidance at the right time. We feel that only by providing these will the EU approach to mainstreaming be worthy of the EU’s self-proclaimed status as an international agenda setter in climate policy.

**Acknowledgements.** We are grateful to Anna Dubel for her kind help in Poland. In addition, we would like to thank all those who agreed to be interviewed about the WFD and adaptation to climate change. The research has been financed by the European Commission (the PF7 RESPONSES project, Grant Agreement number 244092).

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## Appendix A

**Table A1.** List of interviewees.

Italy	Francesco Puma	Competent Authority of the Po River Basin	25 October 2010
	Professor Tibaldi	ARPA Bologna (regional environmental agency)	26 October 2010
	Professor Michele Zazzi	Parma University / Gruppo 183	26 October 2010
	Luigi Fortunato	The Interregional Agency for the Po River	27 October 2010
	Andrea Agapito Ludovici	WWF	28 October 2010
	Raffaele Tiscar	Finlombarda - Milano	28 October 2010
	Roberto Serra	Arpa Lombardia (regional environmental agency)	29 October 2010
UK, Scotland	Marc Stutter	Macaulay Land Use Research Institute	9 November 2010
	Sarah Hendry	UNESCO Centre for Water Law, Policy and Science, University of Dundee	9 November 2010
	Janet Moxley, Becc Walter	Scottish Environment Protection Agency	10 November 2010
	Joyce Carr	Scottish Executive	12 November 2010
	Lisa Webb	The Royal Society for the Protection of Birds	12 November 2010
Sweden	Bo Rutberg	Swedish Association of Local Authorities and Regions / Sveriges Kommuner och Landsting	22 November 2010
	Lennart Sorby	Competent Authority of the North Baltic River Basin District	23 November 2010
	Måns Enander	County Administrative Board Västmanlands län	23 November 2010
	David Liderfelt	Västerås municipality	23 November 2010
	Peder Eriksson	County Administrative Board Örebro län	24 November 2010
	Krister Törneke, Lena Tilly	Tyrens Consultancy	25 November 2010
	Anette Björlin, Charlotta Sundelin	Country Administrative Board, Stockholm	25 November 2010
	Niclas Hjerdt, Weine Josefsson, Berit Arheimer	Swedish Meteorological and Hydrological Institute	26 November 2010
Poland	Professor Kundzewicz, Professor Kedziora, Professor Kedziora	Institute for Agricultural and Forest Environment (Poznan)	8 December 2010
	Krzysztof Wiśniewski	Powiat Poznan	9 December 2010
	Waldemar Paternoga, Dariusz Dymek	Wielkopolska Voivodship Office	9 December 2010
	Marek Gromiec	Warsaw University of Ecology and Management / Polish National Council for Water Management	10 December 2010
Spain, Catalonia	David Sàez Aragay	URS Environmental Consultants Spain, Barcelona office	13 December 2010
	Marc Parés	Universitat Autònoma de Barcelona	14 December 2010
	Toni Munné	Agència Catalana de l'Aigua	14 December 2010
	Lluís Gode, Alex Gracia	Agència Catalana de l'Aigua	15 December 2010
	Gabriel Borràs	Agència Catalana de l'Aigua	15 December 2010
	Andreu Manzano, Jordi Molist	Agència Catalana de l'Aigua	15 December 2010

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**Appendix B****Set of sample questions**

- (1) Apart from the 'how and when question', is it in your opinion desirable to connect climate change with the WFD?
- (2) Has it been assessed what implications climate change might have for the realisation of the aims of the WFD in this basin (general assessment)?
- (3) Have possible contradictions between the goals and current programme of measures and the aims related to climate change adaptation also been assessed?
- (4) Looking at this table with different levels of climate change integration (climate change is considered but consciously disregarded; impacts of climate change on measures and/or impacts of measures on climate change adaptation goals are unknown; ad hoc search for climate proof measures; systematic search for climate proof measures; all measures climate proof and contradictions are removed; all measures climate proof and systematic search for win-win measures; full integration: WFD goals and climate change adaptation goals are treated equally), at what level would you locate this river basin?
  - (a) Why is the level not higher or lower?
  - (b) To what extent are you satisfied with the level of climate change integration in the current RBMP?
- (5) In principle, do you see opportunities to (further) integrate climate change adaptation in future RBMPs, leaving aside possible practical and political constraints?
- (6) Which, if any, opportunities do you see for the integration of climate change adaptation in future flood risk management plans, leaving aside possible practical and political constraints?
- (7) Are you familiar with the guidance document of the European Commission on river basin management in a changing climate, and, if so, to what extent do you consider this document helpful?