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**Adapting water governance to European Water Framework
Directive: implications for river basin planning, public
participation and irrigation management**

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**Adeguare la governance dell'acqua alla Direttiva Quadro sulle
Acque: conseguenze per la pianificazione di bacino, la
partecipazione pubblica e la gestione delle acque irrigue**

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“Ricordati, quando commenti l’acqua, d’allegar prima la esperienza e poi la ragione”

Leonardo da Vinci

“Se il punto in cui ti immergi in un fiume è il presente, pensai, allora il passato è l’acqua che ti ha superato, quella che va verso il basso e dove non c’è più niente per te, mentre il futuro è l’acqua che scende dall’alto, portando pericoli e sorprese. Il passato è a valle, il futuro a monte.”

Paolo Cognetti, Le otto montagne

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Abbreviations and acronyms

AIB	Association for Irrigation Board
CIS	Common Implementation Strategy
CPBs	Coordination and Participation Boards
DPSIR	Driver, Pressure, State, Impact, Response
ERC	Environmental and Resource Costs
IB	Irrigation Board
IMD	Irrigation Management Department
IWRM	Integrated Water Resources Management
MLG	Multi-level governance
OCA	Official Competent Authorities
PGUAP	Piano Generale di Utilizzazione delle Acque Pubbliche
PoMs	Programme of Measures
RBD	River Basin District
RBDAs	River Basin District Authorities
RBMP	River Basin Management Plan
RBO	River Basin Organisation
WDF	Water Framework Directive
WPD	Water Protection Department

Summary

Greater protection and more sustainable use of water resources are priorities of public policies at international and European level.

The Water Framework Directive (2000/60/EC, WFD), indeed, establishes a common framework for European water policies based on a substantial transformation in the governance of water resources. In particular, the Directive requires Member States to divide their national territories into River Basin Districts for which specific plans, called River Basin Management Plans, must be developed and implemented. Furthermore, the Directive requires civil society to be actively involved in the elaboration of River Basin Management Plans.

Almost twenty years after its entry into force, however, the implementation of river basin planning and public participation is limited, and institutional and territorial fragmentation are still key challenges for water governance systems throughout Europe. Moreover, scientific literature is sparse on how implementation of WFD is conducted for the whole River Basin District.

This thesis, therefore, aims to contribute to the understanding of how national governance systems are evolving to meet the requirements of river basin planning and public participation in order to identify what elements are more significant for promoting coordinated and inclusive planning at river basin. In doing so, a specific focus is on how implementation is conducted in Italy.

More in detail, this thesis aims to fulfil three specific objectives. The first aims to identify, analyse and compare the different approaches adopted in European countries to comply with the WFD requirements of river basin planning and participation through a qualitative meta-analysis of scientific literature. The analysis focuses on seven Member States representing different approaches to WFD's implementation: Denmark, England, Germany, Italy, France, Spain and Sweden. The second objective concerns the analysis of the entire process of implementation, from planning to on-the-ground implementation, using the River Basin District as scale of analysis. This second objective was achieved through a case study carried out in the Italian Eastern Alps River Basin District where the overall implementation process, from planning to implementation of measures to increase irrigation efficiency, was analysed.

Finally, the third objective aims at providing policy recommendations for the future implementation cycle of WFD in Italy and more specifically in the Eastern Alps River Basin District.

The results show that the implementation of WFD has indeed promoted greater coordination and participation in decision-making processes in many Member States, but that this has mainly occurred at sub-River Basin District scale. For instance, advisory boards have been set up at sub-district level (e.g. at river basin or local level) to promote greater coordination and participation in decision-making processes.

In the Eastern Alps RBD, it was found that while cross-administrative coordination can be effectively achieved for the whole RBD through specific coordination mechanisms established by the River Basin District authority, stakeholders' engagement in the elaboration of plans was limited. It is at regional level where, indeed, public participation should find more appropriate spaces and greater integration between water protection and irrigation management should be achieved.

The thesis has therefore highlighted the need for the process of adaptation of water governance systems to take place on different government levels that should act synergistically to produce significant results. At national level, where obstacles that prevent a better coordination should be overcome, at River Basin District, where inter-regional coordination should be strengthened, and at regional level, where greater integration between water protection and management and greater public participation should be promoted.

Sommario

Una maggiore tutela e un uso più sostenibile delle risorse idriche sono una priorità inderogabile dell'agenda pubblica a livello internazionale ed europeo.

La Direttiva Quadro sulle Acque (2000/60/CE, DQA), infatti, stabilisce un quadro comune di azione per le politiche idriche europee, fondato su una sostanziale trasformazione della *governance* delle risorse idriche. In particolare, la Direttiva richiede agli stati membri di suddividere i territori nazionali in distretti idrografici e, per ciascuno di essi, di sviluppare e attuare specifici piani, chiamati Piani di Gestione. Inoltre, la Direttiva richiede che la società civile in generale, e in maggior misura i portatori di interesse, vengano attivamente coinvolti nell'elaborazione dei Piani di Gestione.

A quasi venti anni dall'entrata in vigore della DQA, tuttavia, l'attuazione di tali requisiti sembra essere ancora limitata. Allo stesso tempo, il governo delle acque sembra ancora risentire di una profonda frammentazione istituzionale e territoriale. Inoltre, la letteratura scientifica risulta tuttora carente per quanto riguarda l'analisi dei meccanismi di pianificazione e partecipazione pubblica all'interno dei distretti idrografici.

Questa tesi si propone di contribuire allo studio dell'evoluzione dei sistemi nazionali di *governance* per rispondere agli obblighi di pianificazione su scala di bacino idrografico e di partecipazione pubblica posti dall'Europa, al fine di individuare quali sono gli elementi più significativi per promuovere una pianificazione coordinata e inclusiva dei bacini idrografici. Nel fare ciò, un'attenzione specifica è rivolta a come viene condotta l'attuazione in Italia.

Nel dettaglio, la presente tesi si pone tre obiettivi specifici. Il primo consiste nell'identificare, analizzare e confrontare i diversi approcci adottati nei paesi europei per l'attuazione dei requisiti di pianificazione di bacino e partecipazione. Tale obiettivo è stato realizzato attraverso una meta-analisi qualitativa della letteratura scientifica. In particolare, l'analisi si è soffermata su sette stati membri rappresentativi di diversi approcci per l'attuazione della Direttiva: Danimarca, Inghilterra, Germania, Italia, Francia, Spagna e Svezia.

Il secondo obiettivo riguarda l'analisi dell'intera attuazione della DQA su scala di distretto idrografico. Il presente scopo è stato perseguito attraverso un caso studio condotto in Italia, nel distretto idrografico Alpi Orientali, dove l'intero processo di attuazione è stato analizzato, dalla pianificazione all'implementazione delle misure per aumentare l'efficienza irrigua.

Infine, il terzo obiettivo mira a fornire delle raccomandazioni politiche per l'attuazione della Direttiva in Italia e, più nello specifico, nel distretto idrografico Alpi Orientali.

I risultati mostrano che l'attuazione della DQA ha effettivamente promosso un maggior coordinamento e una crescente partecipazione nei processi decisionali in molti stati membri. Ma evidenziano anche che ciò ha raramente riguardato l'intero territorio del distretto idrografico. In molti dei paesi analizzati, infatti, sono stati creati comitati consultivi a livello sotto-distrettuale (ad es. a livello di bacino idrografico o locale), per promuovere un maggiore coordinamento e coinvolgimento degli attori nei processi decisionali.

Nello studio condotto nel distretto idrografico Alpi Orientali, è stato rilevato che, mentre il coordinamento amministrativo può essere realizzato efficacemente attraverso specifici meccanismi di coordinamento stabiliti dall'autorità distrettuale, la partecipazione pubblica ha una maggiore risonanza se condotta a livello regionale.

La tesi ha quindi evidenziato la necessità che il processo di adeguamento della *governance* delle risorse idriche avvenga su più livelli che devono agire sinergicamente per produrre risultati significativi. A livello nazionale, dove gli ostacoli che impediscono un migliore coordinamento su scala distrettuale devono essere superati, a livello di distretto idrografico, dove il coordinamento inter-regionale deve essere rafforzato, e a livello regionale, dove una maggiore integrazione tra tutela e gestione delle risorse idriche e una maggiore partecipazione pubblica devono essere promosse.

1. Introduction

Nowadays, climate change, population growth and changing life and diet patterns all pose serious risks to the quality and quantity of water resources worldwide. Water crises are no longer a concern for developing countries alone, but also developed ones, even those with an abundance of water resources (Gleick, 2000). In Europe, water resources are definitely under pressure: more than half of surface water bodies have a less than good ecological status, and approximately 25% of groundwater is reported to have a poor chemical status (EEA, 2012). Moreover, droughts and areas prone to water scarcity are dramatically increasing, especially in Mediterranean countries (EEA, 2012). To tackle these overwhelming threats, a new generation of water policies has gained momentum since the beginning of the twenty-first century, based on a radically different approach to water resources protection, management and use. Many policies have taken inspiration from a new paradigm called integrated water resources management (IWRM) that is defined as a “process which promotes the co-ordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems” (GWP TAC, 2000). Central to achieving this integrated management is the so-called river basin approach that identifies the river basin¹, or catchment, as the optimal unit around which to organize the multiple uses and activities related to water. Moreover, IWRM suggests a greater involvement of the private sector in water resources management, the adoption of economic policy instruments and tools (e.g., water pricing and cost-benefit analysis), and a greater civil society’s engagement in decision-making processes related to water (GWP TAC, 2000).

In Europe, the Water Framework Directive (2000/60/CE, WFD hereafter) embodied this paradigm shift in water resources management and protection. The WFD came

¹ “River basins are the geographic area contained within the watershed limits of a system of streams and rivers converging toward the same terminus, generally the sea or sometimes an inland water body. Tributary sub-basins or basins more limited in size (typically from tens of square kilometers to 1000 square kilometers) are often called watersheds (in American English), while catchment is frequently used in British English as a synonym for river basins, watershed being more narrowly defined as the line separating two river basins” (Molle, 2009)

into force in 2000, “establishing a common framework for Community action in the field of water policy” (WFD’s preamble) with the ambitious objectives of achieving a good status of all water bodies in Europe by 2015. The WFD belongs to a new generation of environmental legislation that addresses environmental problems mostly through procedural obligations that Member States must comply with, rather than setting specific standards or limits to be respected (i.e., command and control instruments) (Kessen et al., 2010).

Among these procedural obligations, two are particularly significant for water resources management: the requirement for river basin planning and that of public participation.

The WFD, indeed, requires Member States to divide their national territories into River Basin Districts (RBDs), which become the units of implementation of the WFD and for which specific River Basin Management Plans (RBMPs) must be developed. A RBD is “the area of land and sea, made up of one or more neighbouring river basins together with their associated groundwaters and coastal waters, which is identified [...] as the main unit for management of river basins” (Article 2, WFD). Moreover, Member States are required to identify the competent authorities to ensure that coordinated implementation of the WFD is realized throughout the RBD.

The second procedural obligation concerns public participation: Member States should ensure that the public is adequately informed on the contents of RBMPs and that stakeholders are consulted during the decision-making processes. Moreover, Member States should encourage the active involvement of all interested parties in the development of RBMPs (Article 14, WFD).

Recognizing that diverse conditions and needs exist, flexibility is provided to EU countries in adapting their national water governance systems to the requirements of river basin planning and participation. For instance, the WFD neither prescribes that new river basin authorities are created, nor that a specific government level (i.e., central, regional or local) becomes responsible for implementation. Moreover, river basin planning and participation should be adapted to local contexts, for instance, in some cases the planning could be based on a smaller scale than the RBD, if the natural or social characteristics require that (European Commission, 2003a).

However, the WFD is less flexible on the effects that the river basin approach should produce on decision-making. In many EU countries, water resources planning has traditionally followed administrative boundaries causing piecemeal management with a limited consideration of the natural characteristics of the water ecosystem (Whalley, 2012). Fulfilling the requirement of river basin planning means improving the capacity of social institutions to match themselves with the natural and social domains they influence (Moss, 2012). To do so, coordinated implementation of the Directive for the whole of the RBD is explicitly required by the European Commission (Article 3, WFD) which implies a great effort by the competent authorities to overcome institutional fragmentation that often affects water governance systems worldwide (OECD, 2011). Moreover, river basin planning implies considering the effects that the different water-use sectors have on water resources and to make the different sectors contribute to the achievement of the environmental objectives of WFD (Whalley, 2012). Finally, public participation should contribute to: increase the transparency of the decision-making processes, enhance the quality of the plans through the inclusion of local and scientific knowledge, create awareness of environmental issues and increase acceptance and commitment towards RBMPs (European Commission, 2003b). Consequently, the assumption of the European Commission is that compliance with the procedural requirements of river basin planning and participation should produce significant changes on the decision-making processes related to water and, in turn, contribute to achievement of the WFD objectives (Jager et al., 2016).

Looking at how the procedural obligations are being implemented across EU countries, one of the most comprehensive studies is that conducted by Jager et al. (2016), which analysed the implementation of WFD in 13 Member States. The authors found that, despite all countries having complied with the obligations, only in one case (i.e., Sweden) has the implementation actually produced significant change in the national water governance structures. In all other cases, compliance was only on formal aspects, while “established routines of environmental decision-making” were kept (Jager et al., 2016). Concerning public participation, instead, the authors found numerous initiatives of active civil society involvement across EU countries. However, the authors argued that the greater involvement of civil society could be related to the

broader shift from government to governance that many countries were undergoing, rather than being caused by the WFD itself (Jager et al., 2016). These findings highlight that there are two dimensions in implementation of the WFD: the first can be defined as *formal implementation* and refers to the Member States' compliance with procedural obligations of the WFD, the second is *substantial implementation*, which means that the expected changes in decision-making processes have been made.

In terms of scientific debate, the study of the new governance introduced by the WFD is a prolific research field. Boeuf and Fritsch (2016) conducted a meta-analysis of all the articles dealing with institutional novelties introduced by the WFD, finding that "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". Despite this wealth of publications, the authors also found that significant areas of research are still unexplored: (i) Mediterranean countries are much less studied than northern European countries; (ii) lack of cross-countries analysis or comparison among groups of countries with similar characteristics; (iii) while most studies focus on public participation, little is known about river basin planning and management at hydrological scale; (iv) most studies focus on the first phase of WFD implementation, namely from 2000 to 2010, but there is a lack of knowledge on the on-going implementation process; (v) most studies either focus on the national level or sub-RBD level, while few address how WFD is implemented for the whole RBD.

Moving to Italy, implementation of the governance aspects of WFD is a research field considerably less studied compared to many other EU countries. The few studies available clearly describe the complex institutional settings in which WFD implementation took place, characterized by a limited implementation of previous legislation on river basin management and significant conflicts between the central government and regions for the attribution of competences (Alberton and Domorenok, 2011; Domorenok, 2017; Rainaldi, 2010, 2009). However, these studies either consist of an overview of the implementation process at national level (Domorenok, 2017), or were conducted at RBD level but at the very beginning of WFD implementation (Alberton and Domorenok, 2011; Rainaldi, 2010, 2009), with the result that no updated

study exists that explores the on-going implementation process at RBD scale. Second, these studies mainly focus on the fragmentation and conflicts that occur between the central government and regions, but other areas of research are much less explored. For instance, there is limited knowledge regarding the extent to which and how stakeholders take part in the decision-making process for WFD implementation. Similarly, little is known on how the planning processes of other relevant sectors (e.g. agriculture) contribute to achievement of the WFD objective.

Ultimately, the review of international and Italian studies highlights the need to further explore the RBD as scale of analysis for WFD implementation. Indeed, despite the flexibility provided to Member States, the European Commission stresses the importance of having the RBD as reference unit for the implementation and explicitly requires coordinated implementation at this geographical scale (European Commission, 2003c). Moreover, for Italy, studying WFD implementation at RBD scale is even more compelling than in other countries because the Legislative Decree 152/2006, which transposed the WFD into the Italian legislation, established specific competent authorities at this level and provided them with responsibilities for the development of RBMPs by promoting coordination among the regional administrations of the RBD.

Having considered the problems related to implementation of the procedural requirements of WFD emerged by previous studies and the need to further explore this topic in Italy, the general objective of this PhD thesis is to contribute to the understanding of how national governance systems are evolving to meet the requirements of river basin planning and public participation in order to identify what elements are more significant for promoting coordinated and inclusive planning at river basin.

Given the general objective, the following research questions were formulated:

1. What are the strategies adopted in EU countries to comply with the WFD requirements of river basin planning and participation? And, what are their implications for decision-making processes?

2. How are decision-making processes structured for the whole RBD in Italy? And how is coordinated and inclusive decision-making promoted in such a large river basin?

To answer these questions, the specific objectives of the PhD thesis are:

1. To identify, analyse and compare the different approaches used in EU countries to comply with the WFD requirements for river basin planning and participation by reviewing the literature on the topic.
2. To unfold the entire process of WFD implementation in Italy, from planning to on-the-ground implementation, using the RBD as scale of analysis.
3. To use the results to provide information to policy-makers, especially those of the Eastern Alps RBD where a case study was conducted, on how coordination and participation can be improved in a large-scale river basin.

By fulfilling these objectives and answering these questions, this thesis will contribute to fill some of the gaps identified by Boeuf and Fritsch (2016). More in details, the focus on Italy will contribute to broaden the knowledge with regard to Mediterranean countries; moreover, attention will be paid to how river basin planning is organized for the whole RBD, a scale considerably less explored by research. Finally, identifying the key elements of this process of water governance adaptation is crucial to shed lights on the substantial dimension of WFD implementation, which means that the expected changes in decision-making processes, towards more coordination and inclusion, have been made.

Prior to answering the research questions, Chapter 2 of the thesis describes the WFD in more detail. The reasons that led to elaboration of the WFD and the innovations that the Directive introduced into European water policy are analysed. Moreover, the relations among the procedural obligations, the degree of flexibility provided to EU countries, and the expected changes in national governance systems are explained.

Chapter 3 specifically concerns Italy. This chapter provides an analysis of Italian water policies and governance before and after implementation of the WFD. Particular attention is placed on the evolution of the river basin approach and the problems that emerged in terms of responsibilities reallocation for river basin planning.

Chapter 4 describes the general methodological approach adopted in this thesis. A first part of the chapter covers the background theories that guided the analyses and interpretation of the results. We referred to three relevant theories: spatial fit, coordination in public management, and public participation in natural resources management. The second part of the chapter is, instead, focused on the methodology adopted to answer the specific research questions. The methodology consists of a qualitative meta-analysis of the studies concerning WFD implementation, and a case study conducted through semi-structured interviews, closed-ended questions and analysis of policy documents to explore implementation of the WFD in a selected Italian RBD. For the qualitative meta-analysis, the three background theories were used to build a conceptual framework to understand the patterns of WFD implementation in some European countries, while in the case study the theories were at the basis of the development of the text of the semi-structured interviews and analysis and interpretation of the results.

The qualitative meta-analysis is presented in Chapter 5 where a published paper is reported. Aiming to answer the first research question and specific objective, this paper compared groups of countries that are representative of different approaches used for WFD implementation. Studies in the following countries were analysed: Denmark, England and Wales (centralized approach), Germany (decentralized - federal approach), Italy, France and Spain (decentralized - traditional river basin approach), Sweden (decentralized - adaptive river basin approach).

The second research question, along with the second specific objective, are addressed in the second published paper that is presented in Chapter 6. The results of the first paper confirmed the lack of studies addressing the topic of WFD implementation at RBD scale. The aim of the second paper was, indeed, to understand: (i) how coordination among the different administrative levels of the RBD is achieved during the planning phase; (ii) the effects of WFD at local level, which means how plans are translated into concrete actions at local level, and how stakeholders' interests are considered in the elaboration of RBMPs. Since the RBD is a large unit of analysis, typically composed of several river basins and regional administrations, the focus was placed on a single RBD, namely the Eastern Alps RBD. Moreover, studying

implementation of WFD in all sectors (i.e., industrial, households, agriculture) would not have allowed us to acquire an in-depth understanding of the impacts of WFD on the local level; for this reason, the focus was on a specific sector, i.e., the irrigation sector and on measures to improve irrigation efficiency. The paper is based on the analysis of policy documents, twenty-one semi-structured interviews with and closed-ended questions to representatives of the River Basin District Authority, the regional departments for water protection and irrigation management, the regional associations of irrigation boards and the land reclamation and irrigation boards.

Finally, Chapter 7 provides the discussion of the main results of the thesis that is organized in three sub-sections: (i) lessons to be learnt from the EU countries' analysis, (ii) lessons to be learnt from the case-study, (iii) policy recommendations.

Finally, the general conclusions of the thesis are drawn in Chapter 8 where limitations and further research needs are also indicated.

2. The Water Framework Directive

2.1. Trends in water policy: the evolution of water legislation in Europe

The WFD is considered a very innovative legislation both by practitioners and researchers because it marks a significant break with the pre-existing European water legislation. The latter is commonly divided in three waves. The first wave of water legislation started in 1975, with the Surface Water Directive (1975) and Drinking Water Directive (1980), which laid down a regulatory framework for environmental quality standards for surface and drinking water resources. Successively, a second wave of Directives added the control of emission limit values as the means to achieve desired quality standards² (Kaika, 2003). The first waves of water legislation were therefore based on command-and-control instruments, and the decision-making arrangements that supported implementation were organized around two government levels: the States and Community. Although this approach produced significant improvements in the quality of water resources, it failed to consider the complexity of ecosystems characterised by trade-offs and interactions at any scale (Voulvoulis et al., 2017). Overall across Europe, “command-and-control” approaches for environmental policies increasingly came under scrutiny and were replaced by the adoption of economic instruments and more “context-oriented” forms of governance (Holzinger et al., 2006).

The WFD was issued in this context, and it constituted the third wave of European water legislation. Elaboration of the WFD started in 1995 with the aim, on one hand, to overcome the fragmented legislative scenario created by the slew of Water Directives since 1975, on the other, to create a Directive more respondent to the rapid changes that were occurring in the economic and social contexts (Kaika, 2003). Regarding the first purpose, the WFD combined the two preceding approaches of water quality standards and emission limit values, providing a common framework for water policy in the European Union. The second purpose, instead, refers to the changes that have concerned many Western countries since the 1980s, and that can be denominated as a “shift from government to governance” (Huitema and Meijerink, 2017). This transition

² The second wave is composed of Urban Waste Water Management Directive (1991); Nitrates Directive (1991); New Drinking Water Directive (1991); Directive for Integrated Pollution and Prevention Control (1996).

was characterized by the dispersal of authority from the nation states to multiple centres of power and was the result of different, sometimes opposite, ideological positions. In the field of water policy, we can identify at least four different ideologies with the relative shift of power relationships. The first relates to the neoliberal paradigm, which gained currency in the 1970s and emphasized the role of the market to replace government failures. This new paradigm, on one hand, opened the way for the application of economic instruments to incentivize the optimal allocation of natural resources (Holzinger et al., 2006), on the other, it introduced new actors and institutions, such as the markets and the private sector, in the field of water resources management (Huitema and Meijerink, 2017; Kaika, 2003). As second ideology, the engagement of civil society in the management and organization of the public domain became mainstream, opening the way to a number of non-state actors in the decision-making processes. The third power shift concerned, on one hand, an up-scale process (i.e., Europeanization) where the decision-making processes at national level become more and more influenced by the EU level, on the other, a down-scale process due to the subsidiarity principle introduced by the Treaty of Maastricht in 1992 that defined the EU-States areas of competence (Piattoni, 2010). The fourth element was the dispersal of authority to new government layers, often created as independent and functional jurisdictions to fulfil specific functions (Hooghe and Marks, 2001). In the field of water resources management, this aspect was translated into the so-called river basin approach with the consequent introduction of functional jurisdictions for river basin management, often called river basin organizations or authorities (Huitema and Meijerink, 2017).

It is worth mentioning that, at international level, a new paradigm for water resources management has gained momentum since the beginning of the twenty-first century: Integrated Water Resources Management (IWRM). The IWRM was fully embedded in this process of shift from government to governance, because it suggested: greater involvement of the private sector in water management, the use of water pricing mechanisms, the involvement of civil societies in the decision-making processes, and the river basin as optimal configuration for water resources management (GWP TAC, 2000; Jønch-Clausen and Fugl, 2001).

These ideologies, and the relative shift of power relations, are all present in the WFD. For instance, for the first time in EU environmental policy, the Directive integrates economic principles and instruments into water management. Although the Directive recognises that “water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such” (WFD’s preamble), it also acknowledges that water is an economic good and should be managed using economic expertise and tools. The economic elements are scattered in the Directive’s text, but two requirements are particularly significant for water resources management: first, EU countries are required to conduct economic analyses for many steps of the implementation to support the decision-making processes and take into account the costs and benefits related to every water use (Article 5, WFD), and second, Member States have to establish water pricing policies that guarantee an efficient and sustainable use of water resources (Article 9, WFD) (WATECO, 2003).

Moreover, the Directive explicitly requires the engagement of civil society during the decision-making processes (European Commission, 2003b). Public participation is fundamental to increase the quality of information required to develop the RBMPs. Moreover, if public participation is able to include all the relevant stakeholders, then it should also ensure enforceability of the plan (European Commission, 2003b).

In addition, the Directive promoted transnational decision-making processes: in order to address the challenges of implementation in a co-operative and coordinated way, the Member States, Norway and the Commission agreed to set up a common strategy for implementing the WFD. As a result, the Common Implementation Strategy (CIS) working groups were created to support the sharing of information and the development of guidelines to ensure coherence in the implementation across countries. At the same time, the Directive was based on the subsidiarity principle and recognized that “Decisions should be taken as close as possible to the locations where water is affected or used” (WFD’s preamble).

Lastly, in contrast with the preceding water legislation, the WFD establishes a systemic approach to water resources management based on hydrological boundaries. In fact, the WFD looks at the environment as a system and considers management of water and the surrounding environment as indivisible (Savenije and van der Zaag,

2002). For these reasons, the Directive establishes the RBD as the management unit able to capture all the natural and human interactions characterizing a catchment.

As shown in this section, the governance requirements of the WFD are fully embedded in a broader process of change that has concerned many aspects of Western societies. Table 1 shows the links among global governance trends and the governance introduced by the WFD.

The next section provides a more detailed description of the objectives and procedural requirements of WFD.

Table 1. The link between global governance trends and governance to implement WFD

GOVERNANCE From nation states to...	GOVERNANCE TO IMPLEMENT WFD
Markets (economic instruments, private sector)	The economic value of water must be recognized through economic analyses (Article 5) and water pricing policies (Article 9)
Civil society	Public participation in the development of RBMPs
Higher government level (European Union)/ Lower government level (decentralization)	Common Implementation Strategy across EU countries/ Subsidiarity principle
Functional jurisdictions (river basin organizations)	Integrated water management, based on river basin districts as management unit, not on political, administrative and national boundaries

Source: authors' own elaboration

2.2. Objectives and processes under the WFD

The WFD is one of the most ambitious environmental legislations in Europe because it challenges Member States regarding both the objectives to be achieved and the overall implementation process. Regarding the objectives, "Member States shall protect, enhance and restore" all water bodies with the aim of achieving good water status at the latest 15 years after the date of entry into force of this Directive (Article 4, WFD). This objective applies to all water bodies, i.e., surface water, groundwater and protected areas. However, the WFD foresees the possibility to apply extensions to the deadline for achievement of the good status objective. In this case, Member States

must prove that more time is needed for achievement of the good status objective due to technical, economic or natural reasons (Article 4.4, WFD). Moreover, EU countries can apply exceptions to achievement of the good status objective when the changes needed to improve the state of water bodies would cause adverse effects on the environment itself or on surrounding economic or social activities (Article 4.3, WFD). The deadlines prescribed by the Directive are relatively strict: as explained, the good status should have been achieved by 2015 for all water bodies where no extensions or exceptions were applied. After the first deadline, the WFD foresees two other cycles of implementation of six years each, going from 2015 to 2021 and from 2021 to 2027. Table 2 represents the timetable that should guide implementation.

Table 2. Timetable for WFD implementation

Issue	WFD References	Year
Directive entered into force	Art. 25	2000
Adoption in national legislation	Art. 23	2003
Identification of River Basin Districts and Authorities	Art.3	2003
Characterisation of river basin: pressure, impact analysis	Art. 5	2004
Establishment of monitoring network	Art. 8	2006
Start of public consultation (at the latest)	Art. 14	2006
Present draft of River Basin Management plan	Art. 13	2008
Finalise River Basin Management plan including Programme of Measures	Art. 13 & 11	2009
Pricing policies adoption	Art. 9	2010
Make operational Programme of Measures	Art. 11	2012
Meet environmental objectives; First management cycle ends; Second river basin management plan & first flood risk management plan	Art. 4	2015
Second management cycle ends	Art. 4 & 13	2021
Third management cycle ends; Final deadline to meet environmental objectives	Art. 4 & 13	2027

Source: adapted from https://ec.europa.eu/environment/water/water-framework/info/timetable_en.htm

On the left of the table is the list of obligations for the process of implementation that can be summarized in the following steps:

- The transposition into national legislation and identification of RBDs and Authorities. The WFD does not explicitly require setting up new authorities for the implementation, nor does it prescribe the width of the RBD provided that

the hydrological cycle is considered. The only prescription is that “Member States shall ensure [...] the identification of the appropriate competent authority, for the application of the rules of this Directive within each river basin district lying within their territory” (Article 3).

- Characterisation of river basin: pressure, impacts and economic analysis. This basically means that Member States should “set the scene” of each RBD by means of two analyses: a review of the impact of human activities on water resources, and an economic analysis of water uses. For the first type of analysis, the European Commission encourages use of the Driver, Pressure, State, Impact, Response (DPSIR) analytical framework, placing emphasis on the identification of all significant pressures that can hinder the achievement of environmental objectives (European Commission, 2003d). The economic analysis is needed to acquire adequate information to evaluate the economic value of water uses and assess the level of cost recovery of water services (WATECO, 2003).
- Establishment of monitoring network and start of public consultation. These are two cross-cutting activities needed throughout the implementation process. For instance, monitoring programmes are necessary both in the stage of status assessment and at the end of each implementation cycle for the evaluation of the improvements (if any) in the state of water bodies. Likewise, participatory processes may help to identify the driving forces and pressures on water resources, the most cost-effective measures (this aspect is explained in the next point), and to improve acceptability and implementation. Three forms of public participation are mentioned in the Directive: information supply, stakeholders’ consultation and active involvement of interested parties. The first refers to the obligation of informing the public in an understandable and easy way; moreover, competent authorities should allow the public access to the background documents and information used for the development of the RBMPs. Stakeholders’ consultation is the means to improve RBMPs quality by “learning from comments, perceptions, experiences and ideas of stakeholders” (European Commission, 2003b). Unlike the active involvement, consultation is

conducted once the draft of the plans has already been elaborated by the competent authorities. Active involvement, instead, implies that stakeholders actively contribute to the elaboration of the plans in ways that are more suitable for the context in which participatory processes take place. According to the WFD, while the information supply and stakeholders' consultation shall be ensured, active involvement should be encouraged (Article 14, WFD).

- River Basin Management Plans and Programme of Measures. For each RBD, a RBMP has to be elaborated (Article 13, WFD). The RBMP is the informative, legal, technical and operative document containing all the analyses and actions conducted by the competent authorities to achieve good water status in the RBD. Basically, RBMPs are the outcomes of the entire planning process that is composed of three main steps (European Commission, 2003a). The first step, as said, is the assessment of the current situation, through the pressures and impacts analysis and monitoring programmes. Once the state of water bodies has been assessed, the second step consists of deciding what environmental objective can be achieved for each water body. As already explained, the default objective of the Directive is to reach good water status but, where this is not possible, justified extensions or exceptions can be applied. The last step consists of identifying what actions can be undertaken to reach the environmental objectives established on water bodies (European Commission, 2015a). These actions are called measures and are contained in a specific document called Programme of Measures (PoMs). There are two kinds of measures: the basic measures that are defined as “the minimum requirements to be complied with” (Article 11.3, WFD), and the supplementary measures that can be designed and implemented in addition to the basic measures when these are not sufficient to achieve the good status objective (Article 11.4). For supplementary measures, the WFD provides a non-exclusive list, but Member States can adopt further measures if needed. Table 3 summarizes the list of basic and supplementary measures.

Table 3. The basic and supplementary measures of the WFD

BASIC MEASURES	SUPPLEMENTARY MEASURES
11.3.a Measures required to implement Community legislation preceding the WFD	(i) legislative instruments
11.3.b Measures for the recovery of cost of water services (Article 9)	(ii) administrative instruments
11.3.c Measures to promote efficient and sustainable water use	(iii) economic or fiscal instruments
11.3.d Measures for the protection of water abstracted for drinking water (Article 7)	(iv) negotiated environmental agreements
11.3.e Controls over the abstraction of fresh surface water and groundwater and impoundment of fresh surface waters	(v) emission controls
11.3.f Controls, including a requirement for prior authorisation of artificial recharge or augmentation of groundwater bodies	(vi) codes of good practice
11.3.g Requirement for prior regulation of point source discharges liable to cause pollution	(vii) recreation and restoration of wetland areas
11.3.h Measures to prevent or control the input of pollutants from diffuse sources liable to cause pollution	(viii) abstraction controls
11.3.i Measures to control any other significant adverse impact on the status of water, and in particular hydromorphological impacts	(ix) demand management measures, <i>inter alia</i> , promotion of adapted agricultural production such as low water requiring crops in areas affected by drought
11.3.j Prohibition of direct discharge of pollutants into groundwater	(x) efficiency and reuse measures, <i>inter alia</i> , promotion of water-efficient technologies in industry and water-saving irrigation techniques
11.3.k Measures to eliminate pollution of surface waters by priority substances	(xi) construction projects
11.3.l Any measures required to prevent significant losses of pollutants from technical installations and to prevent and/or reduce the impact of accidental pollution incidents	(xii) desalination plants
	(xiii) rehabilitation projects
	(xiv) artificial recharge of aquifers
	(xv) educational projects
	(xvi) research, development and demonstration projects
	(xvii) other relevant measures

- Make operational PoMs (including pricing policies). This step implies the on-the-ground implementation of projected measures. In this phase a larger number of actors is included depending on the type of measures to be implemented. The implementation of PoMs is not the end of the planning process, but it has to be linked with a continuous process of evaluation.

Figure 1 depicts the iterative and reflexive nature of the planning process, meaning that the several steps and decisions need to be evaluated at the end of each cycle to make improvements in the next implementation phases.

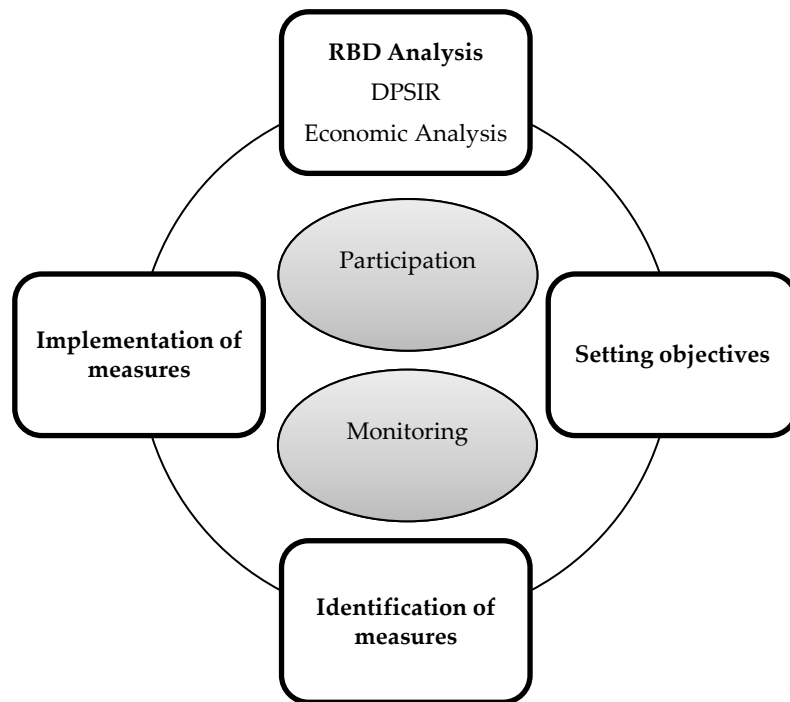


Figure 1. The iterative planning process of WFD. Source: authors' own elaboration

2.3. The governance to implement WFD

Despite the numerous obligations required for implementation, flexibility is provided to Member States that can accommodate the planning process to their national specificities (European Commission, 2003d). The WFD does not require any specific governance arrangements for implementation. For instance, the Directive does not prescribe the scale at which the competent authorities accountable for the WFD should be established, nor does it state that one specific implementation approach (such as centralized, regional, or local) is superior to the others. Nevertheless, the text of the Directive, along with the CIS and other European Commission documents, are full of guidelines that suggest the approach EU countries should undertake to successfully implement the Directive. Here, we summarize the main recommendations regarding river basin planning and participation:

- Article 3 of the WFD requires that “Member States shall ensure the appropriate administrative arrangements, including the identification of the appropriate competent authority”. Moreover, the article specifies that “Member States shall ensure that the requirements of this Directive for the achievement of the environmental objectives, and in particular all programmes of measures are

coordinated for the whole of the river basin district” (emphasis added). Consequently, the competent authorities are deemed appropriate as long as are able to promote coordinated implementation of the Directive along the river basin district.

- the river basin planning process may be very different across EU countries because of different policy-making traditions. The CIS on the planning process (European Commission, 2003a) identifies many different possibilities of planning on a spectrum that goes from top-down approaches to planning, where the competent authority defines the problem and possible solutions and the participation of stakeholders is very limited, to bottom-up approaches, where the authority has a role of facilitator and the problems and relative solutions are discussed among the actors involved. Hence, the European Commission recognizes that all types of planning are available for WFD implementation provided that the social context affected by the RBMPs is adequately considered and that coordinated decision-making across the RBD is promoted (European Commission, 2003a).
- the Directive recognises that the planning process may also occur per different geographical scale (e.g., sub-basin) or water theme. Nevertheless, the RBD is the spatial context at which integrated and co-ordinated water management has to be achieved (European Commission, 2003a).
- integration between river basin planning and other relevant planning processes should be ensured. It is fundamental that planning processes of other relevant sectors contribute to achievement of the objectives of the Directive (European Commission, 2003a). The European Commission goes even further by stating that water planning, due to its specific characteristics, should be “pre-conditional for other types of planning” and, in so doing, clarifies the hierarchy of planning instruments (European Commission, 2003a).
- regarding the scale at which participation should occur, the WFD does not provide any specific instructions for Member States except for the fact that a clear reference to the RBD as planning scale should be made (European Commission, 2003b). In particular, participation should be organized in a way

that, first, all relevant water issues in the RBDs are identified and addressed at the most appropriate geographical scale, and second, information flow across different scales within a district is guaranteed (European Commission, 2003b). The three different forms of participation – information supply, stakeholders’ consultation and active involvement – are representative of different approaches to participation that may co-exist. Regardless, the European Commission clarifies that “Public participation is not an objective in itself” but interested parties and the public should be provided with instruments that allow them to really influence the outcomes of the plans (European Commission, 2003b). By allowing people to participate in the process, acceptance of the decisions should increase and this should make implementation and compliance more likely. Finally, participation can produce positive social outcomes, such as increasing the civil society ownership of environmental problems, trusts, social learning, networking and reduction of conflicts (European Commission, 2003b).

Therefore, the governance outcomes that the procedural obligations of river basin planning and participation should produce can be summarized as: decision-making processes for the development of RBMPs tailored on hydrological boundaries rather than administrative, coordinated decision-making supported by appropriate competent authorities, contribution of other sectorial planning to the achievement of WFD objectives, and representation of civil society’s interests in the plans along with the possibility for stakeholders to influence the outcomes of the plans.

3. Water policy and governance in Italy

3.1. Water legislation and governance before WFD implementation

Water, and its management, has always had a great relevance in Italy. The ancient Roman Empire, at its height, used to consume seventeen cubic metres of water per second, thanks to the Roman aqueducts. The first national legislation on water use dates back to 1884 (Law 2644/1884) and established the legal instrument of temporary water licences. At the beginning of twentieth century, two fundamental pieces of water legislation were issued that are still in force. The first is the Testo Unico 215/1933 introducing the concept of Integral drainage (*bonifica integrale*) and putting all waterworks of public relevance under the jurisdiction of the State and financed through the public budget with a partial contribution by landowners. This law also recognized the role of irrigation and land reclamation boards (already established in 1922) as key actors for the execution and maintenance of reclamation waterworks. The second law is the Testo Unico 1775/1933 on water licences and hydropower. This law marked a distinction between public waters for which water licences were required, and private waters owned by the landowner. This law, even if partially modified by more recent legal dispositions, is still a reference for the discipline of water abstraction licences. During the 1970s, with increasing awareness towards environmental concerns, the Law 319/1976 (Merli Law) was issued to establish a framework on limits and controls to apply to the main sources of water pollution. Hence, in the first decades of water policy in Italy, the state was the only government level holding legislative and regulatory functions, while a multitude of local actors were responsible for managing local infrastructure and water supply.

This situation changed in the 1970s when the regional administrations were instituted and many competences were transferred to the new government level (Massarutto et al., 2003), even though the legislative and regulatory functions were kept by the central government. Regions acquired responsibility for small water derivation authorization, waterworks planning, integral drainage, control of irrigation boards and water quality planning. However, the transfer of responsibilities to the

regions occurred without clear coordination mechanisms between the two levels (Domorenok, 2017) which created overlaps and caused some policy ineffectiveness.

The Law 183/1989 was issued exactly as a response to these unclear and overlapping functions. Following its implementation, the national territory was divided into national, interregional and regional river basins. The new territorial organization was established in an attempt to improve coordination among the government levels, and create an integrated system for the protection and management of land and water resources. Specific authorities were established for each national river basin. River basin authorities were composed of representatives from the main state ministries and regional administrations and were coordinated by the General Secretary holding overall responsibility for river basin authorities' activities. These mixed State-Regional bodies had to develop basin plans that were overarching planning instruments to set up integrated management of water and soil at the river basin level (Rainaldi, 2010). Hence, the law established a cross-cutting system for soil and water conservation and also for their effective socio-economic management (Pioggia, 2015). This generated a complex system of water governance involving many different institutional actors that, theoretically, should have been coordinated under the supervision of the river basin authorities. However, the role of these authorities was essentially weakened by their lack of financial autonomy. Indeed, financing was allocated to the regions and other public administration, leaving space only for programming and control functions to the river basin authorities (Domorenok, 2017). Moreover, the regions were against the creation of river basin authorities and related basin plans because they perceived these reforms as interference by the central government in their responsibilities on water and soil management to the point that some regions brought an action against the Law 183/1989 to the Constitutional Court (Alberton and Domorenok, 2011). Despite the court rejecting their petitions, these conflicts weakened the role of the river basin authorities, and tensions between regions and state further increased (Domorenok, 2017).

The Law 36/1994 (Galli Law) represented a paradigm shift in Italian water management. First, with this law water resources were no longer considered only as a

productive asset but also as a resource to be protected (Clini, 2004; Pioggia, 2015). The law, indeed, abolished the distinction between surface water, public and subject to license, and groundwater, that used to be considered as part of landowner's rights. With the Galli Law both types were considered public waters and consequently subject to concession. The acknowledgment of public ownership of all water resources was a way to recognize the relevance of all interests related to water and represented the State's commitment to protecting them (Pioggia, 2015). The second important contribution of this law was the creation of an integrated water service system for all water services, from water capture to sewerage and depuration systems. According to the law, this system should have been organized and managed at "optimal territorial units" (ATO in Italian) governed by specific authorities (AATO), that were intermunicipal agencies defined by the regions. AATO were public agencies responsible for the analyses of water services and infrastructures within their territorial unit. On the basis of these analyses, AATO had to develop plans containing the actions needed for services modernization and the relative financial plans. AATO could then assign the management system either through public tendering or a contract with an in-house company. The rationale behind the Law 36/1994 was, on one hand, to create optimal units for integrated management of the water system, overcoming municipal fragmentation, on the other, the law aimed at building an industrial model for water services' provision more independent of public finance (Massarutto, 2008). However, in 2008 identification of the optimal territorial units and their authorities was still not completed (Massarutto, 2008). This partial implementation generated a piecemeal attribution of responsibilities with high variability from one region to another (Micalizzi, 2015).

The Legislative Decree 152/1999 adopted the indications of the EU Directives on wastewater treatment (91/271/CEE) and concerning the protection of waters against pollution caused by nitrates from agricultural sources (91/676/CEE). This decree concerned both qualitative and quantitative aspects with the aim of achieving the "good water status" of water resources, anticipating some basic concepts of WFD. The decree introduced regional water plans as part of the basin plans, with the aim of coordinating actions and measures for water protection across the river basins

established by Law 183/1989 (Domorenok, 2017). Despite this, regional water plans were almost exclusively defined by the regions and the function of river basin authorities was limited to a final approval (Alberton and Domorenok, 2011).

In 2006, the Legislative Decree 152/2006 (better known as the Environmental Code) abolished all the previous water legislation and transposed the WFD, creating a single, overarching, legislative framework for water protection and use. Despite some significant innovations, mostly introduced for the transposition of WFD, many elements of the previous legislation were recovered in the Environmental Code. For instance, organization of the integrated water service system in AATO was kept. Regarding the river basin approach introduced by Law 183/1989, adoption of the WFD brought significant changes, at least in terms of legal dispositions, that are discussed in the next section on implementation of the WFD in Italy.

3.2. Implementation of the WFD in Italy

Following Legislative Decree 152/2006, Italy was divided into eight RBDs. The pre-existing national, interregional and regional river basins were grouped to create overarching RBDs in a way that was defined by the European Commission as “illogical and not necessarily in line with the WFD intentions” as, for instance, river basins draining into the Tyrrhenian and Adriatic Seas were grouped together (European Commission, 2007). Recently, Law 221/2015 modified the territorial division establishing seven RBDs as represented in Figure 2. The Environmental Code issued the creation of specific River Basin District Authorities (RBDAs) for each RBD, responsible for coordinating the process of implementation, and developing the RBMPs. Consequently, only the basin plans established by Law 183/1989 were kept. The basin plans and RBMPs partially overlap but are quite different in scope: the first deal with the programming and monitoring of structural interventions, while the second identify the most cost-effective measures to achieve the environmental objectives established on water bodies. As stressed by Rainaldi (2010) the approaches that underlie these planning instruments are rather different: technocratic, top-down approach for the basin plans, while based on economic instruments and bottom-up consultation for the RBMPs.

However, the late transposition of WFD caused delays in many steps of the implementation process, as shown by Table 4 that compares the deadlines required



RBD	Name	Countries sharing RBD
ITA	Eastern Alps	AT, CH, SI
ITB	Po	CH, FR
ITC	Northern Apennines	FR
ITE	Central Apennines	
ITF	Southern Apennines	
ITH	Sicily	
ITG	Sardinia	

Figure 2. The Italian RBDs. Source: adapted from ISPRA

by the European Commission and the timing of compliance in Italy. Given that, after the first implementation cycle the European Commission reported that many shortcomings affected implementation of the WFD in Italy (European Commission, 2012a). In particular, the Commission highlighted that:

- Monitoring networks showed very significant gaps in RBMPs. The fact that monitoring programmes were under revision in many regions and the lack of a national framework (until Decree 56/2009) produced a fragmented scenario across regions in the approaches and methods adopted for monitoring. Moreover, not all RBDs provided information to the monitoring networks.
- The status classification of many surface and groundwater bodies was not completed, moreover the criteria used to classify biological, chemical and quantitative aspects varied considerably across regions. The identification of exemptions was incomplete.
- Although a PoMs was included in all RBMPs, many measures were drawn from other plans, such as the regional water protection plans, and it was not always clear how the measures could contribute to the improvement of state water bodies. This was particularly evident for the Eastern Alps RBD, whose

measures contained in the PoMs were taken from other plans without a clear link with the state of water bodies. In terms of geographical scale, many measures presented in the RBMPs presented a basin-wide scope; however, the authorities identified as responsible for the measures were mostly regional ones and it was not clear what coordination mechanisms were in place among administrations. Finally, the measures established were not supported by a clear analysis of the link between measures, impacts of human activities and objectives.

Table 4. WFD requirements and deadlines and national compliance

Issue	WFD References	CE Year	IT Year	National references
Directive entered into force	Art. 25	2000		
Adoption in national legislation	Art. 23	2003	2006	Decree 152/2006
Identification of River Basin Districts and Authorities	Art.3	2003	2006	Decree 152/2006
Characterisation of river basin: pressure, impact analysis	Art. 5	2004	2008 ³	Decree 131/2008
Establishment of monitoring network	Art. 8	2006	2009	Decree 56/2009
Start of public consultation (at the latest)	Art. 14	2006	2008/2009 ⁴	River Basin Districts' websites
Present draft of River Basin Management plan	Art. 13	2008	2009	River Basin Districts' websites
Finalise River Basin Management plan including Programme of Measures	Art. 13 & 11	2009	2010	River Basin Districts' websites
Pricing policies adoption	Art. 9	2010	Partially achieved	Decree 39/2015
Make operational Programme of Measures	Art. 11	2012	Partially ⁵ achieved	
Meet environmental objectives; First management cycle ends; Second River Basin Management plan & first Flood Risk Management plan	Art. 4	2015	2016	River Basin Districts' websites
Second management cycle ends	Art. 4 & 13	2021		
Third management cycle ends; Final deadline to meet environmental objectives	Art. 4 & 13	2027		

Source: authors' own elaboration

³ A court ruling was issued against Italy by the European Court of Justice for failing to submit the reports on characterisation of the River Basin Districts, review of the environmental impacts of human activity and economic analysis of water use (European Commission, 2012a).

⁴ Only ITH (Sicily) started the public consultation in 2008 for the regional water protection plan. All the other Districts started consultation in 2009.

⁵ Information based on European Commission (2015b)

- Economic analysis varied significantly across RBMPs: for instance, there was not a common approach for water pricing and cost recovery within the RBD. There was no homogeneity in the information provided on existing cost recovery levels and, in many cases, information on calculation and inclusion of environmental and resource costs was completely lacking.
- The Environmental Code established the RBDAs to be in charge of preparing the RBMPs. Anyway, by the time the first RBMPs were adopted, these authorities were only identified on a provisional basis. Law 13/2009, notwithstanding Decree 152/2006, sets out that the plans were adopted by the river basin authorities established by Law 183/1989. This was an issue in particular for four RBDs (ITA, ITC, ITE, ITF) where the authorities covered only a part of the district. This generated a serious problem of governance in these areas because it was not clear if the measures adopted concerned the entire district or only a part of it.

As a consequence of all these shortcomings, two EU Pilot procedures were addressed to Italy after the first implementation cycle, along with the European Commission's communication (COM (2015) 120 final) on the progresses made on the implementation of PoMs (European Commission, 2015a). The EU Pilot 6011/14/ENVI concerned hydropower plants on three rivers, Oglio, Tagliamento and Piave, for which it was required to give application to the minimum environmental flow. The second Pilot 7304/15/ENVI addressed many aspects of the Italian implementation and the European Commission's communication formulated specific recommendations for the second implementation cycle. More in detail, Italy was required to: (i) establish adequate coordination mechanisms to ensure that the objectives of the WFD were fulfilled for the whole RBD, (ii) provide clear signals of progress regarding the internalization of environmental and resource costs (ERCs) within the agricultural sector, (iii) improve monitoring, (iv) base the exceptions to the achievement of environmental objectives on clear and transparent justifications, (v) select the measures of the PoMs on the basis of identified pressures on water bodies (European Commission, 2015a).

Moreover, in 2015 the EU Regulations 1303/2015 and 1305/2015 set up stricter preconditions on the use of EU funds. In particular, the Article 46 of the EU Regulation 1305/2015 made the access and the use of the EU funds subject to: (1) the existence of a RBMP and of a PoMs containing measures specifically relevant for the agricultural sector; (2) the installation of water metering devices; (3) an *ex-ante* assessment of the potential water savings that the investment on irrigation infrastructure should produce on water resources. Moreover, more stringent preconditions for investments are established in case water bodies are in less than good state and when investments result in a net increase of irrigated area.

Consequently, the second implementation cycle was marked by a slew of new laws that aimed at avoiding the risk of infringement procedure and block of EU funds. Hence, the governance has rapidly evolved in the recent years resulting in: (1) attribution of full functions to the RBDAs (Law 221/2015), (2) setting the guidelines on water metering and estimates on irrigation (MIPAAF 31 July, 2015), (3) establishing the criteria for economic evaluation of the ERCs for all water use sectors (Legislative Decree 39/2015), (4) providing guidelines for the *ex ante* evaluation of water concessions (29/STA/2017) and on methodologies related to the determination of minimum environmental flow and ecological flow of water bodies (30/STA/2017). These decrees, on one hand, unlocked the implementation of many of the requirements of WFD (e.g. cost recovery), on the other, strengthened the role of RBDA that became responsible for the coordination of all activities related to the implementation of WFD.

Recently, in February 2019, the European Commission delivered the interim report for the evaluation of the second cycle of RBMPs (European Commission, 2019a). Considering the recommendations addressed to Italy, the Commission (European Commission, 2019b) highlighted that significant improvements occurred with regards to:

- strengthening the role of RBDAs and improving coordination among regions within each RBD;
- setting a clearer hierarchy between RBMPs and regional plans;
- increasing the number of monitoring sites in all water categories;

- adopting a methodology for calculation of ERCs at national level.

Nevertheless, the European Commission also highlighted that significant limitations are still in place, such as:

- the number of exemptions under Article 4(4) has significantly increased in all RBDs;
- the level of information provided for the justification of exemptions is very heterogeneous among the RBDs;
- the level of implementation of the measures set in the first RBMPs has been limited to full application of only some measures;
- the governance aspects are reported as an obstacle in most of the RBDs in the second cycle;
- no clear overall financial commitment has been secured for implementation of the second PoMs for all of the RBDs.

4. General methodological approach

This chapter describes the theoretical background that underlies the study of the process of adaptation of national water governance systems to the requirements of the WFD. A reference to the theories regarding water governance has been provided, with the aim of clarifying the definition of water governance adopted in this thesis. Moreover, an explanation is provided of the three conceptual references – spatial fit, coordination in public management and public participation - used to analyse the process of water governance adaptation in selected EU countries and, more in detail, in Italy.

This chapter also describes the methodology adopted in the research. Chapters 5 and 6, where the two papers are presented, also contain specific sections dedicated to materials and methods. However, here we stress the link between the theories and methodologies adopted, as well as providing more information on data collection that could not be included in the papers (especially with regard to the case study).

4.1. Definition of water governance

The aim of this research is to study the process of adaptation of national water governance systems to the requirements of the European Water Framework Directive. Before starting this analysis, there is the need to clarify what is being adapted, in other words what is the definition of water governance adopted in this study. Governance is, in fact, a multifaced, sometimes elusive, concept often equated with the word government. However, governance indicates something broader than government, encompassing a range of state and non-state actors, and their formal and informal relations. The notion of governance has been applied in many different fields of research. Rodhes (1996) classified at least six uses of the word governance in the literature: Governance as the “Minimal State”, Governance as “Corporate Governance”, Governance as the “new Public Management”, Governance as “Good Governance”, Governance as a “Socio-cybernetic System”, Governance as “Self-organizing Networks”. Kjær (2004), instead, identified at least three applications of the concept of governance: in the field of public administration and public policy, in the field of international relations and in that of comparative politics. The protection, use

and management of water resources being intrinsically linked to public policies, water governance can be ascribed to the field of research related to public policy, management and administration.

One of the most comprehensive definitions of water governance is that provided by the Global Water Partnership (2003), stating that “Water governance refers to the range of political, social, economic and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society”. The OECD, instead, defines water governance as “the set of administrative systems, with a core focus on formal institutions (laws, official policies) and informal institutions (power relations and practices) as well as organisational structures and their efficiency”(OECD, 2015). Water governance also differs from water management because the latter refers to the operational activities that are needed for monitoring, implementing measures and meeting specific quantitative and qualitative targets (OECD, 2015). With this understanding, water governance shapes the rules under which water management operates (Pahl-Wostl et al., 2012).

At EU level, in 2001 the European Commission defined “European governance”, and hence this definition can be extended to the EU water governance. The EU governance refers to “the rules, processes and behaviour that affect the way in which powers are exercised at European level, particularly as regards openness, participation, accountability, effectiveness and coherence” (Commission of the European Communities, 2001).

This definition calls for another aspect that is relevant for water resources and concerns the principles of good water governance. The OECD launched several initiatives on this topic (OECD, 2015, 2011) and identified 3 complementary dimensions of water governance: (1) effectiveness, meaning that the governance enables the meeting of expected targets and implementation of policy goals, (2) efficiency, that implies that the governance contributes to maximise the benefits of sustainable water management at the least cost for society, and (3) trust and engagement that relates to the contribution of governance to create public confidence and the inclusion of stakeholders’ interest in the decision-making procedures (OECD, 2015).

This study is concerned with the governance established for WFD implementation and, consequently, adopts a more restricted approach to water governance than that in the above-mentioned definitions. In particular, the focus is on the *formal rules* that allow river basin planning and participation and the *processes* that conduct to development of the RBMPs. Certainly, both aspects are investigated in different ways and with differing levels of elaboration for the analysis conducted at EU level and that performed in the Italian case study.

4.2. Spatial fit

One of the meanings of the word “fit” in English relates to the matching of sizes. In the field of natural resources management, the matching should occur between the social and ecological systems and processes (Folke et al., 2007). Social systems and processes are shaped by institutions intended as the set of formal (such as rules) and informal constraints (such as norms of behaviour) humans adopt to organize all forms of interactions in a society (Folke et al., 2007). The question at the basis of the so-called problem of fit refers to “How does the scale (temporal, spatial, functional) of an institution relate to the ecosystem being managed, and does it affect the effectiveness and robustness of the institution?” (Folke et al., 2007). There are plenty of examples of mis-use of natural resources that has led to their depletion and, thus, to an inefficient use. Consequently, the problem of fit is a key challenge of sustainable development and is strictly linked to the capacity of social institutions to consider the ecological externalities that decision-making processes related to the use of natural resources may entail.

In terms of water resources management, the answer to the problem of fit has come from the river basin or watershed approach. As Molle (2009) describes, the conceptualization of the river basin as natural spatial unit for water management gained momentum in Western societies from the second half of 18th century and was strengthened during the industrial revolution. At that time, however, the managing of water at river basin was considered only as a means to achieve the “hydraulic mission”: rivers had to be “civilized” to allow the full exploitation of water (for hydropower, navigation and industry). It is only since the end of the last century, and

in particular with diffusion of the IWRM approach, that the river basin has become central to watershed and ecosystem-management. The IWRM recognized the interrelation among land and water components of the ecosystem and river basins appeared to be the optimal spatial unit for a comprehensive and holistic approach to water resources management. From that moment on, the river basin approach became a mainstream concept in water resources management (Molle, 2009) to the point of being institutionalized in the European Union with the formal requirements of the WFD (Moss, 2012). As a consequence, many river basin organizations (RBOs) arose worldwide with the aim of creating jurisdictions and decision-making processes shaped on watershed boundaries (Huitema and Meijerink, 2017). However, as Molle (2009) interestingly highlights, the river basin is also “a political and ideological construct”. The boundaries of a river basin are indeed not always clear cut, not even natural in some cases, implying these are often decided through political decisions that affect who can control and who, instead, loses control over water resources (Huitema and Meijerink, 2017). In this sense, some authors challenge the idea that the managing of water at river basin level is normatively superior to achieve a more efficient water use, because this stance disregards the political implications of establishing RBOs (Huitema and Meijerink, 2017; Molle, 2009). Huitema and Meijerink observe that: “Although from a water management perspective, the focus on hydrological units is a logical one, the key to solving water management issues mostly is with organizations who work on very different geographical and jurisdictional scales. The dilemma thus is that one may develop strong and powerful basin organizations, which enhance spatial fit, but that these organizations remain dependent on others for realizing their objectives”.

This statement does not necessarily go in the direction of a full rejection of river basin management and RBOs, but highlights the need to recognize the political nature of institutional design and that the RBOs are usually layered on the top of other pre-existing institutions and that achieving coordination can become even more complex (Huitema and Meijerink, 2017; Molle, 2009).

Empirical studies have actually highlighted that a better fit between institutions and natural processes does not necessarily lead to a more efficient use. Roggero and

Fritsch (2010), for instance, found that rescaling certain tasks with the aim of improving the matching between institutions and natural processes may entail high transaction costs and, in turn, cannot always be considered as an optimal option. Moreover, ecosystem-based management implies multiple areas of fit, not only that with natural systems, and, in some cases, other areas of fit can be even more important (Lebel et al., 2013).

Given that, some scholars argue that research should be pragmatic in the use of the concept of spatial fit, by exploring the strategies adopted by water governance systems to work across institutional, sectorial and geographical boundaries in order to provide a more effective environmental governance (Moss, 2012, 2004), rather than chasing the perfect fit between institutions and ecosystems (Ostrom et al., 2007).

4.3. Coordination in public management and administration

The most critical element of integrated water resources management in a river basin is the need to reach coordination among the various social institutions and water-use sectors within the basin (Bandaragoda, 2002). For this reason, for the study of the implementation of WFD at river basin level, theories dealing with issues of coordination in complex governance settings have been reviewed.

As already mentioned, since the 1980s central governments have lost their capacity to give direction to society, while the range of decision-making has widened to include decentralized state actors, societal actors and supra-national actors (Piattoni, 2010). Many governance studies agree that the dispersion of authority across jurisdictions and societal actors is normatively superior because it allows decisions to be taken closer to the places where problems arise (Hooghe and Marks, 2001) and facilitates the achievement of benefits at multiple scales as well as experimentation and learning (Ostrom, 2010a). However, this broader range of decision-making, together with the hollowing-out of the State, have made coordination a huge challenge.

Multi-level governance (MLG) research, for instance, raises “the difficulty of having to coordinate governmental and non-governmental actors at different territorial levels in ways that do not conform with the hierarchical relations or the mechanisms of consultation currently in place in member states” (Piattoni, 2008 as cited by (Milio, 2010), p. 12). Rhodes stresses the meaning of governance as self-organizing networks

that risk creating problems to governability when not properly managed by central government (Rhodes, 1996). Dang et al. (2016), indeed, define governance capacity as the “actors’ ability to cooperate to solve collective problems” while institutional capacity is intended as the institutional settings that allow actors’ cooperation. Strategies to improve coordination often find a compromise solution between the increase of central control and the promotion of more collaborative types of decision-making (Wegrich and Stimac, 2014). Rhodes argues that to manage networks of interdependent actors that characterize any governance system, government should search for new tools that differ from traditional authoritative power, such as “game-playing, joint action, mutual adjustment and networking”(Rhodes, 1996). Elinor Ostrom stresses the need for institutions that enable trust among participants engaged in a “dilemma situation” of resources management to promote social cooperation (Ostrom, 2010b).

Implementation of the WFD engages first and foremost public administrations concerned with water management and protection. For this reason, research addressing the issue of coordination in public administration is particularly relevant for our research. Wegrich and Štimac describe three main types of coordination that have been observed for public administration and executive government: hierarchical coordination, negative horizontal coordination and positive horizontal coordination (Wegrich and Stimac, 2014). In the first type, decisions are made at high levels (by executives, leaders, etc.) and affect lower levels regardless of the individual distribution of costs and benefits (Wegrich and Stimac, 2014). In negative horizontal self-coordination, instead, the policy is developed by the group with the main responsibility for the issue and is then analysed by the other units involved in the decision-making to ensure that the draft does not violate or contradict other policy domains (Wegrich and Stimac, 2014). Despite a certain degree of coordination being achieved, this type of coordination does not allow for innovative solutions to emerge, with the “lowest common denominator” being the typical outcome under this process (Wegrich and Stimac, 2014). Finally, positive horizontal self-coordination occurs when proposals from different units are combined to elaborate a joint plan. This type usually

involves the creation of task forces or specific working groups (Wegrich and Stimac, 2014).

These three types of coordination can provide some options for which studying how administrative coordination for the development of RBMPs is pursued. Hierarchical coordination, indeed, can be seen as a top-down strategy that the main competent authorities for the implementation may adopt to require coordination among the administrations of the RBD. Instead, negative horizontal coordination can be observed when the different administrations develop their own planning processes and then pool together to compose a single, overarching, RBMP for the whole RBD. Lastly, positive horizontal coordination can be observed when specific coordination mechanisms are established in order to make the different administrations involved elaborate joint plans.

4.4. Public participation in natural resources management

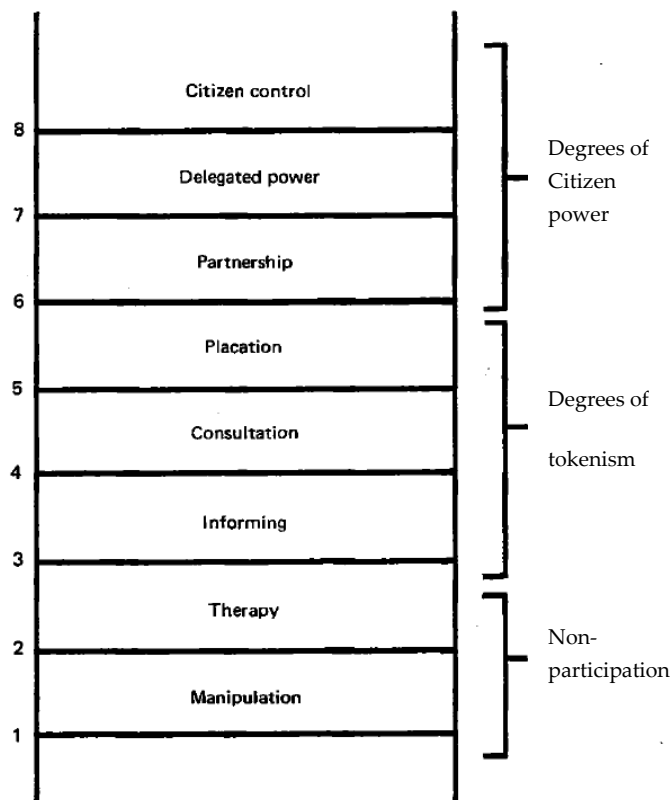
Public participation in natural resources management is not a recent idea. In the USA the first forms of public engagement date back to the 1960s and 70s with the National Environmental Policy Act of 1969, National Forest Management Act of 1975, and Federal Land Management and Policy Act of 1976 that provide guidelines on public participation (Daniels and Walker, 1997). In Europe, the Aarhus Convention in 1998 marked a significant change in terms of civil society's involvement in decision-making processes related to the environment. The 47 parties⁶ of the Aarhus Convention are required to make the necessary provisions so that public authorities (at national, regional or local level) ensure: (1) that citizens have access to environmental information, (2) that the public affected by the decision-making processes is consulted and that their comments are considered in the final decisions, (3) and the right for the public to have access to the justice when public decisions have been made without respecting the two aforementioned rights or environmental law in general. These guiding principles for environmental decision-making have been incorporated in most of the European environmental legislation and, as described in chapter 2, have been translated into clear procedural requirements in the WFD.

⁶ The 47 parties are composed of 46 countries plus the European Union.

Given the relevance of public participation in environmental decision-making, many scholars approached the study of participation that is unanimously referred to as a multifaced social phenomenon (Arnstein, 1969; Fung, 2006; Plummer and Fitzgibbon, 2004).

One of the first attempts to systematize the different forms of civil society engagement came from Arnstein (1969) who introduced the idea of the "Ladder of Citizen participation" (Figure 3). Each rung of the ladder corresponds to the level of citizens' power in determining the outcomes of decision-making processes. The lowest rungs describe a situation of absence of participation where citizens are involved by "powerholders" but with the aim of educating and manipulating them. Rungs 3 and 4 represent forms of participation in which the parties are informed and heard but there is "no assurance of changing the status quo" in terms of power delegation (Arnstein, 1969). Placation is the highest degree of tokenism because participants have the right to advise, but the powerholders retain the power to decide. The last 3 rungs describe different degrees of true power delegation: from partnerships, where there is negotiation among citizens and powerholders, to full citizen control over decisions.

Figure 3. The Ladder of citizens participation



Source: Arnstein (1969)

Within this conceptual framework, Arnstein clarifies that: first, the ladder is certainly a simplification but helps to understand that there is “significant gradation of citizens participation” and, second, that citizen participation is “a categorical term for citizen power” (Arnstein, 1969). These two aspects of Arnstein’s theory have been criticized by some scholars who argue that the ladder represents an oversimplification of reality, excessively focused on power relations, and disregards the complex, often non-linear, relations between agencies and communities over time (Tritter and McCallum, 2006). Moreover, the normative assumption behind this conceptualization is that full citizen control is the greatest option for public participation, whereas, in reality, this is not always desirable or achievable (Hayward et al., 2004). Other models for the study of public participation usually recognize the different dimensions that characterize this phenomenon, each of them with different degrees of intensity. Here we summarize the main dimensions discussed in the literature (Fung, 2006; Newig and Koontz, 2014; Plummer and Fitzgibbon, 2004):

- Representation (or involvement of stakeholders): the degree of inclusiveness of the process (e.g., experts’ consultation vs. large engagement of civil society).
- Information flow (or communication and collaboration): concerns both the direction of communication (e.g., one-way or two-way) and intensity of the communication (e.g., higher intensity in the case of collaboration).
- Influence (or power delegation): the extent to which participants can actually determine decision-making processes (e.g., consultation vs. community control).

The degree to which representation, information flow and influence are exercised gives rise to different governance approaches. Scholars concerned with collaborative governance, for instance, study a governing arrangement that aims to achieve a collective decision-making process between public agencies and non-state stakeholders. Collaborative governance implies two-way communication and influence between public agency and stakeholders and its aim is a multilateral consensus-based deliberation (Ansell and Gash, 2007). Participatory governance can

instead be defined as “the regular and guaranteed presence when making binding decisions of representatives of those collectivities that will be affected by the policy adopted” (Schmitter, 2002 as cited by (Koontz and Newig, 2014), p. 595). Engagement of non-state actors is certainly the common trait of both governance definitions; however, participatory governance implies decision-making processes initiated from the top and that include stakeholders before the policy is created (Koontz and Newig, 2014).

The legal requirement for public participation in the WFD concerns information supply and stakeholders’ consultation, while active engagement is only encouraged by the European Commission. This clarification is relevant for this research because it allows the WFD’s requirement for public participation to be located under the umbrella of participatory governance (Newig and Koontz, 2014) or, as argued by Euler and Heldt (2018), in the central rungs of Arnstein’s ladder. The rationale for having stakeholders involved in the development of RBMPs is, certainly, to increase the transparency of decision-making but, more importantly, to enhance the effectiveness of policy delivery (Newig and Koontz, 2014) and, as the guidance document of public participation clarifies “Public participation is not an end in itself but a tool to achieve the environmental objectives of the Directive” (European Commission, 2003b).

4.5. Methodology

The methodology adopted in this thesis is divided in two parts: a qualitative meta-analysis of the available literature on the topic of water governance adaptation to WFD, and a case study to explore the directive’s implementation in a selected Italian RBD. The qualitative meta-analysis aimed to answer the first research question and address the first specific objective, while the case study was conducted to answer the second research question and second specific objective

4.5.1. Qualitative meta-analysis

The focus of the analysis was on how Member States promoted coordinated and participatory river basin planning through the establishment of organized boards, that were defined Coordination and Participation Boards (CPBs). This common definition was adopted to identify a phenomenon linked to WFD implementation that occurred

in many countries, i.e. the establishment of organized boards that bring together authorities and stakeholders for the development of RBMPs.

The methodology adopted for the meta-analysis is described in the following steps:

- Data collection: Scopus and Web of Science databases were extensively reviewed to select articles dealing with governance aspects of WFD. Moreover, European Commission implementation reports and consultants' reports that address the topic were included.
- Identifying implementation patterns: A first screening of the articles allowed the implementation patterns in the following countries to be identified: Denmark, Latvia, Lithuania, Poland, The United Kingdom, Greece, Finland, Germany, Italy, Spain, Portugal, France, Sweden, The Republic of Ireland and The Netherlands (not for all EU states as no or very few studies were found for some countries). Countries can be divided into two main approaches for WFD implementation, even if these approaches differ widely between countries: the centralized approach where the main competent authorities for WFD implementation are the national ministries and their agencies (this is the case for Denmark, Latvia, Lithuania, Poland, The United Kingdom and Greece), and decentralized approaches where the main competent authorities can be either regions or federal states (Finland and Germany), local authorities (The Republic of Ireland), river basin authorities (Italy, Portugal, France, Spain, Sweden), or a mix of authorities at different government levels (The Netherlands). These categories certainly represent a simplification to enable a comparison among countries; in reality water governance is always, to some extent, multi-level.
- Selection of countries: the focus of the analysis was restricted to 7 EU countries that were still representative of the different approaches but for which more detailed information on CPBs was available. The countries considered in the study are therefore: Denmark, England, Germany, Italy, France, Spain and Sweden. This selection certainly constitutes a limitation to a more comprehensive analysis of coordination and participation across EU countries:

for instance, Eastern European countries were not included. Nevertheless, this study allowed for a detailed analysis of some of the different approaches used in Europe to comply with the WFD.

- Analysis of CPBs: first, the structure and functioning of CPBs were analysed. This meant to consider the role, composition, functioning and resources availability of CPBs for the development of RBMPs. Second, a conceptual framework was developed on the basis of the theoretical background described in this chapter. The conceptual framework supported identification of the factors, research questions and options that drove the analysis of CPBs in EU countries and is described in chapter 5 where the qualitative meta-analysis of the literature is presented.

4.5.2. The case-study

The case study was conducted to unfold the entire process of WFD implementation in Italy, from planning to on-the-ground implementation, using the RBD as scale of analysis.

Case study research is particularly suitable to investigate a “contemporary phenomenon in a real-world context, when the boundaries between the phenomenon and the context may not be clearly evident” (Yin, 2014). In our case study, the phenomenon to be observed was the implementation of WFD, from the development of RBMP to the implementation of a specific type of measures: the measures to improve irrigation efficiency.

The temporal and spatial scales of the case study were also a methodological choice. Regarding the temporal scale, we considered the process that led to the development of the second cycle of RBMP (2015-2021), which have been poorly studied compared to the first implementation cycle (2009-2015) (Rainaldi, 2010, 2009). Implementation still being on-going, we expected to find incomplete information regarding on-the-ground implementation of the measures related to irrigation efficiency. However, as anticipated, the first phase of implementation in Italy came with a long delay that caused limited fulfilment of most requirements of the WFD and led to the European Commission’s delivery of EU Pilots 6011/14/ENVI and

7304/15/ENVI to Italy. Consequently, focusing on the current implementation cycle was supposed to provide more useful insights on how water governance at RBD level is developing in Italy.

For the spatial scale, we decided to focus the study on one of the Italian RBD, i.e. the Eastern Alps RBD that is composed of four administrations: Veneto Region, Autonomous Region of Friuli Venezia Giulia, Autonomous Province of Trento and Autonomous Province of Bolzano. In chapter 6, where the paper on the case-study is presented, we equated regions and autonomous provinces and referred to them using the same terms (e.g., “regions” or “regional”). This choice was made because, in terms of WFD implementation, the four administrations have the same obligations. However, some differences in the governance of water resources do exist among the four administrations of the RBD. The two Autonomous Provinces, in particular, have a different organization with regard to planning sources for water management and protection. Both provinces have their own planning instruments for water resources called *Piano Generale di Utilizzazione delle Acque Pubbliche* (PGUAP) that have the same relevance as the basin plans established by Law 183/1989.

Going back to the case study, its aim was twofold: (i) to understand how coordination among the different administrative levels of the RBD was achieved during the planning phase, (ii) the effects of WFD on the local level, which means both how PoMs are translated into concrete actions at local level, and how stakeholders’ interests are considered in the development of plans.

Data collection was conducted through 21 semi-structured interviews with both public authorities and local stakeholders involved with WFD implementation in the Eastern Alps RBD. In semi-structured interviews, a list of topics or open-ended questions are preliminary defined and establish the perimeter within which the interviewee and interviewer have freedom of movement (Corbetta, 2014). Interviews are suitable data collection tools when knowledge regarding the object of analysis is limited and the sample of interviewees is rather small (Corbetta, 2014). Overall, the questions aimed to understand: (1) what coordination mechanisms (if any) were in place in the different steps of the implementation process, i.e., if implementation was conducted following a RBD perspective or was conducted within administrative

boundaries, (2) how plans are translated into concrete measures for irrigation management at local level, (3) the inclusion of local interest in the development of plans.

In addition, a set of closed-ended questions on a 5-point Likert scale was proposed to interviewees in order to acquire information on their perceptions regarding the effectiveness of coordination and participation mechanisms in place for the decision-making processes related to the development of RBMP.

Since the district is already a large unit of analysis, we decided to focus on the development and implementation of a specific type of measures, i.e., measures to improve irrigation efficiency. This category of measures includes measures regarding the adoption of pricing policies that incentivize more efficient use of water resources for irrigation, the installation of water metering devices, and the shift to more efficient irrigation systems. Irrigation Boards are the main addressees of this type of measures. Consequently, the study of the effects of WFD on local level concerned Irrigation Boards while final users, such as farmers, were not considered in the case-study. Focusing on Irrigation Boards, rather than on farmers, allowed us to keep the RBD as unit of analysis. Irrigation Boards, in fact, although with some differences across the district, share similar organizations and functions. Given the heterogeneity of the agricultural sector in the Eastern Alps RBD, focusing on farmers, instead, would have made comparability across the RBD more difficult.

The primary data collection was supported by the analysis of policy documents. This was split in three levels: (i) analysis of Italian legislation transposing WFD (Legislative Decree 152/2006) and other relevant laws enacting more specific aspects of WFD; (ii) analysis of the RBMP (2015-2021) of the Eastern Alps RBD; (iii) analysis of regional regulations related to the implementation of WFD.

First, the Legislative Decree 152/2006 was analysed in detail to understand the allocation of responsibilities for the main steps of WFD implementation and to see whether and how the legislation supported coordinated river basin planning and participation. Since the focus of the case study was on the measures related to irrigation, the analysis also concerned the national legislation issued to comply with Article 9 of the WFD: the Legislative Decree of the Ministry of Agriculture on water

metering and estimates in agriculture (MIPAAF, July 31 2015), and the Legislative Decree of the Ministry of Environment on the evaluation of ERCs for all water use sectors (MATTM, 39/2015), and the Action Plan for agriculture issued by the Ministries of Agriculture and Environment together with all the Italian RBD authorities.

Second, the RBMP is a manifold plan composed of 11 documents. For the analysis of the case study, the following documents were considered: *Volume 1: Descrizione generale delle caratteristiche del distretto*, *Volume 3: Sintesi delle pressioni e degli impatti significativi sullo stato delle acque*, *Volume 6: Stato e obiettivi ambientali delle acque*, *Volume 7: Analisi economica degli usi e dei servizi idrici*, *Volume 8: Programma delle misure*, *Allegato 8/A: Repertorio delle misure*. These documents were studied to acquire information on: the RBD's natural, economic and social characteristics, the way in which coordinated decision-making and participation were structured along the different steps of implementation, how measures to improve irrigation efficiency were selected, and finally which measures were included in the PoMs.

Finally, for each region of the Eastern Alps RBD, the legislation enacting the Legislative Decrees MIPAAF July 31, 2015, the MATTM 39/2015 and other regional legislation related to WFD implementation, were analysed.

Analysis of the legislation, on one hand, contributed to widen and deepen the understanding of the legislative and political contexts in which WFD is implemented, on the other, it allowed for a triangulation of the results obtained through primary data collection.

5. Coordination and Participation Boards under the European Water Framework Directive: Different Approaches Used in Some EU Countries

Details: This chapter is based on the paper Pellegrini, Bortolini, Defrancesco, 2019. Coordination and Participation Boards under the European Water Framework Directive: Different Approaches Used in Some EU Countries. *Water* 11, 833. <https://doi.org/10.3390/w11040833>.⁷

5.1. Abstract

River basin planning under the European Water Framework Directive (2000/60/CE, WFD) poses two major challenges to EU countries: coordination among administrative units for large-scale river basin planning and the inclusion of interested parties in decision-making processes. To face both challenges, many Member States have established Coordination and Participation Boards at the River Basin District or river basin level. These boards can be defined as multi-agency and multi-actor groups that support the development of inclusive and coordinated river basin planning to comply with the WFD requirements. The aim of this paper is to understand the functioning and effectiveness of the coordination and participation boards in promoting participatory river basin planning in seven EU countries. We built a conceptual framework, based on spatial fit, coordination capacity and participatory governance theories, to assess the scale at which these boards are established as well as the type of coordination and participation they support. The results indicate the relevance of the sub-River Basin District level to promote participatory decision-making. However, a clear linkage between participatory processes conducted at the sub-district level and decision-making processes at River Basin District should be established. Only if this link is well established are the outcomes achieved through the coordination and participation boards included in river basin plans. Moreover, we identified a lack of knowledge on how planning and implementation activities carried out at sub-River Basin District are aggregated and

⁷ Numbers of the tables and figures, as well as reference style are maintained as in the published paper, while numbers of headings and layout have been modified to be consistent with the rest of the thesis.

coordinated for the entire District. Research could contribute to this issue, by focusing on coordination mechanisms and problems that occur at the River Basin District level.

Keywords: Water Framework Directive; policy implementation; integrated water resources management; river basin planning; public participation; water governance; scale; top-down and bottom-up

5.2. Introduction

European water resources are definitely under pressure: more than half of surface water bodies have a less than good ecological status, and approximately 25% of the groundwater is reported to have a poor chemical status [1]. Moreover, European waters are endangered by over-abstractions and increasing climate change effects, such as droughts and short periods of rainfall [2]. In 2000, the Water Framework Directive (2000/60/CE, WFD) established the European strategy to address these increasing concerns about water resources. The reference to the principles of Integrated Water Resources Management (IWRM) is evident for some aspects of the WFD, such as river basin management, participatory approach and the acknowledgement of the economic value of water. However, the WFD reflects a narrower and more technical vision of IWRM with a primary focus on water sector [3] and its overall aim is to establish a framework for the protection of water resources that applies to all available water bodies in Europe. For this purpose, two targets were set in 2000: first, preventing further deterioration of water bodies, and second, improving their state with the aim of achieving “good water status” by 2015 (Article 4, WFD). As a “framework” directive, the WFD does not prescribe EU countries what to do to improve water quality and management but rather tell them how to do it [4–6]. In particular, the WFD establishes the river basin planning process as the “central tool” to achieve water quality objectives [7]. Outputs of this process are the River Basin Management Plans (RBMPs) that are manifold documents that go from the evaluation of the state of water bodies within a specific hydrological scale, the River Basin District (RBD), to the identification of a set of measures to improve and restore qualitative and quantitative aspects of water resources [7]. The identification of RBD as the

management unit of water bodies, and the development of RBMPs, can be observed as the institutionalization of the principle of spatial fit at the European level [8]. This large-scale configuration for river basin planning poses a great challenge to EU countries in terms of coordination among the government tiers at different geographical scales of the RBD. Moreover, the WFD mandates the involvement of civil society at each stage of the planning process [9]. Kaika [10] argues that the new decision-making procedures and institutions that the WFD implementation mandates can be seen as “a top-down effort to create social capital” and that the interaction between this WFD-generated social capital and the pre-existing social capital determines the final implementation. Newig and Koontz [11] synthesized this new approach for policy implementation established at the EU level with the expression Mandated Participatory Planning (MPP). The latter tries to grasp the main aspects of this implementation style that are: the creation of new governance levels and the need to improve horizontal and vertical coordination for effective policy implementation, the participation of private actors in decision making, “the creation of plans that are in themselves political programmes” [11]. After the first implementation cycle (2009–2015) it was evident that implementation of the WFD has been cumbersome for many Member States [12,13]. By studying the adaptation to the requirements of river basin management and participation in thirteen EU countries, Jager et al. [14] concluded that “established routines of environmental decision-making” were kept in most of the countries. Nevertheless, the authors found that implementation of the WFD encouraged the creation of organized boards that bring together authorities and stakeholders for the development of RBMPs [14]. These boards promote coordination and participation for river basin planning and can be seen, we argue, as the new social capital generated by the WFD under Kaika’s definition [10].

Even though the WFD does not formally require the institution of these boards, in the guidance document on public participation the European Commission suggests the creation of steering and advisory boards as methods to promote coordination and participation in many steps of the planning process [9].

We believe that the governance changes that occurred in EU countries as a consequence of the WFD implementation deserve a specific attention from research.

Consequently, the aim of this paper is to understand what type of coordination and participation these boards support for the development of RBMPs. To this end, we performed a qualitative meta-analysis of the implementation strategies in 7 EU countries, focusing on the role of coordination and participation boards in the development of RBMPs. In this paper we refer to Coordination and Participation Boards (CPBs) to identify multi-agency and multi-actor groups supporting the development of river basin planning.

In doing so, this paper aims to contribute to the growing branch of the literature that addresses the governance implications of the WFD [15] and to provide useful suggestions for the future implementation cycle.

The rest of the paper is organized as follows: the second section provides more information about the procedural obligations established by the Directive for the development of RBMPs and public participation; the third section provides the theoretical framework that guides our analysis. We referred to the theories of spatial fit, coordination in public management and participatory governance and we identified three research questions: (1) At what scale are CPBs established? (2) How is coordination among administrations within the same RBD achieved? (3) How are civil society's interests included in RBMPs? The fourth part describes the method adopted to select the EU countries for whom CPBs are analysed; in the Results section, we analysed the formal institutional changes occurred in selected EU countries to comply with the WFD's requirements; in the sixth section, we discuss the results in view of the conceptual framework, focusing on what implications institutional changes have in promoting effective coordination and participation strategies; finally the Conclusion outlines the main results of our analysis, limitations and future avenues of research.

5.3. River Basin Planning under the EU Water Framework

Directive

To achieve both objectives of good water status and not deterioration, the WFD establishes two main procedural obligations that EU countries should undertake. The first requires Member States to base the planning and management of water bodies on hydrological boundaries rather than on administrative ones. This requires setting up a

new unit for the management and protection of river basins, the RBD, which is “the area of land and sea, made up of one or more neighbouring river basins together with their associated groundwaters and coastal waters” (Article 2, WFD). For each RBD, an RBMP must be developed (Article 13, WFD), which includes the analyses of the RBD characteristics and of the main physical and societal pressures on the water resources; the designation of specific objectives for each water body according to the pressure and the state identified; monitoring programmes to trace improvement in the state of the water resources; the economic analysis of water uses and services; and the Programme of Measures (PoMs). The latter is a key document of RBMPs as it establishes all the activities that have to be carried out on water bodies to achieve the good status objective.

The second obligation asks Member States to engage in participatory processes by including all interested parties into the development of RBMPs. To operationalize this bottom-up approach, information supply, stakeholder consultation and the active engagement with civil society in the development of RBMPs are required by the WFD (Article 14). Both information supply and consultation are mandatory for WFD implementation but do imply a direct engagement of the public in the decision-making process, while active involvement is encouraged by the European Commission and implies collaboration among authorities and interested parties in the development and implementation of RBMPs and PoMs [9].

Due to the heterogeneity of water governance systems across EU countries, river basin planning and public participation can be achieved in many ways, and the Directive recognizes a high degree of flexibility in addressing both procedural obligations. For instance, the WFD does not require that specific competent authorities accountable for the WFD are created, nor does it state that one specific implementation approach (such as centralized, regional, or local) is superior to the others. In addition, the Directive recognizes that the planning process may occur at different geographical scales (i.e., sub-basin) or per water themes [7]. In the same vein, public participation may be carried out at the scale deemed most appropriate by countries as long as a clear reference to the RBD is made and information flows across the different scales are guaranteed [9].

Despite this flexibility, the WFD is unequivocal on the effects that both requirements should produce. For instance, Article 3 states that “Member States shall ensure that [...] all programmes of measures are coordinated for the whole of the river basin district” (WFD). This requirement has implications both in terms of coordination across administrative levels at different geographical scales of the RBD and for cross-sectoral coordination among different water-use sectors that must align their interests and objectives to improve the state of the water bodies [3,16]. In the same vein, the WFD links the achievement of effective policy implementation to public participation [4,17,18]. For instance, participatory planning is supposed to improve the quality of river basin planning, as expert-based and local knowledge are included in the decision-making processes, as well as to increase social acceptance towards decisions that should, in turn, facilitate implementation. Moreover, public participation should increase public awareness and the ownership of environmental problems [19] and facilitate a process of mutual understanding among parties as well as social learning [3,20,21].

In summary, the adoption of both procedural requirements by Member States is expected to produce results in terms of administrative and sectorial coordination, as well as of inclusive decision-making. Whether these outcomes are achieved depends on the actions and activities that the actors involved in water management and protection establish [22]. In this paper, we focus on a specific activity that Member States usually engage in to promote inclusive and coordinated river basin planning and management: the creation of CPBs. These boards, established at the RBD or sub-RBD scale, address the challenge of coordination through the creation of multi-agency and multi-actor groups that develop or support the development of RBMPs and PoMs.

5.4. Conceptual Framework to Analyse CPBs

Cross-administrative coordination and civil society engagement in decision-making procedures are surely issues widely discussed in public management literature.

New Public Management (NPM) reforms that occurred in many Western democracies during the 1980s and 1990s challenged the notion of the State as the only

provider of public services [23]. Central government lost its capacity to give direction to society, while the space of decision-making became wider including decentralized state actors, societal actors and supra-national actors [24]. This modern setting is referred to with the overarching definition of governance. As Hufty observes, governance is a social fact that has to do with the way in which each society develops its own ways of making decisions and resolving conflicts [25]. This definition explains why this term is widely used in governance literature. Kjær [23] provides a basic definition of governance saying that it entails “something broader than government, and it is about steering and rules of the game”. For our research’s objectives, three specific aspects of this social phenomenon are relevant. The first relates to how multiple actors that are engaged in decision-making processes coordinate their activities to find solutions for collective problems (Coordination in public management and administration). The second addresses the issue of how decision-making processes include the interests of civil society in policy development (Participatory governance). The last one regards the capacity of social institutions to match themselves with the natural and social domains they influence (Spatial fit).

Coordination in public management and administration. Many governance studies agree that the dispersion of authority across jurisdictions and societal actors is normatively superior because it allows decisions to be taken closer to the places where problems arise [26] and it facilitates the achievement of benefits at multiple scales as well as experimentation and learning [27]. However, this broader space of decision-making, together with the hollowing-out of the State, makes coordination a huge challenge.

MLG research, for instance, raises “the difficulty of having to coordinate governmental and non-governmental actors at different territorial levels in ways that do not conform with the hierarchical relations or the mechanisms of consultation currently in place in member states” (Piattoni, 2008 as cited by [28], p. 12). Rhodes stresses the meaning of governance as self-organizing networks that risk creating problems to governability when not properly managed by central government [29]. Dang et al. [30], indeed, define governance capacity as the “actors’ ability to cooperate to solve collective problems” while institutional capacity is intended as the

institutional settings that allow actors' cooperation. Strategies to improve coordination often find a compromising solution between the increase of central control and the promotion of more collaborative types of decision-making [31]. Rhodes argues that for managing networks of interdependent actors that characterize any governance system, government should search for new tools different from traditional authoritative power, such as "game-playing, joint action, mutual adjustment and networking" [29]. Elinor Ostrom stresses the need for institutions that enable trust among participants engaged in a "dilemma situation" of resources management to promote social cooperation [32].

The implementation of the WFD engages first and foremost public administrations concerned with water management and protection. For this reason, research addressing the issue of coordination in public administration is particularly relevant for our study. Wegrich and Štimac describe three main types of coordination that have been observed for public administration and executive government: hierarchical coordination, negative horizontal coordination and positive horizontal coordination [31]. In the first type of coordination, decisions are made at high levels (by executives, leaders, etc.) and affect lower levels regardless of the individual distribution of the costs and benefits [31]. In negative horizontal self-coordination, instead, the policy is developed by the group with the main responsibility for the issue and then is analysed by the other units involved in the decision-making to ensure that the draft does not violate or contradict other policy domains [31]. Finally, positive horizontal self-coordination occurs when proposals from different units are combined to elaborate a joint plan. This type usually involves the creation of task forces or specific working groups [31].

Participatory governance. We borrow definitions from both collaborative governance and participatory governance theories. Collaborative governance is defined as "A governing arrangement where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policy or manage public programs or assets" [33]. Participatory governance, instead, can be defined as "the regular and guaranteed presence when making binding

decisions of representatives of those collectivities that will be affected by the policy adopted” (Schmitter, 2002 as cited by [34], p. 595). Engagement of non-state actors is certainly the common trait of both definitions; however, collaborative governance implies a two-way communication and influence between public agency and stakeholders and its aim is a multilateral consensus-based deliberation [33]. Partnerships, collaborative management, interactive decision-making can provide examples of this bottom-up approach of decision-making [33,35]. Participatory governance, instead, implies decision-making processes initiated from the top and that include stakeholders before the policy is created [34]. Newig and Koontz [11] place WFD’s requirement for public participation under the umbrella of participatory governance and underline that the rationale for having stakeholder involved in the development of RBMPs is to enhance the effectiveness of policy delivery. The guidance document of public participation, in fact, clarifies that “Public participation is not an end in itself but a tool to achieve the environmental objectives of the Directive” [9]. Newig and Koontz [11] identify three dimensions of participatory governance: representation, information flow and influence. The first relates to the extent to which participatory processes reflect the variety of interests of society. The second, at least in the terms of the WFD, can range from information supply to the public (one directional flow), consultation of interested parties (bi-directional flow with advisory function), active engagement (bi-directional flow with deliberative function). Finally, influence is related to the capacity of participatory processes to actually determine decision-making [11]. This last dimension is particularly relevant for our study, because it provides information on whether, and under what conditions, the outcomes of participatory processes are included in RBMPs.

Spatial fit. Spatial fit, and its related problem of fit, refers to the attempt to improve the capacity of social institutions to match themselves with the natural and social domains they influence [8,36,37]. In terms of water resources management, the answer to the problem of fit has come from the river basin approach or watershed approach [38]. Although river basin management was a practice since ancient time, it is only in the last century that this approach was deemed at the base of sustainable water resources management [39]. Empirical research on the topic highlights the

difficulties of matching institutional boundaries with natural ones [40] and stresses the need to take into account also other dimensions of fit, for instance, with political, socioeconomic and cultural features, to support sustainable water management [8,41–43]. CPBs established at the river basin level, can be regarded as an endeavour to make institutions more consistent with natural and societal processes.

The theoretical background described in this section allowed us to identify the three relevant factors that we analysed in the selected case studies: the scale, the type of coordination and the type of participation. For each factor, a specific research question has been identified and possible options outlined. Table 1 summarizes the theoretical background, the factors, the research questions and options that guided the analysis of CPBs in the selected EU countries.

Table 1. Conceptual framework used to analyse the CPBs.

Theoretical Background	Factors	Research Question	Options
Spatial fit	Scale	At what scale are CPBs established?	Administrative RBD Sub-RBD Hierarchical coordination
Coordination in public management and administration	Type of coordination	How is coordination among administrations within the same RBD achieved?	Negative horizontal self-coordination Positive horizontal self-coordination Representation
Participatory governance	Type of participation	How are civil society's interests included in RBMPs?	Information flow Influence on decision-making

Source: author's own elaboration

5.5. Materials and Methods

This article analyses empirical studies, European Commission implementation reports and consultants' reports that address the topic of water governance adaptation to WFD requirements in EU countries. Using the Scopus and Web of Science databases, papers were first screened by title and abstract to exclude non-English written papers; papers on physical or natural science; mathematical, technology and software-based research; studies on the exportability of the WFD to non-EU countries and meta-analyses. This first screening led us to consider 70 studies. This analysis

allowed us to understand the overall implementation pattern for the following countries (not for all EU states as none or very few studies were found for some countries): Denmark, Latvia, Lithuania, Poland, The United Kingdom, Greece, Finland, Germany, Italy, Spain, Portugal, France, Sweden, The Republic of Ireland and The Netherlands. These countries represent a good sample of different approaches used for WFD implementation: the centralized approach (Denmark, Latvia, Lithuania, Poland, The United Kingdom, and Greece), the federal/regional approach (Finland and Germany), the river basin approach (Italy, Portugal, France, Sweden, and Spain), the local approach, (The Republic of Ireland), and the multi-level approach (The Netherlands). However, as the aim of the study is to understand the structure and functioning of CPBs, we restricted our analysis to 64 studies referring only to those countries for which detailed information on the topic was available. Thus, the focus was placed on the following countries: Denmark, England and Wales, Germany, Italy, France, Spain and Sweden. This selection certainly constitutes a limitation to a more comprehensive analysis of coordination and participation across EU countries. Nevertheless, this study allows for an analysis of some of the different approaches used in Europe to comply with the WFD requirements.

5.6. Results

Implementation of the procedural obligations described in the Section 5.3. varied considerably across EU countries depending on the different domestic water policies already in place. In this section, we analyse formal implementation of both requirements of river basin planning and participatory decision-making in the seven selected countries with a focus on CPBs. In particular, we looked at how countries have adapted their water governance structures and what role, composition, functioning and resources “availability CPBs had in the development of RBMPs. We overall identify two main approaches for the implementation of the WFD: the centralized and the decentralized. Specifically, we identified the centralized approach in Denmark, England and Wales, and the decentralized in Germany, Italy, France, Spain and Sweden although these countries differ considerably within the group.

5.6.1. Centralized Approach for WFD Implementation

5.6.1.1. Denmark

The first phase of WFD implementation in Denmark was characterized by a rigid top-down approach. According to Liefferink et al. [44], the main reason for this centralized planning approach was related to the fear that a more participatory approach would have increased the costs of the decision-making process. The Nature Agency (NA) under the Ministry of Environment (MoE) and its seven local agencies were given the responsibility for the development of RBMPs for the four RBDs [45]. Additionally, PoMs were designed in a highly centralized process with a limited inclusion of municipalities despite their role of recipients and implementers of the measures [46]. In 2013, however, the Ministry of Environment reformed water governance for WFD implementation and established 23 new water councils (WCs) at the sub-RBD level composed of a maximum of 20 members each, representing a variety of stakeholders of water resources protection, use and management [47]. The new structure for the WFD implementation is organized as follows: the NA is still responsible for RBMP development, and it establishes a fixed regulatory framework within which WCs can work (e.g., the NA establishes the minimum environmental improvements that PoMs must make). Then, the municipalities organize and facilitate the WCs' work, which basically consists of providing advice to the municipalities for the drafting of PoMs. [47]. Concerning funding sources, for the implementation cycle 2015–2021, the Danish government allocated DKK 695,700,000 (€93 million) to the 23 water councils and municipalities, and the money was distributed across WCs according to the NA's criteria [47]. Hence, WCs have a twofold function as they allow for stakeholders' participation in the planning process, and they provide advice to local authorities even if they do not have veto power over municipalities' decisions.

5.6.1.2. England and Wales

WFD implementation in England and Wales shares many common features with the Danish experience. During the first planning cycle (2009–2015), in fact, water planning was centralized at the Environment Agency (EA), with poor consideration of local authorities and stakeholders' organizations, which were treated merely as "co-delivers" of PoMs rather than "co-deciders" [48]. To ensure a degree of coordination

and stakeholder consultation, the EA established RBD Liaison Panels composed of representatives of key sectors of the district who were responsible for PoMs implementation [19]. However, these panels were mainly used by the EA to transmit information to other administrations and stakeholders, rather than being real participatory bodies [48,49]. Similar to Denmark, for the second cycle (2015–2021), the government launched the so-called “Catchment-based approach” (CaBA), re-focusing the scale of water planning from 10 RBDs to 93 individual catchments [50]. At the catchment scale, the national government encouraged the creation of multi-actor groups, called “Catchment Partnerships” (CPs). The structure, composition and organization of the CPs are not established by the national government, but these partnerships can organize their activities based on local needs. However, the aim of these collaborative groups is to facilitate collaborative works between local communities and the EA’s planning process through the identification and implementation of measures. For its part, the EA encourages such initiatives by providing data, the framework of analysis and funding support. During the start-up of the process, the government allocated £1.6 M to be distributed across the CPs according to criteria delineated by the EA. After the initial funding cycle, the CPs are expected to establish their own funding sources to support their activities [51]. Moreover, in each CP, an EA Catchment coordinator is responsible for ensuring that there are information flows and collaboration between the experts of the EA and the CPs [51]. Although the EA should show “due regard to the advice from those partnerships in relation to the priorities set out in the River Basin Management Plan” [51], the leading role in the development of RBMPs and PoMs is kept in the hands of the Environment Agency.

5.6.2. (Decentralized) Federal Approach for WFD

Implementation

Germany

Water management in Germany is traditionally organized around administrative-political boundaries rather than hydrological ones [41]. Following the WFD, 10 RBDs were identified, and the Länder Ministries for the Environment were appointed as

competent authorities for WFD implementation for all water categories [52–54]. As many RBDs include more than one Federal State (Länder), they are required to coordinate their activities for RBMP development [52]. A joint working group of Federal States, called LAWA, insures cross-state cooperation, but the development of joint RBMPs among Länder belonging to the same RBD is not general practice [14]. The governance for WFD implementation varies depending on the Federal State but is generally organized as follows: at the Länder level, the federal ministry for the environment provides general instructions on the planning process and approves RBMPs. At this level, coordination boards are established, composed of groups of technical experts to support the implementation of the WFD. However, real stakeholder engagement and participation occur at the catchment level, where long-term participatory institutions, called working groups (WGs) or area cooperation (AC), were established [14,20,42,55,56]. These CPBs are established by the Länder Ministries for the Environment and are usually led in cooperation with the Federal State environmental agency, which sets the agenda for meetings and selects participants among existing networks of organizations [34]. These boards are composed of local authorities, water-user associations, and NGOs, and their task is to discuss and identify feasible and cost-effective measures [57]. The measures selected by the CPBs are then returned to the Länder Ministries for the Environment to elaborate the final versions of the RBMPs and PoMs. In terms of funding, we did not find information for the whole country, but both Newig et al. [42] and Koontz and Newig [34] report that the Lower Saxony Ministry for the Environment allocated €15,000 to each AC to support their work.

5.6.3. (Decentralized) Traditional River Basin Approach for WFD Implementation

5.6.3.1. Italy

In Italy, the institutionalization of river basin management occurred before WFD implementation.

In 1989, Law 183/1989 was the first attempt to establish a systemic management of land and water resources based on river basin boundaries with specific river basin

authorities. In addition, Law 36/1994 identified “optimal territorial units”, where intermunicipal agencies identified by regional administrations were in charge of managing all the water services, from water capture to sewerage and depuration systems, in an integrated way to overcome administrative fragmentation. However, both laws were implemented to a limited extent. The main governance innovations established by the laws—namely, the creation of functional jurisdictions for water management and protections—were basically overlooked [58]. In 2006, for WFD implementation, specific competent RBD authorities (RBDAs) were designed and appointed to develop RBMPs and PoMs and ensure public participation [52]. According to the law, these RBDAs should have replaced the pre-existing river basin authorities and become the coordinating and decision bodies for WFD implementation. However, this replacement occurred only in 2016, so that the first and second rounds of RBMPs were approved under the supervision of the weak pre-existing river basin authorities and large-scale river basin planning was very limited [58–61]. Moreover, in the first implementation cycle, no additional funding sources were allocated by the Ministry of the Environment to the RBDAs. Regardless, the governance for WFD implementation is organized as follows: regional administrations (R in Figure 1) develop their own water protection plans, which are similar to RBMPs and contain PoMs. RBDAs should ensure that the regional plans are consistent with the objectives set at the RBD level. RBDAs are composed of two decisional bodies, namely, the institutional and the technical committees. The first is the deliberative body of the RBD authorities and is composed of the head of the RBD authority, all the regional administrations in the district, representatives from the main national ministries and representatives from the agricultural sector, which have only an advisory function. The second is a technical body that provides technical support for the development of RBMPs (Article 63 Legislative Decree 152/2006). However, in addition to these institutional bodies, coordination is mostly achieved through more informal meetings at the district or sub-district level. RBD authorities also organize road shows in different places and at different levels of the RBD to provide information on WFD implementation to citizens and stakeholders. In summary, although RBDAs are competent authorities for WFD, the main actors for river basin

planning are still the regional administrations (see in Figure 1, where the transparent triangle of RBDA is compared to that of regional administrations).

5.6.3.2. France

In France, river basin management was established long before the WFD, in 1964, when Water Agencies (WAs) at the river basin level were created [62]. Moreover, in 1992, the French Water Development Master Plan established planning at the watershed level, and citizens were allowed to give input to these plans by means of Basin Committees and Local Water Commissions [63]. Following the WFD, the French water governance is organized around two main governance levels: the RBD where the WA, and in particular its legislative body called the Basin Committee (BC), adopt a river basin management plan (SDAGE) that is equivalent to the RBMP under the WFD [44]. In addition, there is the local level, where local authorities develop their own water management plans (SAGE) and implement measures [64]. At the RBD level, the BC is composed of elected representatives from ministries (20%), regional and local governments (40%), water users and associations (40%) (such as farmers, industries and NGOs). The river basin plans adopted by the BC are then approved by the *prefet*, which is a national government representative designed as the official competent authority for the WFD in each RBD, so that central control over the plans is insured [44]. The WAs are also composed of executive bodies, called, again, water agencies, which are “state-owned, financially autonomous bodies responsible for levying abstraction and pollution charges on water users” [64]. At the sub-basin and local levels, local authorities can elaborate the cross-municipality plans called SAGE. The latter is developed through a local water commission (CLE) composed of representatives of the state (25%), local authorities (50%) and users (25%) [65]. Upon WFD implementation, water governance in France has become increasingly less centralized [64]; however, at the RBD level, through the *prefet*, and at the sub-RBD level, because of CLE composition, central control is ensured.

5.6.3.3. Spain

River basin management in Spain was established in 1926 when the “*Confederaciones Sindicales Hidrológicas*” were created. Moreover, in 1985 river basin plans became compulsory and approved as Royal Decrees by the government [66]. Upon the WFD implementation, the country has been split in 25 RBDs, of which 9 are inter-regional RBDs made up of several *Comunidades Autonomas* (regions hereafter), while 16 are intra-regional RBDs. Competent authorities for inter-regional RBDs are the *Confederaciones Hidrográficas* (CHs) that are river basin authorities belonging to the Ministry of the Environment and Rural and Maritime Affairs (MMARM). CHs have a high degree of financial autonomy because they receive fees from users; however, the MMARM also contributes to their functioning by providing them with financial resources and appointing their presidents and water management boards [67]. In the intra-regional RBDs, instead, regional hydraulic administrations are the main competent authorities for the WFD implementation [52]. In this organization, CPBs are established both at national and RBD levels. At the national level, the National Water Council (NWC) is composed of the national government, regional and local administrations, CHs and regional hydraulic administrations that together are called *Organismos de Cuenca*. NWC provides information and coordination for the development of RBMPs and for the drafting of National Water Plan. At RBD, the CHs are composed by four different bodies: the executive body, the management board, the Water Council and the Committee of Competent Authorities. These bodies have a similar composition, including representatives from state, regional and local administrations belonging to the same RBD and the main water users. Although with different functions for water planning and management, all these bodies support coordination and participation for the planning process. In particular, the Water Council is the organism in charge of planning process and participation, while the Committee of Competent Authorities ensures administrative cooperation for the execution of water protection standards [52]. Concerning public participation, very inclusive forms of participation have been established following the WFD implementation. However, participatory processes are usually organized at regional level where specific sub-groups of public and private stakeholders are established;

moreover, specific offices have been created within regional administrations to foster participation [18,20].

5.6.4. (Decentralized) Adaptive River Basin Approach for WFD Implementation

Sweden

Sweden has undergone formal institutional changes to comply with the river basin management requirement established by the WFD [14]. Before the WFD, competences for water protection and management were shared between two actors: the central state was responsible for water regulation, and the municipalities were responsible for water and land-use planning [14,68,69]. For the WFD, 5 RBDs and new regional water authorities (RBDAs) were created [70]. These new authorities are responsible for coordinating water management among the regional county administrations of the RBD, while in each RBD, formal decision-making is carried out by a Water Board (WB), which is made up of government-appointed experts [14]. Coordination among the RBDAs is also foreseen; for instance, the measures listed in the PoMs are the same for all RBDs [70]. While the RBDAs are responsible for formal decision-making for WFD implementation, participatory processes are mainly conducted at the sub-RBD level through Water Councils (WCs), which are composed of regional and local authorities, companies and interest groups [70]. At the local level, stakeholder engagement was already in practice, and WCs inherited this tradition. The function of the WCs is twofold: they have an advisory role and should be consulted by RBDAs before making decisions, even those regarding technical issues (e.g., the classification of water bodies or EQS). They should also serve as arenas for knowledge sharing, the identification of water problems and the development of solutions [70,71]. WCs receive economic support from water authorities depending on some requirements, such as the broad representation of stakeholders, the size of the catchment, and the number of municipalities and inhabitants [71]. However, the advice and comments provided by WCs on the RBMPs and PoMs are not binding for the RBDAs [71].

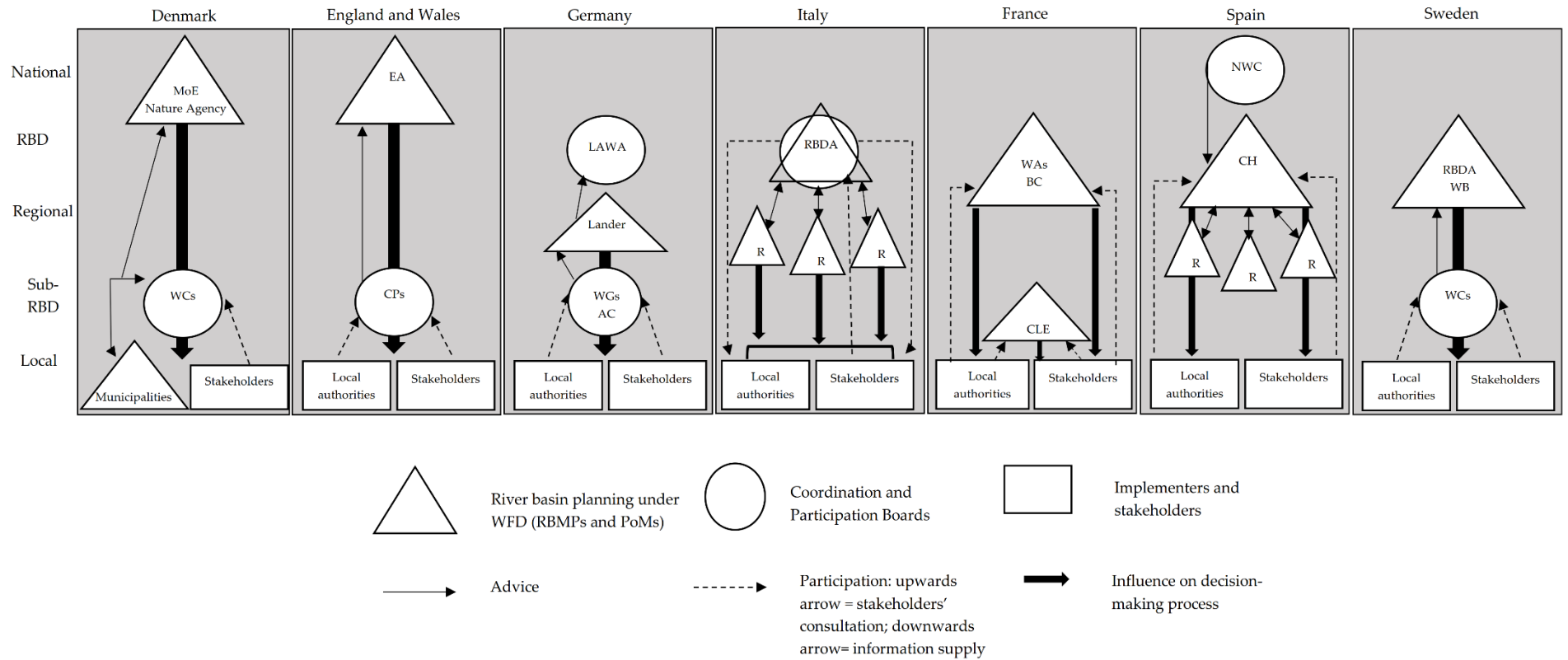


Figure 1. Governance structure for WFD implementation in the selected countries. Source: author's own elaboration.

5.7. Discussion

After the analysis of the implementation structures, in this section we discuss the implications that institutional changes undertaken in the 7 EU countries have in promoting effective coordination and participation strategies. Table 2 summarizes the main results of our analysis based on the conceptual framework provided in Table 1. In doing so, we are left with four questions that summarize what emerges from the countries' analysis and may suggest future research needs.

Table 2. Summary of the main results based on the conceptual framework provided in Table 1.

Country	CPB	Scale	Type of Coordination	Type of Participation
Denmark	Water Council	Sub-RBD	Hierarchical + positive horizontal coordination	Representation: Medium Information flow: Stakeholders consultation Influence: High
England and Wales	Catchment Partnership	Sub-RBD	Hierarchical coordination	Representation: Low Information flow: Stakeholders consultation and active engagement Influence: Low
Germany	Area Cooperation Working Group	Sub-RBD	Information not available for the RBD, While positive horizontal coordination within AC	Representation: Medium Information flow: Stakeholders consultation Influence: Low
Italy	RBD Authority	RBD	Negative horizontal coordination	Representation: Low Information flow: Stakeholders consultation (mostly regional and state representatives) Influence: Low
France	Basin Committee Water authority	RBD and Sub-RBD	Positive horizontal coordination	Representation: Medium Information flow: Stakeholders consultation Influence: High
Spain	National Water Council <i>Confederaciones Hidrográficas</i>	National and RBD	n.a. (not available)	Representation: High Information flow: Stakeholders consultation and active engagement Influence: mixed results
Sweden	RBD Authority Water Council	RBD and Sub-RBD	Positive horizontal coordination at municipal and RBD level. No clear coordination between the two levels	Representation: Medium Information flow: Stakeholders consultation Influence: Low

Source: authors' own elaboration

5.7.1. Denmark and England: Softening the Top-down Approach (Apparently?)

- Scale. Denmark and England have both reformed their water governance structures moving from the first to the second implementation cycle. Interestingly, both countries opted for the sub-RBD scale as the optimal level for enhancing coordination and participation rather than the RBD scale. In England, the appropriateness of the sub-basin scale was endorsed both by the government and the involved organizations [50]. In Denmark, the large-scale river basin approach is perceived as a limiting factor since the size of the RBD is considered to be too broad to facilitate access to local knowledge [47].

- Type of coordination. As Figure 1 shows, in either case, the structure for WFD implementation is top-down, with the NA and EA leading the planning process. The presence of WCs and CPs certainly softens the hierarchical approach to coordination; in Denmark, as it will be discussed in the next point, collaborative planning has occurred in some cases. In alignment with Wegrich and Stimac [31], we could argue that in Denmark, a mix of hierarchical coordination and of positive horizontal coordination achieved through CPBs, is in place. In England, the hierarchical approach seems to still dominate in the implementation process as it is discussed in the next point.

- Type of participation. The three dimensions of participation identified by Newig and Koontz, display quite differently in the two countries. Concerning representation and information flow, in Denmark, decisions on who can have access to the process are defined within the fixed regulatory framework given by the NA. Participation was limited to stakeholder organizations, with an uneven representation of interest groups, generally in favor of agricultural water users [72]. The strict framework provided by the NA, defining timing, funding allocations, competences and influence of WCs on PoMs elaboration, allowed WCs and municipalities to work effectively [47] but limits these participatory processes to “expanded stakeholder consultation” and does not provide any possibilities for active public involvement [72]. Concerning the influence, in Denmark the measures concerning stream management proposed through the

collaboration of the municipalities and WCs were adopted by the NA for the development of RBMPs [47]. In this case, CPBs were given a deliberative power to identify the most cost-effective measures and the clear regulatory framework provided by the NA, together with funding allocation, allowed an effective co-production of PoMs [47]. However, a second factor explains this successful collaborative planning and relates to the role of municipalities in the planning process. Municipalities, in fact, by acting as facilitators and intermediaries between the central level and lower level of decision-making, established a link between the *loci* of knowledge production and those of policy formulation. Scholars highlight the need for institutions that act as “interface” to ensure that the results of collaborative planning are integrated into the decision-making processes [73] and for the active participation of decision-makers in continuous learning processes [74]. In the Danish case, municipalities fulfill both needs and this may explain the elaboration of collaborative planning.

In England concerning representation and information flow, the EA gives considerable leeway on CPs organization and activities. Euler and Heldt [17], for instance, describe the CPs in the Thames catchment that are coordinated by the non-profit charity Thames21 “which works with the community to improve rivers and canals for people and wildlife”. The authors highlight that despite the non-profit organization is able to promote a very participative form of information sharing and consultation, representativeness in participatory processes is not guaranteed because all the activities are volunteer-based [17]. Similarly, Rollason et al. [75] found that CPs are embedded into local social structures and are found to be effective in improving the horizontal integration of management practices among the members of the partnerships. However, the same authors highlight that traditional top-down approaches still dominate planning and management activities and that “participation is limited in either power transfer and/or representation” [75].

5.7.2. Germany: To Change or Not to Change?

- Scale. In Germany, long-term participatory institutions have been established at the sub-RBD scale to comply with WFD requirements. These CPBs, together with the Lander, determine how the policies are shaped and implemented in practice, despite the WFD requirement of large-scale river basin management [57].

- Type of coordination. Cross-administrative coordination in Germany occur at supra-federal state level, within the LAWA, and at sub-basin level, through AC and WGs. However, since the development of joint RBMPs among Lander belonging to the same RBD is not general practice, we consider only coordination carried out at sub-basin scale. The authors found that the AC supported the “mutual understanding of the views and positions of stakeholders and even help to develop a shared perception of problems” [76]. This may suggest the achievement of positive horizontal self-coordination within the AC.

- Type of participation. CPBs in Germany usually include several interest groups from both public and private domains. Municipalities, local water authorities, farmers and fishery associations, environmental NGOs, water boards and state representatives usually participate in AC or WGs [20]. However, many authors highlight the uneven representation of environmental concerns compared to agricultural interests and highlight the risk for “co-optation” of environmental actors from stronger interest groups [42]. Participation through AC has similar characteristics with the WCs in Denmark in terms of expanded stakeholder consultations and is found to be effective in promoting social outcomes such as networking, satisfaction of participants, mutual understanding and shared perceptions of environmental problems [20,76]. Concerning influence, the extent to which the decisions made by the CPBs are actually considered by the federal ministries of environment for the development of RBMPs and PoMs is questionable. Scholars found a limited impact of the measures identified by the WGs or AC on the final draft elaborated by the federal ministry for the environment [20,34,42,57]. There may be strategic reasons behind the decision of using measures identified by the CPBs only as a general reference [34]; in

addition, water planning in larger and aggregated management units cannot be, by nature, as specific as local water planning [42]. However, authors identify other reasons that may explain the low capacity of the CPBs to influence decision-making. The first relates to the unclear framework provided by the federal state environmental agency to define CPBs' functioning. Koontz and Newig [34] indicated that the guidelines given by the federal state environmental agency to AC in Lower Saxony were vague and unclear about how the CPBs could structure their work. This caused performance to vary across working groups of AC even for substantial aspects, such as how to propose measures and how to decide which ones to include in the final draft [34]. The second aspect is intrinsic of the complex shift from administrative-based to hydrological-based water planning. Germany, like almost all EU countries, should consider who decides "in this complex balance between local basin bodies and federal national administrations" [3]; otherwise, it runs the risk of creating two disconnected governance levels, which will end up in confusion, conflicts and overlaps [73].

5.7.3. Italy, France and Spain: Keeping the Status Quo?

- Scale. Italy, France and Spain established planning and the management of water bodies along hydrological boundaries before the WFD. Moreover, all these countries set up competent authorities and CPBs at the RBD scale to comply with the Directive's requirements.
- Type of coordination. Despite these commonalities, the results in terms of coordination for river basin planning are rather different. After the first implementation cycle in Italy, RBMPs were a simple collection of regional water protection plans without clear coordination mechanisms at RBD in place [13]. Regional administrations in Italy have had competences in water protection and management since the 1970s; consequently, it would be illogical, even risky, to completely change the water governance structure. However, as Rainaldi [60] explains, problems emerge because a number of planning tools, such as the river basin plans established by Law 183/1989 and regional water protection plans established with the Legislative Decree 152/1999, coexist and overlap with RBMPs

without the law clearly defining the roles and hierarchies of these different planning instruments. These overlaps, together with the great delay in providing RBDAs with their full functions, significantly affected the capacity of coordination for RBMPs development. Using Wegrich and Stimac definitions [31], Italy shows the features of negative horizontal coordination although improvements from the first to the second cycle are evident at least for some RBDs (see for example the second implementation cycle in Alpi Orientali RBD at <http://www.alpiorientali.it/>).

Compared to Italy, in France since 1964, water governance has increasingly been characterized by hydrological-based water planning and management. As Aubin et al. highlight [65], the polycentric water governance system observed in France, where functional water agencies are present at both the RBD level (WA) and at the sub-RBD level (CLE), is anchored in a long history and the influence of the WFD on that is limited. However, some authors highlight that coordination between planning at RBD and planning (SDAGE) at the municipal level (SAGE) may be an issue in terms of implementation of measures. For instance, Christophe and Tina [77] highlighted that the municipalities may be more interested in re-election than in water protection, and this may be an obstacle for the implementation of some types of measures.

In Spain, while many studies have focused on how coordination and participation are achieved at regional level, the capacity of CH to coordinate the planning at RBD level is not evident from the analysed literature.

- Type of participation. In contrast to the other countries analysed, in Italy, the implementation of the WFD has not prompted the creation of CPBs at the sub-RBD level, where participation would deliver more effective results. Certainly, a number of participatory initiatives do exist within regional administrations, but it is not evident how these are related to the development of RBMPs and PoMs. Official planning for the WFD remains structured with top-down and technocratic approaches, as proven by the inclusion of few stakeholders in the decisional bodies of RBDAs. In France, both the BC and CLE provide robust platforms for stakeholders' consultation. Although citizens are not directly

engaged in the decision-making processes, both the BC and CLE are composed of elected representatives, giving an indirect voice to citizens.

Spain has been a pioneer country in promoting participatory processes for water resources management. Civil society actively engaged with participatory processes, with peaks of 644 participants in Cantabria [20] and over 1600 people in Catalonia [18]. This outstanding participation, however, is only partially the result of the WFD requirement of public participation but mostly relates to a large movement called the “new water culture” (*nueva cultura del agua*) [78]. This movement, in opposition with the previous policy paradigm—largely based on large infrastructure building and supply management—considers water as finite resource which requires an integrated and holistic management. The influence of these large participatory processes on the development of RBMPs varies depending on the case. Kochskämper et al. [20] found that the result of participatory processes was mainly a list of generic measures and no explanation was provided in the final RBMPs on whether and how these proposals have been used. On the contrary, Parés et al. [18] found that the deliberative process conducted in Catalonia had a “significant impact on the river basin management policy” and the innovative measures were actually included in the RBMP. Despite these remarkable results, it is interesting to note that many authors question the fact that Spanish water governance can be considered an example of democratic governance. Following Parés [78], “Even though a deliberative mechanism could be carried out in really democratic conditions [...], if this deliberation does not have a real impact on politics and society and, above all, if the resources between participants are unequal, then we cannot qualify this form of steering as a form of democratic participation” and he concludes “Formal participatory mechanisms, therefore, become just one more space of influence in a complex and net-worked governance system”. In the same vein, Cabello et al. [79] found that mainstream narratives, reflecting traditional coalitions around large infrastructure investments, dominate the process at the expense of local and rural interests. Cultural factors, such as uncertainty avoidance by the government [79,80], power

distance [80] and lack of a deliberative culture [18] are discussed as possible reasons that hinder the shift to more democratic processes.

5.7.4. Sweden: Is full Compliance Enough?

- Scale. Sweden has established functional water jurisdictions, the RBDAs, and participatory bodies, the WCs, at hydrological scales to comply with the WFD. At least in terms of formal adaptation to EU requirements, Sweden can be considered the “the leap-frog” [14], questioning traditional implementation theories, such as the goodness-to-fit approach, which hypothesizes that when domestic policy arrangements diverge from European requirements, implementation effectiveness is likely to be low [81].

- Type of coordination. However, in this new governance setting, the municipal level is still relevant in terms of water and land-use planning. The addition of the new governance layer for water planning, the RBD, is causing problems of coordination because competences that were exclusively under the jurisdiction of municipalities are now shared with the RBDAs [69]. Despite the WFD implementation enhanced coordination within and between municipalities, as well as positive coordination between concerned parties at different administrative levels, there is a risk of a “disintegrative process” between water planning and land-use planning [69].

- Type of participation. Participatory process in Sweden reflects the technical/scientific approach for WFD implementation that the country has undertaken (for instance, the environmental quality standards are legally binding in the country). For this reason, public participation in Sweden is more conceived as stakeholder consultation rather than active involvement of civil society, despite that large representation of interest groups is provided by WCs [71]. WCs are based on pre-existing water associations and their effectiveness in engaging local stakeholders and undertaking measures seems to be related to the legacy of cooperation capacity that was in place under pre-existing organizations [71]. A recent study highlighted the need to refine the role of WCs as municipalities do not consult WCs to ask advice on implementation [70]. According to Dawson et al.

[16], the WCs provide a good basis for improving the integration of multiple kinds of knowledge into decisions, but this collective knowledge production is still separated from decision-making procedures. Combining scientific and local knowledge to develop RBMPs and PoMs is not an easy task, as evidenced by Hammer et al. [82]. Some authors argue that the technocratic structure for the implementation of WFD, which is focused on water quality goals and data-oriented, somehow conflicts with learning and knowledge integration that WCs should enhance [16].

5.8. Conclusions

This paper seeks to contribute to research regarding the functioning and effectiveness of new institutions, actions and activities that have come into being as a result of WFD implementation [14]. In particular, we focused our study on the multi-agency and multi-actor groups, we called CPBs, that many EU countries have established to comply with the WFD requirements of coordination and participation for river basin planning.

Three research questions, and related theoretical arguments, guided our analysis of CPBs. The first was an exploratory question aimed to understand the scale deemed more appropriate by EU countries to establish process of coordination and participation for river basin planning. We found that in most of the countries analysed, CPBs are set up at sub-RBD level. Some scholars identify the success of integrated water resources management in a combination of top-down and bottom-up policies and approaches [65]. The requirement of the WFD to adopt RBMPs at RBD scale responds to top-down approaches of decision-making, the District being too large for meaningful stakeholder participation. In addition, some characteristics of the WFD itself, such as the focus on water quality goals, its data-oriented approach, and the strict deadlines for water quality improvements, are prone to top-down decision-making and somehow conflict with participatory processes that require time and willingness to engage with complexity. Given that, the creation of CPBs at the sub-RBD scale can be seen as a positive signal of Member States' attempts to find a sound balance between the two decision-making approaches.

The second research question aimed to identify how coordination among administrations within the same RBD is achieved. Overall, we found that the implementation of WFD promoted different forms of horizontal and vertical coordination but, hardly, this concerns the RBD. It is fair to say that most of the studies analysed focus on a narrower scale, such as a river basin, river or regional level, while the RBD usually lies in the background of their investigations. Consequently, it was not possible to draw general conclusions on how coordination is achieved at the RBD level for the seven countries we analysed. It is logical to think that most of the studies have been carried out at the scale where most of the activities related to the implementation are conducted, that is at the regional, municipal or river basin level.

The third research question concerned how the outputs of participatory processes are included in RBMPs and, in other words, whether CPBs are able to influence decision-making procedures. We generally found that establishing linkages between spaces for knowledge production and those for policy formulation is a hard task for most of the analysed EU countries. When the linkage proved effective, some factors may provide good explanations for that: the longevity, legitimacy and robustness of river basin institutions (e.g., in France), the clear framework provided to the CPBs to work, the clear allocation of roles and responsibilities among the actors engaged in RBMPs and PoMs, the active participation of decision-makers in learning processes and the presence of an “interface” between the *loci* of knowledge production and those of policy formulation (e.g., in Denmark).

Finally, our analysis provides some general conclusions and instrumental recommendations for a more effective implementation of the WFD:

- in water governance, there are no “one-size-fits-all” solutions, and the analysis of the countries confirmed that CPBs have to fit existing governance structures;
- if coordinated and participatory planning is needed to safeguard and improve the quality of water bodies, then the sub-RBD level should be given a primary role by the European Commission. The rule established by Article 13 that “...decisions should be taken as close as possible to the locations where water is

affected or used" (WFD) can be effectively achieved only at a level lower than the RBD;

- to avoid losing the knowledge acquired through the CPBs, a clearer linkage between the top-down and bottom-up dimensions of WFD implementation is fundamental regardless of the institutional legacy of the country. The EC should encourage, and Member States should establish, a connection between the arenas engaged in learning, networking and knowledge exchange and those where decisions are made;

- there is a lack of knowledge on how planning and implementation activities carried out at sub-RBD are aggregated and coordinated for the entire District. In our opinion, the requirement of the WFD that all PoMs are "coordinated for the whole of the river basin district" (Article 3, WFD) cannot be achieved only by a formal aggregation of measures established at different levels of the RBD but requires a greater effort of coordination among public administrations concerned with the implementation. Research could further contribute to this issue, by focusing on coordination mechanisms and problems that occur at the RBD level.

- the conceptual framework we adopted in in this paper could provide guidance for empirical research on the topic. Quantitative methods, such as the Social Network Analysis, could support the analysis of what type of coordination strategies exist among the set of actors engaged with decision-making. Moreover, specific indicators on the type of coordination and participation among public and private stakeholders could be applied: e.g., for coordination, the number and frequency of interactions among public authorities as well as the scope and the frequency of joint activities, while, for participation the degree of stakeholders' satisfaction for participatory processes [83].

Even if the focus of the paper is limited to the EU context, these conclusions might be extended to other non-EU countries that aim to implement integrated river basin management policies, by considering, however, that implementing frameworks have to be tailored on the specific local contexts. The exportability of the WFD requirements

to non-EU countries was out of the scope of the paper; however, other studies address this issue especially with regard to EU-candidate countries [84,85].

Finally, we must acknowledge some limitations of this study. The first refers to the limited number of countries analysed that cannot provide a complete overview of implementation patterns in Europe. Second, this study was based only on secondary data derived from the literature. Testing our conceptual framework on other case studies would allow us to grasp less-structured aspects of coordination and participation that, in most cases, are crucial for determining policy implementation outcomes.

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6. Unfolding the Water Framework Directive at the River Basin District Scale: An Italian Case Study on Irrigation Measures

Details: This chapter is based on the paper Pellegrini, E., Bortolini, L., Defrancesco, E., 2019. Unfolding the Water Framework Directive Implementation at the River Basin District Scale: An Italian Case Study on Irrigation Measures. *Water* 11, 1–21. <https://doi.org/10.3390/w11091804>.⁸

6.1. Abstract

Despite that the European Water Framework Directive has attracted scholars' attention worldwide, research is sparse on how its implementation is carried out for the whole River Basin District (RBD). This paper aims to fill this research gap by studying the implementation of this directive in the Italian Eastern Alps RBD. Based on 21 semi-structured interviews with both public authorities and the stakeholders engaged with implementation, along with a document analysis, we traced the overall implementation process, from planning to implementation, of measures to increase irrigation efficiency. Our interest was on how coordination mechanisms for the entire RBD were established during the main steps of the implementation process. Moreover, we looked at the effects of the Water Framework Directive at the local level, both in terms of changes in irrigation management practices and in terms of stakeholders' engagement in decision-making processes. We found that, establishing decision-making processes based on a stronger coordination among all the authorities involved was fundamental both in terms of the production of shared decisions and of the participants' satisfaction with the processes. Moreover, if true participation of stakeholders has to be achieved in the decision-making processes, then the RBD could not be the only scale where participation takes place. Actually, interactions among stakeholders and public authorities, in order to consider local interests in the decision-making processes, could be more effective at the sub-RBD level. Ultimately, while cross-administrative coordination can be achieved for the whole RBD through

⁸ Numbers of the tables and figures, as well as reference style are maintained as in the published paper, while numbers of headings and layout have been modified to be consistent with the rest of the thesis.

specific coordination mechanisms, public participation should find more appropriate spaces at the sub-RBD level.**Keywords:** policy implementation; water governance; river basin planning; coordination; public participation; irrigation management

6.2. Introduction

The Water Framework Directive (2000/60/CE, WFD hereafter, a list of abbreviations is provided in the end) is a milestone in European water policy, establishing a common legislative framework for water protection in Europe. Its overall objective is to achieve a good water status for all water bodies in Europe and, where this is not possible, it requires Member States to not further deteriorate their waters. The study of the WFD and its implications on EU countries has attracted the attention of several social scholars [1]. This is because, more than the other EU environmental directives, in the WFD, the achievement of the good status objective is linked to a significant change in national governance systems. Some authors actually argue that the WFD will be effectively implemented only when a substantial paradigm shift occurs in the water management practices across Europe [2,3]. At the base of this paradigm shift is the requirement to set up a new unit for the management and protection of river basins, i.e., the River Basin District (RBD). According to the WFD, RBD “means the area of land and sea, made up of one or more neighboring river basins together with their associated groundwaters and coastal waters, which is identified (...) as the main unit for management of river basins” (Article 2). Moreover, large-scale river basin planning and management is required for the whole RBD through the elaboration of specific River Basin Management Plans (RBMPs). For the development of these plans, competent authorities should accomplish four key-tasks [4] that we have summarized in the following steps.

- RBD analysis: Competent authorities should carry out a comprehensive analysis of all the pressures on water bodies that might hinder the achievement of the good status and not deterioration objectives. The European Commission encourages the use of the Driver, Pressure, State, Impact, Response (DPSIR) analytical framework for the elaboration of RBMPs. DPSIR is a widely applied tool because it provides a

'systematic examination of the causality flow between human activities and nature' [5].

- Setting objectives: Based on the pressure analysis, for each water body, a specific environmental objective should be established. If achieving the good status objective is not possible due to technical, economic or natural reasons, then extensions in the deadline to achieve environmental objectives, along with less stringent objectives (called exceptions), can be applied.

- Identification of measures: To achieve the objectives, appropriate measures should be identified. The measures are contained in a specific document of the RBMPs, which is the Program of Measures (PoMs). Measures should be linked to the pressures identified to guarantee an actual improvement in the state of water bodies and should also be selected through a cost-effectiveness analysis. Moreover, Article 3 of the WFD requires PoMs to be coordinated for the whole of the RBD.

- Implementation of measures: The implementation of PoMs should not be considered as the end of the process, but should be linked with a continuous process of evaluation [4].

Public participation, at least in the form of information supply to the public and stakeholders' consultation, should be ensured during the accomplishment of the four key tasks. This means that before the approval and publication of the plans, the documents should be made available to the public for comments and their observations should be considered in the final RBMPs [6].

Although the WFD recognizes some flexibility in the scale at which this planning process can be conducted, the unit of implementation of the WFD should be, regardless, the RBD [4]. This requirement has significant implications for the national decision-making procedures because it implies that coordinated and inclusive river basin planning should be promoted within RBD boundaries.

Given that, the goals of this study are to understand: (i) How coordination among the different administrative levels of the RBD is achieved during the planning phase, (ii) the effects of WFD on the local level, which means both how PoMs are translated into concrete actions at the local level, and how stakeholders' interests are considered in the development of plans.

To achieve both research objectives, we focused on how the overall process, from the elaboration of the RBMP (2015–2021) to the implementation of measures, is carried out for the whole RBD. As Boeuf and Fritsch [1] argued, the scale at which WFD implementation is studied is itself a methodological choice that should be made explicit. Despite the relevance that WFD attributes to the RBD, most of the studies on the topic are located either at the national or sub-RBD-level, with the result that the picture we obtain from research is incomplete [1,7]. Studying WFD at the RBD level, instead, would provide relevant information on how the institutional arrangements for water protection and management develop to promote multi-level actors involvement and coordination in large river basins where often complex and competing interests are in place.

For this purpose, we focused on the process of implementation of the WFD in a single case study, namely the Italian Eastern Alps RBD. Since the district is already a large unit of analysis, we decided to focus on the development and implementation of a specific type of measures, i.e., measures to improve irrigation efficiency. In Italy, as in all Mediterranean countries, most of the water withdrawals are employed for irrigation, and climate change is expected to exacerbate the pressure on water resources [8,9]. Moreover, despite its primary focus on water quality, the WFD explicitly addresses water quantity issues through water demand instruments, e.g., water pricing (Article 9 WFD), and the requirement of establishing ‘measures to promote an efficient and sustainable water use in order to avoid compromising the achievement of the objectives’ (Article 11, WFD).

Given our research objectives, four specific research questions (RQs) were formulated for each key-task described above. Figure 1 depicts how research questions were linked to the four key-tasks identified. RQ1 to RQ3 are related to our first research objective, which is understanding administrative coordination during the planning phase, while RQ4 concerns the effects of WFD on the local level. Due to the lack of detailed information on the topic, research questions were purely exploratory.

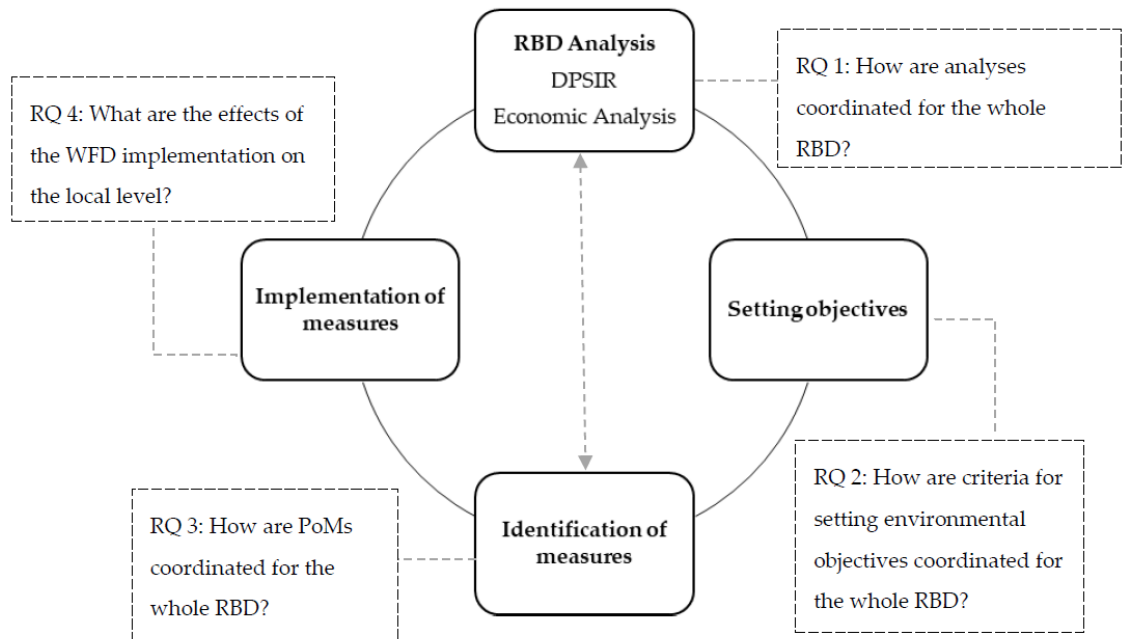


Figure 1. Four key-tasks for the Water Framework Directive (WFD) implementation and related research questions. Source: Authors' own elaboration

6.3. River Basin Approach in Italy: Between Institutional Reforms and Conflicts

This section describes and discusses the main steps that have been conducted in the institutionalization of river basin governance in Italy.

During the first decades of the last century, the Italian water policy was mainly focused on building large water infrastructure for hydropower and land reclamation, and on regulating the use and concession of public waters. In this phase, the state was the only government level holding legislative and regulatory functions, while a multitude of local actors were responsible for managing local infrastructure and water supply. Since the 1970s, with the institution of regional administrations, a process of devolution to the new government levels started. The institutional system in Italy foresees that regional administrations can exercise significant administrative and regulatory functions within the legislative framework provided by the central government. In the field of water policy, the transfer of competences to the regions, however, occurred without clear coordination mechanisms between the two levels [10]. Moreover, when the increasing awareness on environmental problems brought to

the first law establishing emission limit values (Law 319/1976), water protection and management were subject to separate regulations [11].

Indeed, the first legislation concerning river basin management, the Law 183/1989, was issued in an attempt to improve the coordination among the government levels, and to create an integrated system for the protection and management of land and water resources.

Following this law, the national territory was split into national, interregional and regional river basins and for national river basins, specific river basin authorities were established. River basin authorities were composed of representatives from the main state ministries and from regional administrations and were coordinated by the General Secretary holding overall responsibility for river basin authorities' activities. These mixed State-Regions bodies had to develop basin plans that were overarching planning instruments to set up an integrated management of water and soil at the river basin level [12]. However, the regions went against the creation of river basin authorities and the related basin plans because they perceived these reforms to be an interference of the central government in their competences on water and soil management to the point that some regions brought an action against the Law 183/1989 to the Constitutional Court [13]. Despite the court rejecting their instances, these conflicts weakened the role of the river basin authorities, and the tensions between regions and state further increased [10].

A second step was made with the Law 36/1994 that was issued to create an integrated water service system for the whole of water services, from water capture to sewerage and depuration systems. According to the law, this system was organized and managed at 'optimal territorial units', for which intermunicipal agencies were defined by the regions. The rationale behind the Law 36/1994 was, on one hand, to create optimal units for an integrated management of the water system, overcoming municipal fragmentation, on the other, the law aimed at building an industrial model for water services' provision more independent from public finance [14]. However, in 2008, Massarutto [14] reported that the identification of the optimal territorial units and their relative authorities was still not completed. This partial implementation

generated a piecemeal attribution of competences with high variability from one region to another [15].

Another important step is represented by the Legislative Decree 152/1999, which transposed the EU directives on wastewater treatment (91/271/CEE) and nitrates pollution caused by agricultural sources (91/676/CEE). This decree concerned both qualitative and quantitative aspects with the aim of achieving the 'good water status' of water resources, anticipating some basic concepts of the WFD. The decree introduced the regional water plans as part of the basin plans, with the aim to coordinate actions and measures for water protection across the river basins established by the Law 183/1989 [10]. Despite this purpose, the regional water plans were almost exclusively defined by the regions and the function of river basin authorities was limited to a final approval [13].

In 2006, the Legislative Decree 152/2006 (better known as the Environmental Code) abolished all the previous water legislation and transposed the WFD, creating a single, overarching, legislative framework for water protection and use. The Environmental Code divided the national territory into eight RBDs, abolishing the territorial organization established by the Law 183/1989. Moreover, the river basin authorities were replaced by the River Basin District Authorities (RBDAs). Similar to the preceding river basin authorities, the RBDAs are State-Regions boards composed of three main bodies: The Institutional Committee, which is the decisional body, the General Secretary, holding overall responsibility for the work done by the Institutional Committee, and the Technical Committee, which provides technical support to the Institutional Committee for the development of RBMPs. The Institutional Committee is composed of the General Secretary, the presidents of all regional administrations of the RBD, representatives of the main ministries concerned, and some representatives from the agricultural sector, only with an advisory function. The Technical Committee is made of representatives from all the regional administrations of the RBD and is chaired by the General Secretary.

Following the WFD, the RBDAs, the regions and the Ministry of Environment, were designed as competent authorities for implementation. More in details, while regions are responsible to provide most of the information and analyses needed for

RBMPs, the RBDAs ensure that decision-making at the regional level complies with the overall objectives of the WFD and are also responsible for the elaboration of RBMPs.

Despite the aim of the Environmental Code to reorganize the overall water legislation characterized by overlapping norms and planning instruments, the code generated even further confusion and increased the conflicts among administrations [12,13]. Here, we report the most controversial aspects that affected the WFD implementation:

- The Environmental Code introduced the RBMPs that should have been developed based on regional water plans. Nevertheless, the RBMPs were thought to be very similar to the regional water plans to the point that some scholars have questioned the relevance of RBMPs [12].

- The abolishment of river basin authorities was contested by regional administrations and environmental NGOs because the territorial division into RBDs and the RBDAs were deemed not able to reflect local specificities [12].

- Within the Institutional Committee, the ministerial representation was larger than the regional representation, causing strong regional opposition [10].

Thus, it is not surprising that the implementation of the large-scale river basin approach required by the WFD was not smooth in Italy [10]. In particular, the RBDAs, although formally envisaged by the Environmental Code, did not acquire full competences until 2016. Meanwhile, the first and second cycles of RBMPs were approved by the pre-existing river basin authorities that, in some cases, did not even cover the entire territory of the RBD [16]. Due to the unclear governance for WFD implementation, after the first implementation cycle, the European Commission sent the EU Pilot 7304/15/ENVI to Italy. The EU Pilot is an informal dialogue between the European Commission and the Member State concerned, on issues related to potential non-compliance with EU law, prior to launching a formal infringement procedure. The EU Pilot 7304/15/ENVI addressed many aspects of Italian implementation that were considered to be barriers for the achievement of WFD objectives. Among them, Italy was required to establish adequate coordination mechanisms to ensure that the objectives of the WFD were fulfilled for the whole RBD. Moreover, Italy was required

to provide clear signals of progress regarding the internalization of environmental and resource costs within the agricultural sector.

Consequently, in the second implementation cycle, many activities to improve the coordination for the whole RBD were undertaken [17]. One above all was the attribution of full competences to the RBDAs to coordinate and supervise the WFD implementation process. Despite these changes, crucial issues, such as the overlap between RBMPs and regional water plans, were not changed.

As shown by this overview, the Italian water governance system is characterized, on one hand, by a repeated gap of policy implementation, and on the other, a continuous change of legal dispositions often generating a system of overlapping norms and unclear competence attribution [12,18].

6.4. Study Area

Recently, with the Law 221/2015, the division of the Italian territory has been modified from eight to seven RBDs: Po Basin, Eastern Alps, Northern Apennines, Central Apennines, South Apennines, Sicily and Sardinia (Figure 2a). The Eastern Alps RBD (Figure 2b) covers an area of approximately 37,600 km² and it is composed of four regional administrations (EU-NUTS 2 classification): Veneto, Friuli Venezia Giulia, Trento and Bolzano. The district is composed of twelve river basins, the Venice lagoon and the Marano and Grado lagoon. Three river basins are transboundary, falling between Italy and Slovenia, and between Italy and Switzerland. Over the last 40 years, the population living in the Eastern Alps RBD has constantly grown, reaching almost seven million inhabitants. The regions of the Eastern Alps RBD represent one of the most developed areas of the country, especially, regarding the manufacturing industry [19].

The agricultural sector is particularly developed in the southern part of the RBD, and in particular in the Veneto region [19]. The RBD is supplied by approximately 402 irrigation schemes, 209 of which are located in Veneto region [20]. The technical characteristics of the irrigation systems are very different across the RBD: Surface irrigation prevails in Veneto (47%), in Friuli Venezia Giulia there is a mix of sprinkling irrigation (63%) and surface irrigation (36%), while in Trento and Bolzano sprinkling irrigation (57%) and drip irrigation (30%) are predominant [21]. The most irrigated

crops in the RBD are corn, followed by permanent crops (orchards and vineyards) and meadows [21].

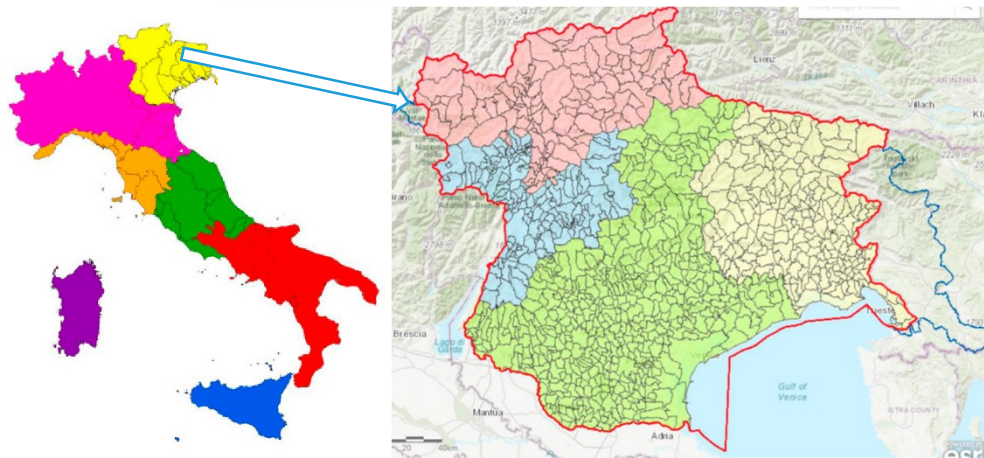


Figure 2. (a) Italian river basin districts (RBDs); and (b) Eastern Alps RBD: The red line is the border of the RBD, the blue line is the international border of the RBD, the different colors represent the four regional administrations. Source: (a) ISPRA; (b) www.alpirorientali.it.

Regarding the measures to improve irrigation efficiency, the following actors are involved in the implementation of the WFD: The official competent authorities, the regional irrigation management departments, the irrigation boards and the associations for irrigation boards. These categories are briefly discussed below, and Figure 3 schematically represents the main actors involved, their relations and competences.

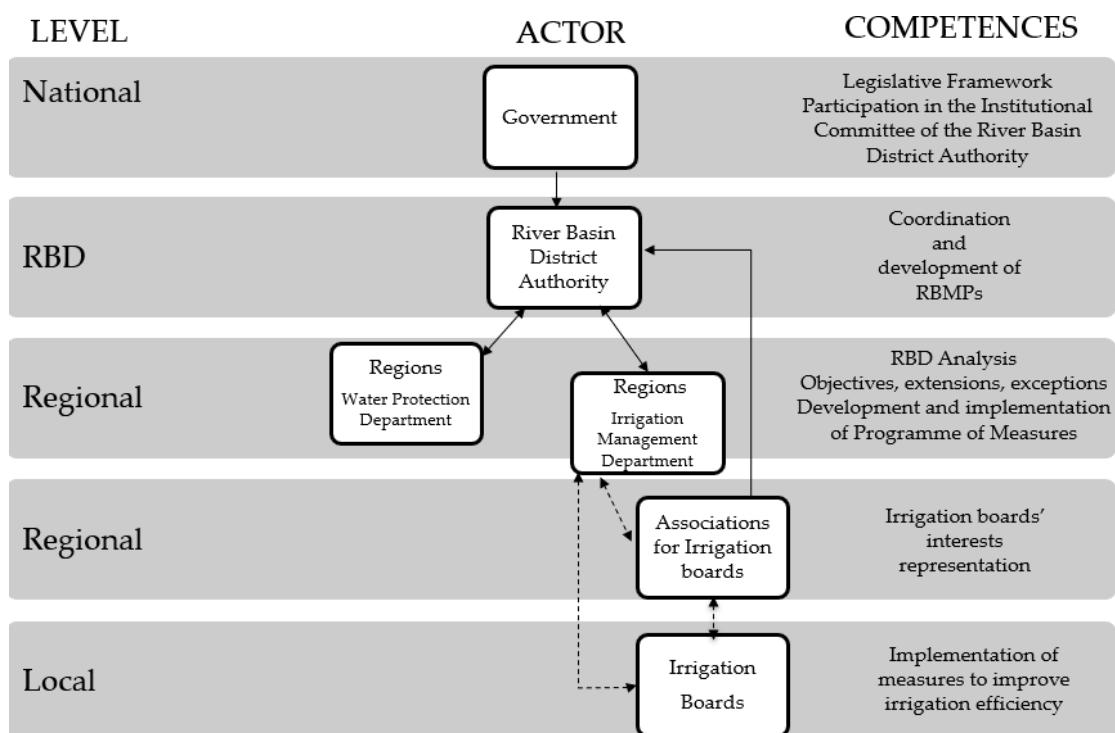


Figure 3. Main actors, relations and competences for the implementation of measures to improve irrigation efficiency under the WFD in the Eastern Alps RBD. Arrow means formal relations defined by the Legislative Decree 152/2006; dashed arrow means informal relations. Source: Authors' own elaboration

6.4.1. Official Competent Authorities (OCAs)

Official competent authorities (OCAs) have remit on the overall implementation process and are officially designed as competent authorities for WFD implementation in the Eastern Alps RBD. These are the RBDA, which coordinates and supervises the process of implementation for the whole RBD, and the regional water protection departments (WPDs), which coordinate the process at the regional level. The WPDs work in close collaboration with the regional environmental protection agencies, which carry out monitoring, data collection and analysis of water resources.

6.4.2. Regional Irrigation Management Departments (IMDs)

Irrigation management departments (IMDs) are the regional offices that define the rules for irrigation water uses. For instance, IMDs provide regulation on water metering, water tariffs and on the use of European funding sources, such as rural development programs. Moreover, IMDs are the reference for the irrigation boards for on-the-ground implementation of technical measures. Despite some small differences, IMDs have the same competences for WFD in all the regions of the district.

6.4.3. Irrigation Boards (IBs) and Association for Irrigation Boards (AIBs)

IBs are responsible for the implementation of technical measures related to irrigation and are the recipients of regional regulations on irrigation water uses. IBs were established in 1922 in Italy with a double function: On one side, they are public entities entitled to use water resources for irrigation and to manage public water infrastructure for wetland reclamation, water security and irrigation; on the other hand, they are consortia of private landowners who elect their own representatives and pay water fees to IBs for the irrigation services that they receive. IBs approve their

own financial plans, *Piani di classifica* in Italian, which establish the tariff that farmers have to pay for the irrigation services received. Water services are paid either through flat tariffs, that are not based on the actual irrigation services received, or binomial tariffs, that are composed of a fixed part (e.g., the costs of maintenance for the irrigation systems) and a variable part that can be based on different parameters, e.g., the volume of water used, the type of irrigation systems, the type of crops produces, etc. The most diffused tariff system in the RBD is the flat tariff usually based on the irrigated acreages [21]; however, binomial tariffs have recently been introduced in some of the regions of the RBD (see Section 6.6.4.2). The structure and organizations of IBs vary among the regions of the district: Ranging from one of the largest IB in the Veneto region with approximately 190,000 ha, to a very small IB (approximately 6 ha) in Bolzano; moreover, some IBs are not public entities but act only as private consortia. Most of the IBs of each region are associated and represented by an association for irrigation boards (AIBs). These associations are consulted during the decision-making processes related to WFD implementation and act as intermediaries for IBs' interests. The AIBs' structure, functions and level of engagement in WFD implementation vary across the regions of the district since some AIBs are similar to a labor union, some provide practical support to IBs for their daily tasks and others are more active at the institutional level to lobby for IBs interests in the decision-making processes. Overall, three regions have a AIB even though not all are active in the same way in the WFD implementation, while one region does not have any AIB.

6.5. Materials and Methods

6.5.1. Data Collection

This study was based on 21 semi-structured interviews, a set of closed-ended questions on a 5-point Likert scale [22], and analysis of some of the documents of the RBMP (2015–2021) [19,21,23–27]. The different methods were used to answer the four RQs presented in Figure 1.

Data collection was carried out in two steps:

- Interviews with eleven institutional actors involved in the planning phase. We interviewed one civil servant from RBDA, five from WPDs and five from IMDs

- Interviews with ten stakeholders involved in the implementation and their representatives: Seven representatives of the IBs of the district together with three representatives of the AIBs. The sample of IBs and AIBs was selected to cover all the regions of the RBD, but the differences discussed in the previous section were considered in the selection of the interviewees. In particular, we selected the larger and more active IBs of the district and we considered only the IBs that had both public and private functions.

Starting from the general RQs presented in Figure 1, more specific questions were asked during the interviews. Due to the heterogeneity of the actors interviewed, questions were tailored on their level of engagement in the planning and implementation processes. For instance, the questions addressed to the OCAs and IMDs aimed to understand: First, what coordination mechanisms (if any) were in place in the different steps of the implementation process, i.e., if implementation was conducted following a RBD perspective or was conducted within administrative boundaries. The questions asked to IBs and AIBs, instead, aimed to understand two aspects of the implications of WFD on the local level: First, how plans are translated into concrete measures for irrigation management at local level (Section 6.6.5.1), and second, the inclusion of local interest in the development of plans (Section 6.6.5.2). Moreover, some cross-cutting questions were asked to all interviewees to understand: (i) Their role and competences in the implementation process, and (ii) changes and consequences derived from the WFD implementation. Last, the set of closed-ended questions on a 5-point Likert scale was asked to the interviewees to understand their perception of the effectiveness of coordination and participatory mechanisms in place for the WFD implementation.

Interviews lasted 40 min–2 h each and interviewees were given an assurance of confidentiality. The text of interviews was analyzed using the framework approach as guidance [28] and a coding scheme was created based on the research questions presented in Figure 1.

6.5.2. Selection of Measures

This study focuses on the measures to improve irrigation efficiency that are included in the PoMs of the RBMP (2015–2021). Due to the large size of the RBD and to

the large number of measures included in the PoMs, we decided to focus only on measures for which more coordination across the administrations of the district has occurred. We conducted a preliminary analysis of the RBMP [25] and we found that a common strategy was established for the whole RBD to recover environmental and resource costs in the agricultural sector. More coordination regarding the recovery of environmental and resource costs was triggered by two constraints established by the European Commission. The first was the EU Pilot 7304/15/ENVI that, as explained earlier, required more coordination specifically regarding the internalization of environmental and resource costs within the agricultural sector. The second was related to EU Regulations 1303/2015 and 1305/2015, which established the common regulatory framework for the use of the European funding sources, linking the access and use of European funds to the fulfillment of some prerequisites (called ex-ante conditionality). Among them, the existence of incentivizing pricing policies, the installation of water metering devices in agriculture, and more stringent conditions on the investments for irrigation in the case where the state of water bodies is less than good. Hence, the risk of an infringement procedure, and the need to satisfy the ex-ante conditionality established by the EU Regulations, required a more coordinated strategy among all the administrations of the RBD.

Consequently, the questions addressed to the authorities involved in this decision-making process aimed to understand how this coordination was reached, if it was deemed effective, and what outcomes were produced.

6.6. Results

In this section, results were reported in the view of the four RQs presented in Figure 1 to understand what coordination and participation mechanisms were established for the development of RBMP (2015–2021). Moreover, we commented on the perception of the interviewees regarding the effectiveness of these mechanisms that had been acquired through the closed-ended questions. Moreover, Table A1 in the Appendix A reports the summary of the descriptive statistics. In addition to the four RQs, the following Section 6.6.1 provided information on the OCAs' opinions regarding how the competences for WFD implementation were allocated within the

RBD. Finally, Table 1 shows the different approaches adopted by the regions for the selection of irrigation water efficiency measures, while Tables 2 and 3 at the end of this section summarizes the answers to the four RQs.

6.6.1. Competences for WFD Implementation

Given the role that OCAs have in coordinating and supervising the implementation both at the RBD and regional level, one question concerned the extent to which the allocation of competences and responsibilities for WFD implementation was clearly defined. Respondents had different opinions on the issue mostly due to intra-regional implementation structures. However, all of them mentioned that the coexistence of RBMPs and regional water protection plans generates overlaps for competences attribution, reduces accountability and hinders the adoption of a large-scale river basin approach. According to interviewees, these plans had very similar contents to the point that one interviewee questioned the significance of the RBMP: “the information for the RBMP are usually taken from other regional plans but then the RBMP should provide some obligations for the lower governance level to generate a virtuous circle. However, very often the result is a vicious circle in which the limitations of regional plans are transferred in the RBMP”.

6.6.2. RQ1: How Are Analyses Coordinated for the Whole RBD?

The analysis of the RBMP [24] and the interviews revealed that specific working groups were established by the RBDA to set up common criteria and methods for the identification of significant pressures on water bodies. These working groups were composed of civil servants from regional administrations and environmental protection agencies that held the responsibility for the update of all the analyses related to the WFD implementation, while the RBDA was responsible for coordinating the process [24]. Coordination through the working groups was on average appreciated (Mean: 3.8) by all the actors involved that agreed on the effectiveness of this coordination mechanism to provide a common criterion for pressure analysis. As the output of these working groups, the institutional actors found an agreement on the thresholds that distinguish what is a significant pressure from what is not [24].

Some interviewees, however, highlighted that, despite the enhancement of coordination in the decision-making process, administrations were not always aligned in their analyses because the RBDA was not always able to steer the process. According to one interviewee, instead, the limitation in the coordination capacity was not due to the RBDA but rather to the unclear legislative framework as expressed by these words:

“The law allocates to the regions competences on these subjects, consequently each administration went on its own. We did not start to collaborate from the beginning, but we had to put all together at a later time. It was not always easy to find a common strategy because we worked separately. In addition, the Ministry of Environment should have provided us with clear guidelines from the beginning, but this did not happen”. Indeed, only with the Law 221/2015, it has been established that the analyses performed by the regions have to be fed into the RBMPs. Before that law, in fact, regions were required to collect the data and conduct analyses only to update their own regional water protection plans.

6.6.3. RQ2: How Are Criteria for Setting Environmental Objectives Coordinated for the Whole RBD?

We found that coordination to set up a common strategy for the definition of objectives, extensions and exceptions was more controversial among the OCAs interviewed. The perceived effectiveness of coordination in this step is on average low (Mean: 2.8), and the interviewees expressed very different opinions on this issue.

Indeed, no true coordination mechanism was in place to set up common criteria for setting environmental objectives but coordination was limited to the guidelines provided by the RBDA on the basis of European Commission recommendations and of other European experiences such as the UK Technical Advisory Group on the Water Framework Directive [23]. The RBDA also reported that coordination in this step should be improved because the criteria for setting objectives, extensions and exceptions are not objectively defined. Hence, while some administrations deemed the guidelines provided by the RBDA to be an effective strategy to ensure coordination among the regions, others found them inadequate to avoid an unbalance of

commitments among the administrations of the district to achieve the WFD's objectives.

Moreover, the interviews revealed that the limited information provided by the central government on this topic affected the possibility to establish common criteria to set up objectives, extensions and exceptions. This argument was raised regarding the application of extensions and exceptions due to the disproportionate costs of the measures, as established by article 4 of the WFD. The first guidelines provided by the Ministry of Environment on the topic arrived quite late, with the Legislative decree 39/2015, which established the legislative framework for the economic evaluation of water uses and services. Moreover, many of the interviewees considered such legislation too theoretical and not providing any operative instructions on how to implement a sound economic evaluation.

6.6.4. RQ3: How are the Programme of Measures Coordinated for the Whole RBD?

6.6.4.1. RBD Coordination for the Selection of Measures

We found that, with the exception of the measures related to the internalization of environmental and resource costs, which are discussed below, coordination for the definition of measures is not provided for the whole RBD. The way through which the RBDA ensures that the administrations adopt the same strategy for the selection of measures is by encouraging them to adopt the DPSIR analytical tool to link measures to the pressures identified. This means that "once the pressures on water bodies have been identified, the regional administrations should search for the measures that can mitigate the pressures in the available regional and local planning instruments" (RBDA). The opinions on the effectiveness of coordination in this step of implementation were very different and a medium result (Mean: 3) was attributed to the effectiveness of coordination mechanisms. Some respondents found that the guidelines provided by the RBDA were effective to improve coordination, while others deemed the guidelines not sufficient to establish a common strategy. Similarly, the approaches adopted for the selection of measures were very different: Some were more aligned with a DPSIR approach, while in other the link pressures–measures was less evident. One region, for instance, reported that the selected measures were never

site-specific or identified starting from the pressures, but rather were generic measures identified to deal with macro-problems. Another interviewee reported that the process for the selection of measures started from the measures already available in the regional and local plans with a limited consideration of the state of water bodies. Other administrations, instead, reported being able to follow the DPSIR approach: The WPDs decided to focus only on water bodies classified with a bad state and for those water bodies, specific measures were identified by the WPDs to cope with the pressures. These heterogeneous approaches are also reflected in this statement of the RBDA: “improvements must be performed to make the link pressure-measure more robust (...) nevertheless it is difficult to improve this aspect because this would mean to adopt analytical tools that, in many circumstances, are not available”.

It is noteworthy that the Environmental Code foresees that the PoMs are part of the regional water protection plans and not of the RBMPs. Coordination should be guaranteed by the final approval of PoMs by the RBDA, which should control that the measures are sufficient to achieve the environmental objectives.

The RBD coordination for the selection of measures to internalize environmental and resource costs in the agricultural sector, instead, followed a different path. As explained in Section 6.5.2, the EU Pilot 7304/15/ENVI and EU regulations on the use of EU funds, boosted coordination for the decisions regarding the recovery of environmental and resource costs in the agricultural sector. Interviewees reported that specific working groups were established by the RBDA to define a set of common actions for the internalization of the environmental and resource costs for the whole RBD. These working groups were composed of all the IMDs of the district, along with some representatives of AIBs with an advisory function. The interviewees agreed on the effectiveness of the working groups (Mean: 3.75) because the meetings allowed the administrations to become acquainted with the other regional contexts and coordinate their activities. Four common objectives to improve irrigation efficiency were established for the whole RBD: (1) To increase the knowledge regarding the volumes of water employed in agriculture; (2) to improve water use efficiency through the adoption of more efficient irrigation systems and through initiatives that increase awareness and knowledge regarding irrigation efficiency; (3) to internalize

environmental and resources costs within concession fees and (4) to implement incentivizing water pricing policies. Since the regions are very different in terms of irrigation infrastructures, crops production, regulatory framework and on-going initiatives, the specific measures to achieve these objectives had to be defined at the regional level [25].

6.6.4.2. Selection of Measures at the Regional Level

Despite the common strategy established at the RBD level through the working groups, we found that common outcomes for all administrations of the RBD were achieved only regarding the first objective. Based on the guidelines provided by the Ministry of Agriculture and on the work performed through the working groups, in 2016, all the regional administrations of the Eastern Alps RBD adopted specific regulations that introduced the obligation to install water metering for large water withdrawals and of water estimates for minor withdrawals. The IMDs found the coordination through working groups effective (Mean: 4) and appreciated the role of the RBDA that acted as an intermediary between the Ministry of Agriculture and the regions.

For the other objectives, instead, the outcomes of coordination were limited. Assessing the outcomes related to the second objective was not possible because of the high quantity of activities carried out in each region to improve irrigation efficiency. Moreover, the measures to fulfill the second objective depend on several local aspects, such as the climate, crop production, soil conditions and water availability; thus, a comparison throughout the district would be meaningless. Regarding the measures to recover the environmental and resource costs in concession fees or volumetric pricing, only two regions deliberated on the topic. Furthermore, one introduced a system of volumetric pricing for the water provided for irrigation, while the other established that concession fees must be differentiated on the base of the efficiency of the irrigation systems.

We also analyzed the PoMs [27] to understand what type of measures the regional administrations included to promote a more efficient use of water in agriculture and, therefore, to achieve the four objectives established at the RBD level. We found a great heterogeneity in the way the measures were selected by the four administrations of the

RBD. Two main types of measures were identified in the PoMs: (1) Technical measures for which IBs are typically responsible, e.g., the shift to more efficient irrigation systems, and (2) non-technical measures, for which regional administrations are responsible. Non-technical measures can be divided in mandatory regional rules issued, for instance, to enact the four objectives established at RBD level, and financial incentives for agriculture. The latter are usually linked to the rural development program that is a system of financial incentives granted by the EU that each region implements to support the competitiveness of the local agricultural sector and to stimulate farmers to adopt more sustainable farming practices.

Given these two types of measures, we identified two different approaches adopted by the four administrations for the selection of measures: In the first, technical measures greatly exceed non-technical measures; in contrast, in the second approach, only non-technical measures are included (Table 1). Regarding the authorities responsible for implementation, in the first approach, responsibilities are distributed among regional administrations (52.7%), IBs (38%) and a few other authorities (9.3%), while in the second approach, only regional administrations (100%) are accountable for implementation (Figure 4).

The IMDs belonging to the first approach reported that the measures contained in the PoMs were simply taken from regional plans (e.g., rural development program) and that the PoMs ends up being a collection of measures established elsewhere.

In the second approach, instead, the measures included are fewer and are all specifically related to the objectives established at the RBD level. Moreover, one interviewee from OCAs reported that the choice of not fragmenting responsibilities for implementation among several actors was made to enhance effectiveness and accountability.

In both cases, however, the measures contained in the PoMs (2015–2021) were not selected on the base of the pressures identified in water bodies. Nevertheless, the interviews revealed that some improvements might be achieved in the next planning cycle (2021–2027). The ex-ante conditionality established by the EU regulations 1305/2015 is actually strengthening the link-pressure measure in all administrations of the district. This is indicated by the actuality that in all the regions of the district,

initiatives of coordination among WPDs and IMDs were set up to identify the most appropriate irrigation efficiency measures, starting from the assessment of the state of water bodies. In one region, the coordination went even further with the creation of the Technical Committee for Water (Tavolo tecnico Acque in Italian) to ensure the coordination of all regional departments for the implementation of the WFD and the Flood Directive (2007/60/CE) and also to ensure collaboration with the RBDA.

Table 1. Different approaches adopted by the regions for the selection of irrigation water efficiency measures.

Approach based on:	Overall measures (n°)	Technical measures (%)	Non-technical measures (%)	
			Mandatory rules	Incentive-Based
Mostly technical measures	115	73	23.5	3.5
Exclusively non-technical measures	20	0	70	30

Source: Authors' own elaboration based on Distretto Idrografico Alpi Orientali [27].

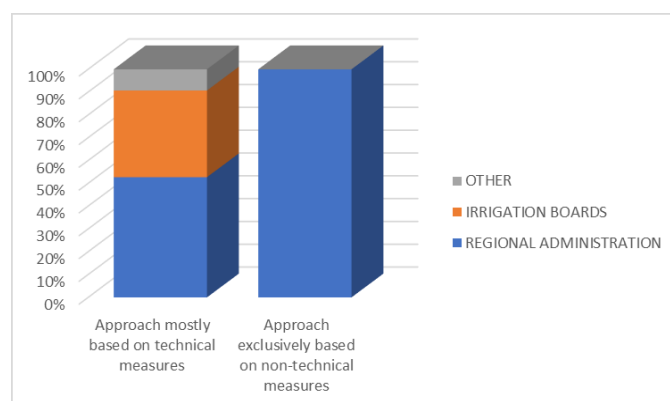


Figure 4. Authorities responsible for measures implementation by approaches (%). Source: Authors' own elaboration based on Distretto Idrografico Alpi Orientali [27].

6.6.5. RQ4: What are the Effects of the WFD Implementation on the Local Level?

6.6.5.1. The Translation of PoMs into Concrete Measures at the Local Level

Concerning the technical measures contained in the PoMs, these are usually taken from the local plans of IBs and, so, they are already concrete measures. Each IB, in fact, has its own programming tool to define what actions are required for irrigation, land

reclamation and flood management. Consequently, the measures contained in the PoMs are derived from these plans but how these are related to the objectives established at RBD level was not always evident. For instance, one IB reported that technical measures were included in the PoMs that were in no way related to the improvements in the state of water bodies because the IB was not adequately informed on the meaning and importance of the PoMs.

Technical measures to improve irrigation efficiency are mostly related to the adoption of more efficient irrigation systems. These measures imply considerable costs for IBs that are financially supported either through regional funds or through the national rural development program to whom boards have access through public announcements. However, the availability of regional funds is very different among the regions of the district, so that in some regions, half of the financial resources for IBs comes from regional funds, while in the others, regional funds are almost non-existent. Moreover, not all the IBs have been selected to have access to the national rural development program, with the result that, in some cases, the implementation of measures to improve irrigation efficiency can be prevented by the lack of financial availability.

The translation of non-technical measures into local actions usually means the installation of water metering devices and, for those regions that approved specific regulations, the adoption of pricing policies. In both regions that approved a regulation on water pricing, the implementation is very recent or is not started yet, so it was not possible to understand what the implications for irrigation management are. However, the interviewee with one AIB revealed that the effect of the introduction of water pricing will not be dramatic for the farmers because the largest share of the tariff is related to the fixed costs (construction and modernization) that are not related to the actual water consumption. Water metering and estimates, instead, is requiring a great effort from many IBs for the implementation: Before 2016, in fact, only large water withdrawals were subject to metering, while now this requirement has been extended also to medium withdrawals and for small withdrawals an estimate is required. Most of the IBs and AIBs interviewed reported that the implementation is challenging and, as for the adoption of more efficient irrigation systems, the installation of metering

devices is strictly related to the availability of funding sources. However, some interviewees from IBs and AIBs agreed that the knowledge and awareness regarding qualitative and quantitative aspects of water resources is rising and, despite the difficulties of implementation in this initial phase, the irrigation management will benefit from these improvements.

Overall, all IBs and AIBs stated that the implementation of the WFD has accelerated a process of improvement of irrigation efficiency that, however, was underway regardless of the WFD. Finally, it is noteworthy that in all the regions, the interviewees revealed that the PoMs was not considered as the reference plan for irrigation management by the administrations and IBs involved. Indeed, the interviewees referred that the PoMs (2015–2021) did not have real operational implications for irrigation management compared to the other regional and local plans.

6.6.5.2. The Inclusion of Local Interest in the Development of Plans

The interviews revealed a great heterogeneity in the way IBs and AIBs participate in the activities carried out at the RBD level. We found that only two AIBs participated in the meetings organized by the RBDA to inform stakeholders about the implementation of the WFD and the AIBs found them very useful to acquire relevant information. The other AIB, instead, deemed that the information provided by the regional IMD was adequate and there was no need to participate at the meetings organized by the RBDA. Out of seven IBs, six participated at the meetings organized by the RBDA and five of them were satisfied with the information provided (Mean 3.67). Nevertheless, one IB was very critical regarding the work done by the RBDA because, in his opinion, the information provided to stakeholders was partial and there was no interest in listening to their comments and observations.

In addition to these meetings, AIBs have the right to represent IBs during the decision-making processes occurring at the RBD level. Moreover, in this case, only two AIBs participated and their evaluations were positive (Mean 4.5). The different level of engagement of AIBs in the processes carried out at the RBD level can be explained because some of them have traditionally had a closer relationship with the former

river basin authorities and so are more used to interacting with the RBDA even informally, while, in the other case, the AIBs prefer to interact with the regional IMDs.

IBs do not formally have the right to participate in the decision-making processes held at the RBD level. Nevertheless, we found that two IBs participated in some of the working groups to decide on water metering. Those who participated found the working groups effective for what concerns planning but not effective regarding the consideration of their interests in decisions that will dramatically impact their irrigation practices (Mean: 2). We also found that the IB's dissatisfaction was not only related to the RBDA. The IBs that were more critical towards the decisions taken by the RBDA were also very disappointed with the way the regional administration was dealing with implementation.

Table 2. Summary of the results related to the research questions 1,2 and 3 presented in Figure 1.

RQ	Coordination Mechanism	Effectiveness (Perception)	Outcome	Barrier to Coordination
RQ1: How are analyses coordinated for the whole RBD?	Working group	Effective	Common thresholds for significant pressures	Until the Law 221/2015 coordination for the analysis was not required by the national law
RQ2: How are criteria for setting environmental objectives coordinated for the whole RBD?	Guidelines provided by the RBDA	Low effectiveness	No common outcome	The national legislative framework for the application of extension and exceptions arrived late
RQ3: How is PoMs Coordinated for the Whole RBD?	For all the measures: Guidelines provided by the RBDA and approval of PoMs by the RBDA	Medium effectiveness	No common outcome	Different availability of analytical tools among regional administrations
	For water metering: Working group	Effective	Common regulation for water measuring and estimates.	

Table 3. Summary of the Results Related to the Research Question 4 Presented in Figure 1.

RQ	The Translation of Poms into Concrete Measures	Barrier to Implementation	The Inclusion of Local Interests in the Rbmps	Barrier to Participation
RQ4: What are the effects of the WFD implementation on the local level?	Technical measures are taken from local plans so there is not the need for 'translation'. Non-technical measures are regional rules, so implementation is mandatory	Lack of financial availability; low acceptance towards decisions taken at a higher level	Limited stakeholder consultation	The large scale of the RBD; regional commitment to engage with stakeholders

6.7. Discussion

Studying the implementation of WFD at the RBD scale in Italy is compelling because, compared to other countries, Italy adopted a large-scale river basin approach for the directive's implementation. Moss [29] highlights that the task of institutionalizing river basin management can be accomplished in two different ways: Either, with 'institutionally hard solution', meaning the creation of river basin authorities 'equipped with extensive executive powers, budgets', or with 'a cooperative institutionally soft solution' that are based on a set of procedures to reach agreement among the various authorities concerned.

Apparently, the Italian water governance for the implementation of WFD adopted an 'institutionally hard solution' with the creation of new overarching authorities, suggesting high substantive ambitions [30] for implementing the requirement of river basin approach. Nevertheless, the RBDA in Italy are neither equipped with executive powers, nor with budgets; on the opposite, regional administrations are fully equipped with administrative and regulatory powers for water protection and management. As Rainaldi [12] observed, the gap between, the ideology that inspires the legal disposition (the theory) and the context in which the law has to be implemented (the practice), generates a context-oriented evolution of the law that needs to be constantly adapted to the reality. In the Eastern Alps RBD, the context-oriented evolution of water governance brought to the creation, by the RBDA, of working groups to reach consensus among administrations on relevant decisions for WFD implementation. This 'cooperative institutionally soft solution' produced positive results both in terms of the participants' satisfaction and of reaching shared decisions, such as the definition of common thresholds to identify significant pressures, and the regulation on water metering in agriculture. Nevertheless, the co-existence and similarity of regional water protection plans and the RBMPs, together with the actuality that many competences are still exclusively attributed to the regions, e.g., the development of PoMs, make these cooperative soft solutions temporary. In both of the cases where more coordination was achieved, in fact, this was driven by

the EU Pilot and the need to comply with the EU regulation. Once the risk of infringement procedure is overcome, and the EU regulation satisfied, there is not necessarily the need to keep on working together because the overlaps that characterize the Italian water governance system are still in place.

The findings of this case study are also consistent with those of other studies that evidenced that the PoMs are not used to guide local implementation of measures [31]. However, studies usually focus on whether and how measures established during the planning processes are translated into concrete actions at the local level. In the Eastern Alps case study, we observed a different trend: Most of the measures contained in the PoMs were derived from local plans and their implementation was either already under-going or waiting for the necessary funding sources. This approach for the selection of measures reveals that the PoMs has not been used as planning instruments to promote integration between local management practices and the qualitative and quantitative state of water bodies. These findings resonate with what a recent study has highlighted: The way in which measures are selected indicate a little consideration of the rationale that is at the base of the WFD, that is 'the harmonized transposition of the integrated river basin management paradigm' [32]. In this case study, the recent spread of initiatives of integration among the water protection departments and water management departments at the regional level, as described at the end of section 6.6.4.2., can be interpreted as a good signal that goes in the direction of a more systematized selection of measures, but these improvements have not concerned the current planning cycle (2015–2021). These progresses in the integration among water protection and water management can only be partially related to the implementation of WFD. Our results are in line with the results of Schröder [33] highlighting that 'The WFD was found not to be a driver for integration as a regulative framework but induced an increased number of integration attempts through setting goals which can rarely be achieved without integration'. We may add to this consideration that in the Eastern Alps RBD, at least for what concern measures to improve irrigation efficiency, the EU Pilot and EU regulations on the use of European funds were the most significant drivers for integration, more than the WFD.

Finally, scientific literature highlights the importance of considering the geographical scales at which public participation is conducted. Two arguments are usually raised by scholars. The first points out that lower scales for participation, e.g., at the local level, are usually linked to higher representativeness [7], and to the production of better informed and meaningful plans that are also deemed more legitimate because decision-making processes are closer to stakeholders' interests [34]. On the other hand, research highlights the risk of co-optation of environmental groups by more powerful interests when participatory settings are organized at a very local level [34]. The case study analyzed in this paper describes how public participation is structured in a large river basin. In such a large RBD, participation cannot, by definition, exceed information supply and limited stakeholder consultation. The process that we observed in the Eastern Alps RBD, in fact, resembles that of the 'expanded stakeholder consultation' [35] where, despite the WFD's requirement of public participation being formally complied with, active participation of stakeholders is very partial. One of the arguments to support the engagement of non-state actors in the development of plans is to enhance the effectiveness of policy delivery [36]. The latter is running the risk of limited implementation if decisions are perceived as imposed by stakeholders and they do not see the possibility to negotiate their interests. For this reason, it is at the sub-RBD level that stakeholders should find the appropriate spaces for participation, and the regional administration plays a crucial role in that. Being IBs local actors, the effect of WFD, as well as their involvement in the implementation of WFD, are mediated by the activities carried out at the regional level. Not surprisingly, the region where the IBs were more critical towards the WFD was also the region in which the relationships among IBs and the regional administration were less structured.

6.8. Conclusions

This paper unfolds the process of WFD implementation at a scale usually less explored by research: The RBD. Studying WFD at RBD level contributes to widen our understanding of how the institutional arrangements for water protection and management evolve to comply with the WFD requirements of river basin planning and participation. In the Eastern Alps RBD we found that new institutional

arrangements to promote coordinated decision-making have only occurred for two key-tasks of the implementation process: The analysis of significant pressures and the identification of a set of common objectives to recover environmental and resource costs. In either case, coordination proved effective both to reach common outcomes for the whole RBD, and for participants' satisfaction with the decision-making processes. Nevertheless, we also found many problems that affect the Italian water governance system: The co-existence and similarity of regional water protection plans and the RBMPs that generates significant competences' overlaps, the delays of the national legislative framework that affected the overall process of WFD implementation, a limited consideration of the actual state of water bodies in the selection of measures contained in the PoMs (2015–2021), a limited stakeholders' participation in the development of RBMPs. As the RBD is a unit of implementation too large to encourage stakeholders' participation, it is at the sub-RBD level where stakeholders should find the appropriate spaces for participation. Therefore, the quality and frequency of interactions among stakeholders and public authorities at the regional level plays a crucial role to enhance the acceptance of stakeholders towards decisions that will inevitably impact their irrigation management practices.

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Appendix A

Table A1. Descriptive statistics of closed-ended questions.

Official Competent Authorities				
Question (5: Completely Defined; 1: Not Defined)		N° Respondents	Mean	Standard Deviation
To what extent are competences and responsibilities for WFD implementation clearly defined?		5	3.4	1.14
Official Competent Authorities				
Question (5 Very Effective; 1 Not Effective)		N° Respondents	Mean	Standard Deviation
RQ1	What is the degree of effectiveness of the coordination mechanisms (if any) to make the criteria for the analyses homogeneous for the whole RBD?	5	3.8	0.45
Official Competent Authorities				
Question (5 Very Effective; 1 Not Effective)		N° Respondents	Mean	Standard Deviation
RQ2	What is the degree of effectiveness of the coordination mechanism (if any) to establish common criteria for objectives, extensions and exceptions for the whole RBD?	5	2.8	1.64
Question (5 Very Effective; 1 Not Effective)		N° Respondents	Mean	Standard Deviation
Official Competent Authorities				
RQ3	What is the degree of effectiveness of the coordination mechanism (if any) to coordinate the Program of Measures for the whole of the RBD?	5	3	1.87
	Irrigation Management Departments			
	To what extent were the working groups effective to produce coordinated decision-making for the whole RBD?	4	3.75	0.5
	To what extent were the working groups effective to produce coordinated decision-making for the measuring of water in agriculture?	4	4	0.82
Question (5 Very Useful/Effective; 1 Not Useful/Effective)		N° Respondents	Mean	Standard Deviation
Association for Irrigation Boards				
RQ4	To what extent were the public meetings organized at the RBD level useful to acquire relevant information on the planning process?	2	5	0
	What is the degree of effectiveness of the working groups organized at the RBD level (if participated in any) to coordinate the decision-making among administrations and stakeholders of the RBD?	2	4.5	0.5
	Irrigation Boards			
	To what extent were the public meetings organized at the RBD level useful to acquire relevant information on the planning process?	6	3.67	0.82
	What is the degree of effectiveness of the working groups organized at the RBD level (if participated in any) to coordinate the decision-making among administrations and stakeholders of the RBD?	2	2	1.41

Statistics based on a 5-point Likert scale questions. Given the limited number of respondents the statistics simply provide a description of the opinions of interviewees on the coordination and participatory mechanisms (mean) and the degree of consensus on the topic (standard deviation).

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7. Discussion

In February 2019, the European Commission delivered the report on the state of implementation of WFD and FD. In this report the Commission clearly stated that, despite some encouraging results for instance regarding groundwater resources, only a limited number of water bodies have improved in status from the first to the second planning cycle (European Commission, 2019c).

Looking at Italy, the data provided in Table 5 show that some improvements in the ecological status of surface water bodies have, indeed, occurred across the country. The most significant achievement is related to the greater knowledge regarding the state of water bodies and the improvements in monitoring systems play a major role in that. However, the table also shows that the more the knowledge regarding the state of water bodies, the higher the number of them falling in low ecological status categories. Consequently, the road to the achievement of good water status for all water bodies seems to be still long in Italy.

Table 5. Ecological status of surface water bodies (rivers) in Italy reported in the 1st and 2nd RBMPs.

Ecological status	Surface Water Bodies (rivers) %	
	1 st planning cycle	2 nd planning cycle
High	1.0	4.7
Good	24.0	36.1
Moderate	12.8	24.7
Poor	5.3	11.5
Bad	0.9	2.9
Unknown	51.7	15.8

Source: EEA

However, given the evidence of some progresses, though modest, in the quality of water resources, what can be said about the governance of them?

The general purpose of the thesis was, indeed, to understand the evolution of national governance systems to meet the requirements of river basin planning and public participation in order to identify what elements are more significant for promoting more coordinated and inclusive planning at river basin. Hence, the discussion of the main results of the thesis is organized in the following sub-sections:

7.1. Lessons to be learnt from the EU countries' analysis, 7.2. Lessons to be learnt from the case-study, 7.3. Policy recommendations.

7.1. Lessons to be learnt from the EU countries 'analysis

The study conducted by Jager et al. (2016) on WFD implementation has looked at EU countries' adaptation strategies with regard to river basin planning and participation. This work highlighted that formal compliance with the governance requirements of WFD has rarely resulted in substantive changes in water-related decision-making processes across EU countries (Jager et al., 2016). Based on this previous study, the qualitative meta-analysis of literature looked at a specific aspect of this process of governance adaptation, that is the constitution of advisory boards to make decision-making processes more coordinated and inclusive. Moreover, the time-span of the study conducted by Jager et al. (2016) referred to the first implementation cycle (2009-2015) when the WFD-related governance changes were at a very initial stage. The the qualitative meta-analysis, instead, cover a longer time-span, going from the adoption of the Directive to the current implementation cycle. The longer time-span of the analysis allowed me to observe how institutions evolved to comply with EU obligations while fitting them into national contexts.

Illustrative of this evolution are the processes of adaptation undertaken in three of the countries analysed, i.e. Denmark, England and Italy. Denmark and England, for instance, started implementation with a highly top-down approach, but after the first cycle realized the need for a greater inclusion of local authorities and stakeholders in the decision-making processes. Hence, in both countries the main competences for implementation were retained by the national environmental agencies but with the auxilium of participatory boards established at sub-RBD scale. What were the triggers for this evolution? Graversgaard et al. (2017) highlighted that the lack of involvement of stakeholders and local authorities in the first planning cycle caused reluctance and delays in the implementation of measures. Similarly Robins et al. (2017) reported that the shift to the Catchment-based approach in England, and the relative institution of the Catchment Partnerships, were the government's response to the criticisms with respect to "limited stakeholder involvement, inflexibility at the local level and the characterisation of catchment management at too broad a scale" occurred during the

first cycle. It is interesting to note that in both cases the drivers for a change came from the dissatisfaction of actors involved in implementation rather than being the consequence of an explicit requirement made by the European Commission after the first planning cycle. In its evaluation on the RBMPs (2009-2015) the Commission, indeed, reported that both countries had complied with the requirement of information supply and stakeholders consultation (European Commission, 2012b, 2012c). This aspect again emphasizes the discrepancy that might exist between formal compliance with WFD requirements and the realization of substantive changes in decision-making processes.

In Italy, instead, the evolution of water governance from the first to the second cycle passed through the full empowerment of the RBDAs. Unlike the other two countries, in this case one of the main drivers for the change was the EU Pilot 7304/15/ENVI – the document that anticipates an infringement procedure from the European Commission – requiring more coordination at RBD level to ensure the achievement of the environmental objectives. In all three countries the governance changes have occurred quite recently so that it is not possible to draw general conclusions on the outputs and outcomes of these transformations. However, as the study of Graversgaard et al. (2017) interestingly shows, the new institutional settings established in Denmark were able to identify more cost-effective measures compared to those identified under an exclusively top-down approach. In Italy, the empowerment of the RBDAs has certainly increased their coordination capacity over the regional administrations but, as it will be discussed in the section dedicated to the case-study, many structural problems persist and are limiting the effects of this institutional change.

The cross-country analysis has also highlighted that the requirement of adopting a river basin approach for water planning has resulted in two main different strategies. Under the first strategy, traditional authorities competent for water protection and management (e.g. Ministry of Environment, Environmental Agency, etc.) were identified as “appropriate administrative arrangements” (Article 3) to promote coordinated implementation of the Directive along the river basin district. This was the strategy adopted by countries where basin planning was not in place before WFD

(i.e. Denmark and Germany) or was very limited in term of participation (i.e. England and Wales). Under the second strategy, instead, implementation of WFD led to the creation of new inter-regional river basin authorities (i.e. Sweden) or to the strengthening of pre-existing river basin institutions (i.e. Italy, Spain and France). Given these different approaches, one may ask if differences in the capacity of coordination and of involvement of interested parties can be traced back to different implementation modalities. In other words, based on the results of the cross-country analysis, the questions that arises is whether it is possible to conclude that one approach is superior to the other to promote a better fit between institutions and environmental and societal processes being managed. The analysis of the literature has shown that both strategies have numerous strengths and weakness and, on the basis of these results, is not possible to draw general conclusions on what strategy works better. Nevertheless, the qualitative meta-analysis of literature has clearly highlighted that integrated water resources management can be achieved only if countries are able to establish an effective combination of top-down and bottom-up approaches. In this regard, two aspects deserve a specific attention:

- **The importance of a clear institutional framework that allows interplays among government levels.**

The requirement of establishing a better link between hydrological and administrative boundaries may puzzle pre-existing institutional settings and create confusion in competences attribution. The cross-country analysis, indeed, highlighted that a clear institutional framework where competencies of each institutional actor in the development of RBMPs are clearly defined is an essential pre-requisite in this process of governance adaptation. Regardless of the strategy adopted by EU countries, the analysis revealed that there is a tendency to keep two disconnected government levels: one represented by the institutions that have traditionally dealt with water management (e.g. government, regions, federal states, municipalities), and the other that is composed by the basin bodies established to comply with WFD requirements. Hence, clear institutional framework, first, means to establish a clear legislative framework that allows the creation of effective interplays between these two government levels and their relative planning instruments. Second, a clear

institutional framework requires the existence of a central guidance that is able to plant “the seeds for integrated water management” (Nielsen et al., 2012). Illustrative of that is the Danish case where the clear framework provided by the National Agency allowed the advisory boards and the municipalities to work effectively for the identification of measures. Ultimately, the requirement to organize water management and protection along hydrographical units requires a greater effort from national authorities to create instruments, incentives and platforms for coordination that allow effective interactions among involved government levels.

- **The importance of creating links between public participation and decision-making processes.**

In all the countries analysed, the requirement of public participation for the development of RBMPs promoted the establishment of advisory boards for stakeholders’ consultation, while a broad involvement of civil society rarely occurred. These findings are not surprising as the Directive’s approach to public participation tends to favor stakeholders’ consultation rather than a broader civil society’s engagement. However, the analysis also highlighted that most of the countries analysed are experiencing difficulties in including the outputs of stakeholders’ consultation in the final plans. When, instead, the link between the *loci* of knowledge production and those of policy formulation was more robust, some factors played a significant role in that:

1. As the Danish case showed, when the scope of participatory process is well defined, along with its timing and resources allocated, it can effectively contribute to identify cost-effective measures.
2. The location where stakeholders’ consultation is more meaningful is at a scale lower than the RBD (i.e. sub-basin, river, etc.) that, instead, appears to large to encourage an active participation.
3. The role of public authorities participating in the advisory boards is fundamental to create an effective link between spaces where stakeholders are consulted and the those where RBMPs are elaborated and approved.
4. Cultural factors also contribute to explain different traditions of public participation across countries (Enserink et al., 2007): countries where, in terms of

water resources management, little decision-making power has traditionally been transferred to the public (e.g. Spain, England, Italy) are experiencing more difficulties to implement public participation (Enserink et al., 2007; Massarutto et al., 2003). In other words, allowing stakeholders and the public to influence the outcomes of planning processes is not only a matter of what decision-making procedures are adopted, but also concerns a broader cultural transformation.

7.2. Lessons to be learnt from the case-study

Table 6 reports the ecological status of rivers belonging to the Eastern Alps RBD as reported in the first and second RBMPs. As evident, the trend is the same of that showed in Table 5 for the whole country. The results of the case study also showed that more coordinated decision-making processes, indeed, occurred during the second planning cycle although some structural problems persist in the Italian water governance. Hereafter the main results of the case-study are discussed on the basis of the two main objectives of the study: (1) understanding the dynamics of inter-regional coordination and participation during the planning process at RBD scale, (2) understanding the effects of the planning process on irrigation management at local level.

Table 6 Ecological status of surface water bodies (rivers) in the Eastern Alps RBD (ITA) reported in the 1st and 2nd RBMPs.

Ecological status	Surface Water Bodies (rivers) %	
	1 st planning cycle	2 nd planning cycle
High	2.4	11.6
Good	31.3	42.8
Moderate	7.3	19.1
Poor	3.0	6.8
Bad	0.8	1.7
Unknown	53.0	15.8

Source: EEA

- **Coordination and participation at RBD level.**

For the analysis of how coordinated and inclusive decision-making have been organized in the Eastern Alps RBD, both endogenous (i.e. internal organization of the

RBD in the different steps of WFD implementation) and exogenous factors (i.e. national legal framework, EU recommendations and regulations) were considered.

Coordination among the regional administrations of the RBD was pursued through the working groups organized by the RBDA. Compared to the first planning cycle, where the RBMP of the Eastern Alps RBD was considered just a collection of regional water protection plans and no clear coordination mechanism was in place (European Commission, 2012a), the working groups represented an improvement in the capacity of coordination between the different actors involved.

Beside the direct coordination promoted by the working groups, the case study also highlighted that the *ex-ante* conditionality issued by the EU Regulations 1305/2013 provided a platform for a greater intra-regional coordination between water protection and irrigation management departments. In Veneto, for instance, a stronger intra-regional collaboration between the departments was established to identify the irrigated areas where water bodies are in a good water status⁹. In Friuli Venezia Giulia the access to the funds of regional Rural Development Program was contingent upon the proof that investments in irrigation will produce more water savings¹⁰. Finally, the Province of Trento is probably the most interesting case: in 2018, the Technical Committee for Water (*Tavolo Tecnico Acque*) was established with the aim of ensuring coordination of all departments for the implementation of WFD and the Flood Directive (2007/60/CE)¹¹.

Despite this greater inter-regional and intra-regional coordination, the ambiguity of the legislative framework – that keeps together very similar regional water protection plans and RBMPs – and the lack of a clear guidance from the central government on relevant aspects of implementation affected the capacity of coordination of the RBDA. For instance, the case-study showed that the working groups produced more effective outcomes when the government had provided clear guidelines on the topic under discussion, as in the case of water metering, while their

⁹ Regional decree (DGR) n. 1940, December 21st, 2018 Annex B and the DGR n. 1415, October 2nd, 2018 Annex A.

¹⁰ Regional decree n. 1440, August 10th, 2016 Annex A

¹¹ Provincial decree n. 144, February 2nd, 2018.

outcomes were limited when no clear central direction was provided, as for water pricing.

Another issue that affected coordination concerns the resources allocated to the RBDAs. In Italy, indeed, the attribution of full competences to the RBDAs, occurred in 2015, has not come with an increase in their financial resources. The resources allocated to river basin authorities are related to the functions they are established for. Molle et al. (2007), for instance, identify three types of river basin organizations: the basin authorities that are provided with extensive executive powers and hold significant financial autonomy, the basin committees whose main functions are policy settings and planning, and the coordinating councils that are deliberative decision-making bodies made of public and private stakeholder. In Italy, RBDAs are public entities primarily responsible for planning activities in the RBD; consequently, under the taxonomy provided by Molle et al. (2007), the Italian RBDAs might fall within the type of basin committees, while, for instance, the French river basin authorities could be placed under the first typology. However, following WFD implementation, the RBDAs were charged with other significant responsibilities, such as stakeholders' consultation and coordination for RBMPs development, but this change was not followed by an increase in their financial availability. Without adequate financial resources, the functions of the RBDAs remain limited and the empowerment of the authorities occurred in 2015 appears to be more formal than substantial.

This aspect also affected public participation. From interview with the Eastern Alps RBDA, for instance, it emerged that financial resources allocated to the authority were not even adequate to make road-shows across the RBD to inform stakeholders and the public regarding WFD implementation. The Environmental Code, indeed, establishes that the RBDAs ensure access to information to the public and involvement of public authorities in the development of RBMPs. At the same time, RBMPs are largely based on regional water protection plans for which regional authorities should promote active participation of all interested parties during the elaboration. Consequently, according to the law, public participation for water resources management and protection should be carried out at two levels, i.e. the RBD and regional. However, no explicit mechanism exists to integrate the participatory

processes conducted at both levels. Much of the implementation of the Directive concerns the regions, so it is logical to have more active forms of participation at this level. However, it would be necessary for regional participatory processes to take place within a common framework provided by the RBDA. The analysis of the case study, indeed, showed that the selection of the measures contained in the PoMs followed very different criteria among the regions, and that stakeholders were involved in very different ways across the RBD. Selection of measures is when consultation is most significant as stakeholders are usually responsible for on-the-ground implementation of measures. Ensuring a common framework for stakeholders' consultation, albeit flexible to local needs, could ensure greater homogeneity across the regions of the RBD in the selection of measures. Moreover, it could also avoid the risk of excessive localism, that can produce negative effects on participatory processes organized at a very local level (Newig et al., 2016).

- **The effects of WFD on the local level.**

Regarding the effects of WFD on local irrigation management, the case study highlighted that the very heterogeneous conditions of the regions certainly produced different paths of implementation across the RBD. First, the different morphological characteristics of the Eastern Alps RBD – ranging from mountains and foothills in the Alpine area to the low plains of Veneto region - resulted in different crops production and different irrigation practices. Where the production of orchards and vineyards is predominant, as for the autonomous provinces of Trento and Bolzano, the irrigation schemes are already highly efficient, and implementation of WFD is easier for Irrigation Boards. On the opposite, implementation resulted to be very challenging in Veneto region because water withdrawals for irrigation are significant and low-efficient irrigation schemes (e.g. surface irrigation) are still prevailing.

Moreover, if the autonomy of the autonomous provinces does not count in terms of their obligations for WFD implementation, it certainly counts in terms of financial resources' availability. While both autonomous provinces and Friuli Venezia Giulia have their own budget to invest in measures to improve irrigation efficiency, in Veneto regional funds are limited. The different availability of financial resources may

constitute a barrier for implementation of PoMs especially in those areas where more improvements in irrigation efficiency are needed.

Finally, the case study highlighted that stakeholders' perception with regard to WFD implementation is more influenced by the quality and frequency of interactions with regional authorities than by the interactions with the RBDA. This is not surprising: being Irrigation Boards local actors, the effect of WFD, as well as their involvement in the implementation of WFD, are mediated by the activities carried out at the regional level. However, if a common framework to engage stakeholders is lacking, and everything is left to the initiatives of regional administrations, there is a risk of uneven engagement of stakeholders in some areas of the RBD with the likely effect of limited implementation of WFD in the long-run.

7.3. Policy recommendations

The above-mentioned considerations provide the basis to set up a list of policy recommendations for the next implementation cycle of WFD in Italy. Given the fact that an in-depth knowledge of how decision-making is organized was acquired only for the Eastern Alps RBD, these recommendations primarily applies to this district; however, some of them concern changes that should occur at government level and, thus, could be extended to the whole country. Figure 4 depicts the governance for WFD implementation that emerged from the case-study along with the suggestions for improvements. More in details, red colour means that the implementation of that recommendation would imply a completely new organization, while the other recommendations are already being implemented and should be retained and strengthened in the next steps of implementation. Consequently, the proposed operational recommendations can be divided by target group at the different governance levels:

- Recommendations to the government. Integrated and coherent implementation of the WFD throughout the district may be achieved only with a national institutional framework that provide the RBDAs with clear and substantive powers. This, first, implies to reduce the overlaps between regional water protection plans and RBMPs. This does not mean that regional water protection plans should be repealed by RBMPs, but that the law should create

effective interplays between the two planning instruments. Second, more financial resources should be allocated to the RBDAs in order to enhance their capacity of coordination in the decision-making processes. Finally, the government should support the RBDAs by recognizing their leading role on water protection and flood management and, not least, on climate change adaptation strategies. This means to provide the RBDAs with new competences to be conducted in close collaboration with the regions, such as river restoration and green infrastructures.

- Recommendations to the RBDA. At RBD level, coordination through working groups should be retained and strengthened. Given the large size of the RBD, coordination should primarily focus on macro-objectives and not on the details of regional planning. A common framework for the participatory processes conducted at regional level could be established by the RBDA. Following the examples of the other EU countries, advisory boards might be established in all regional administrations and the RBDA should provide them with common rules for the selection of stakeholders to be included in the process, the scope of participatory processes and timing. A share of the resources allocated to RBDAs should be allocated to these advisory boards.
- Recommendations to the regional administrations. At regional level, intra-regional coordination should be maintained and strengthened. Competent authorities for implementation at regional level should participate in the advisory boards to support stakeholders in the selection of measures. The two aspects - greater intra-regional coordination and participation - are not separate. Following the organization of the Technical Committee for Water in the Province of Trento, advisory boards for the selection of measures should always include regional water protection departments to ensure that the status of water bodies is taken into account in the selection of measures.
- Recommendations to local stakeholders. At local level, stakeholders should be more actively involved in the selection of measures.

Finally, the case-study has shown that the only incentives to promote effective coordination derived from the risk of infringement procedures and constraints on

access to EU funds. However, these mechanisms are likely to be only temporary once the risks have been overcome. It is necessary to establish long-lasting incentives for cooperation that are not only based on top-down drivers. River contracts, collaboration in EU projects, more intense cooperation between the RBDA and the regions in the field of flood risk and drought management could be all effective incentives for cooperation.

Figure 4 certainly depicts an ideal model of implementation; however, it does not excessively deviate from reality. In line with the definition of spatial fit adopted in this research, improvements in river basin governance are proposed, indeed, recognising the characteristics of the current water governance system. Regions have traditionally had competences for water protection and management in Italy and these recommendations do not foresee any rescaling of responsibilities. At the same time, however, these recommendations recognize the importance of having a more coordinated and inclusive water management that overcomes administrative fragmentation. Figure 4 also represents the need for the process of adaptation of water governance systems to take place at all governance levels that should act synergistically to produce significant results.

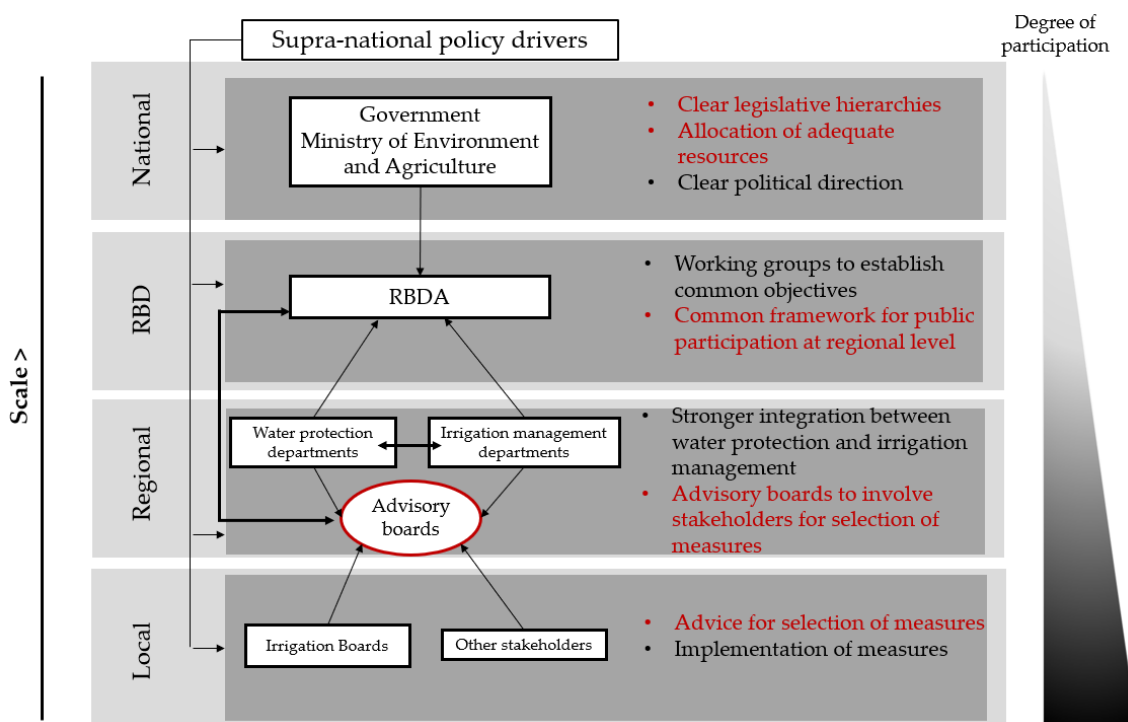


Figure 4. The governance for WFD implementation in the Eastern Alps RBD with suggestions for improvements. Source: author’s own elaboration adapted from Rollason et al.(2018).

8. Conclusions

The focus of this thesis was on the institutional novelties introduced by the WFD in terms of river basin planning and public participation. Prior studies have highlighted that, even though most of the EU countries have formally complied with the requirements of WFD, water-related decision-making processes have neither become more coordinated nor more inclusive. Moreover, studies dealing with water governance in Italy have shown that, despite the existence of river basin authorities and river basin planning instruments, competences for water protection and management remain fragmented among a slew of institutional actors with limited coordination along river basins.

Given that, this research aimed at identifying the elements that play a significant role in this process of water governance adaptation and that are, thus, needed to promote more coordinated and inclusive planning at river basin.

This aim was achieved by means of a qualitative meta-analysis of studies related to the implementation of WFD in seven EU countries, and a case study to explore the Directive's implementation in a selected Italian RBD.

The qualitative meta-analysis has shown that there is a tendency, among the countries analysed, to keep two disconnected government levels: one represented by the institutions that have traditionally dealt with water management (e.g. government, regions, federal states, municipalities), and the other that is composed by the basin bodies established to comply with WFD requirements. Likewise, EU countries are having difficulties in integrating the knowledge acquired through participatory processes in the RBMPs. Nevertheless, the existence of a clear institutional framework – which means clear legislative framework and clear central guidance from national government – was found to be pivotal to enable interplays between these usually disconnected government levels. Moreover, participatory processes resulted to have a greater influence on decision-making when there was a clear definition of scope, timing and resources allocated to the consultation process, along with the presence during consultation of public authorities directly involved in the formal elaboration and approval of plans. Finally, the qualitative meta-analysis showed that, despite the relevance attributed by the European Commission to the RBD, for most of the

countries analysed this scale has not resulted to be central neither to promote administrative coordination for the development of RBMPs, nor to carry out stakeholders' consultation.

The case-study allowed to delve into the process of water governance adaptation from a direct observation of WFD's implementation in the Eastern Alps RBD. The results, indeed, confirmed and strengthened the importance of the elements emerged from the qualitative meta-analysis. For instance, coordinated decision-making throughout the RBD was found to be effective only when the national government had provided clear direction on the topic under discussion. On the opposite, when central direction was lacking, coordination among regional administrations of the RBD was limited to formal provisions without any operational effects. The ambiguity of the institutional framework was worsened by the actuality that the legislative framework keeps together very similar RBMPs and regional water protection plans that partially overlap. Hence, the case-study showed that the shortcomings of the national institutional framework are significantly limiting the coordination capacity of the RBDA. Even though some progresses in terms of inter-regional and intra-regional coordination were found in the case-study, these were always triggered by emergency reasons (e.g. the risk of infringement procedure). Consequently, these improvements might not last in the long-run because the limiting factors mentioned above could take over again.

Regarding participation, the case-study showed that regional administrations interpreted the engagement of stakeholders in very different ways. Without a common framework for participation provided by the RBDA, there is a risk of uneven involvement of stakeholders throughout the RBD with the possibility of reluctance towards implementation of WFD in the long-run.

Given the elements emerged from the qualitative meta-analysis and from the case-study, this thesis formulated a list of policy recommendations that specifically applies to the Eastern Alps RBD but that could be, for some aspects, extended to the whole country. These recommendations were addressed to all government levels, from central government to implementing actors at local level, as this research highlighted the need for improvements to occur at all levels to produce meaningful results. The

greatness of WFD lays in the fact that it introduced a systemic approach to the protection of water resources. This thesis has demonstrated that improvements in water governance require the same systemic understanding of the relation among institutions if integrated river basin planning has to be achieved.

Finally, some limitations of the study must be acknowledged. First, the qualitative meta-analysis was based on information derived from other studies. Hence our understanding of water governance systems in the selected EU countries was based on the results of other studies and not on direct observation. This constitutes a potential bias of research because information contained in the papers may be limited or partial. This bias was reduced by the fact that implementation modalities of EU countries were not only deduced from literature but also from European Commission and EU consultants' reports. Moreover, even though different implementation modalities adopted in EU countries, and their effects on decision-making processes, were analysed in this thesis, potential linkages between implementation modalities and outcomes were not explored. This aspect certainly deserves more inquiry in the future.

Concerning the study of the Italian water governance, the focus on a single case-study certainly constitutes a limitation of the thesis. Indeed, generalization of results cannot be done on the basis of the study conducted in the Eastern Alps RBD as the governance systems of the other Italian RBDs may vary widely. Furthermore, the study of the effects of WFD on irrigation management at local level was limited to one sector, i.e. irrigation. Even though in that sector different public and private stakeholders have been interviewed, the effects of WFD on other sectors, as well as interactions and conflicts among different water uses, cannot be deduced from this thesis.

Hence future research dealing with WFD implementation in Italy should explore the effects of WFD on other sector (e.g. hydropower) and if implementation is softening or worsening conflicts among different water-use sectors. Similarly, future research might explore how decision-making processes are organized in other Italian RBDs. Finally, another interesting topic for research would be to study how other institutions, e.g. river contracts, contribute to this process of governance adaptation in Italy. Furthermore, river contracts are voluntary agreements so it would be interesting

to explore the effectiveness of these instruments to promote a better fit between decision-making and environmental processes, in comparison with planning processes at RBD that are, instead, mandatory.

9. References

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