Integrated River Basin Management in the European Union: insights from Water Framework Directive and Flood Directive implementation

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1. Premise

The European strategy to address the growing concerns regarding water resources protection and flood risk management is centred on the so-called Integrated River Basin Management (IRBM). The latter can be considered as an operational tool to enact the principles of Integrated Water Resources Management (IWRM) that foresee an integrated management of land, water and related resources in order to maximise the economic and social welfare without compromising ecosystems' sustainability (GWP TAC, 2000). IRBM, indeed, recognises the river basin as the space where an integrated and coordinated approach to the planning and management of natural resources should be conducted in order to make stakeholders aware of a wide array of social and environmental interconnections that occur at this hydrographical scale (Hooper 2006).

The European Water Framework Directive (2000/60/CE, WFD hereafter), first, and then the Flood Directive (2007/60/CE, FD hereafter) recognise the river basin as the appropriate spatial scale to improve the quality of water resources and to enhance the capacity of flood risk management. Moreover, both directives promote the active involvement of civil society in the elaboration of river basin

plans. In so doing, both directives represent an outstanding attempt to institutionalise the IRBM approach throughout European countries.

Given the relevance of this topic at European level, this paper aims to provide a framework to understand how IRBM is conceived by European legislation and to discuss some of the relevant implications for national water governance systems derived from implementation of the requirement of river basin planning and management.

To do so, the next section provides a description of WFD and FD, focusing on the instruments and processes established by the European Commission to promote IRBM. The third section sets out the theoretical framework at the basis of river basin management, making reference to the concept of "spatial fit". The fourth section provides some empirical considerations on the implementation of river basin management in Europe, while the fifth section raise and discuss some concluding remarks.

2. EU Water Directives: Instruments and Processes to promote IRBM

2.1. *The Water Framework Directive (WFD)*

The European WFD is a milestone in the European environmental legislation, marking a significant break with previous water laws in Europe. The overall objective of the Directive is to achieve a good water status for all European water bodies and, where this is not possible, it requires Member States to not further deteriorate their water resources. The deadlines established by the Directive are relatively strict: the good status should have been achieved by 2015; however, after this first deadline, the WFD foresees two other cycles of implementation of six years each, going from 2015 to 2021 and from 2021 to 2027.

Following WFD implementation, Member States were required to adopt a river basin approach to improve the protection and management of water resource. More in detail , EU countries had to divide their national territories into River Basin Districts (RBDs) that are defined as «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). Central to achieve the ambitious objectives of WFD is the planning process that Member States should conduct at river basin level and whose main output are the River Basin Management Plans (RBMPs) (European Commission, 2003a).

The development of RBMPs can be seen as an iterative process composed of four main steps that should be repeated every six years for each implementation cycle: (i) assessment of the current qualitative and quantitative status of water bodies, (ii) setting of specific environmental objective for each water body on the basis of the status assessment, (iii) identification of measures to reach the environmental objectives established on water bodies, (iv) evaluation of advancements in the implementation of measures and of improvements in the status of water bodies through monitoring programs (European Commission, 2003a). Moreover, two cross-cutting activities are required throughout the implementation process. The first concerns the implementation of monitoring programs that 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. The second is the requirement of engaging civil society in the development of RBMPs. More in detail, the Article 14 of WFD requires EU countries to ensure that civil society is adequately informed regarding implementation of WFD, and that stakeholders are consulted during the planning process; moreover, the WFD encourages Member States to promote the active involvement of civil society in the development of RBMPs.

2.2. *The Flood Directive (FD)*

The FD is one of the so-called "daughter directives" of WFD. The overall aim of the FD is to establish a framework for the assessment and management of flood risks in order to reduce the negative consequences of flooding on human health, economic activities, the environment and cultural heritage in the European Union (Article 1, FD). Likewise WFD, to achieve this objective EU countries are required to produce specific planning instruments called Flood Risk Management Plans (FRMPs). These plans, however, are only the last step of a three-stage planning process that foresees, first, the elaboration of Preliminary Flood Risk Assessments (in 2011), and second, the production of Flood Hazard and Risk Maps (in 2013) (European Commission, 2019a).

The Preliminary Flood Risk Assessments is needed to assess the areas with significant potential risks of flooding (Arts. 4 and 5); hence the Flood Hazard and Risk Maps have to be produced for those areas identified as "at risk" (Article 6). These maps should contain information on: (i) hydrological aspects (e.g. water depths, flow velocities) under three scenarios of low, medium and high probability of flooding, and (ii) potential adverse consequences on socio-economic activities under the three scenarios. The purpose of FD, indeed, is not only to assess the probability of flooding but also to consider a broad range of possible conse-

quences in order to improve the capacity of flood risk management (Mostert and Junier, 2009). The third output of this planning process, i.e. the FRMPs, should be revised and updated every six years (the first cycle of planning ended in 2015) and should contain "appropriate objectives" for the management of flood risk in the areas considered with significant risk of flooding (Article 7). The plans should also contain measures to achieve the stated objectives, even if the definition of both objectives, measures and prioritisation of measures is left to the discretion of Member States (Mostert and Junier, 2009). One clearly established constraint, instead, concerns the fact that in international river basins measures established in one country cannot increase the risk of flooding in the neighbouring state (Article 7.4).

Overall, implementation of FD should be conducted in coordination with WFD: for instance, the implementation of the FD and the WFD has been synchronised. Furthermore, the requirements of public participation are similar for both directives and the participatory processes conducted for the development of FRMPs can be coordinated with those for the elaboration of RBMPs if deemed "appropriate" (Article 9). Moreover, the unit for flood risk management should be the same of WFD, i.e. the RBD; however, Member States may opt for a different unit of management (e.g. individual river basin). In the same vein, competent authorities may be the same or different from those indicated for WFD implementation.

3. Improving Spatial Fit in Water Management: from Theories to EU Policy

As described in the previous section, the implementation of both directives requires Member States to adopt a river basin approach for water protection and flood risk management. However, the conceptualisation of the river basin as natural spatial unit for water management is certainly not an innovation in Europe. In practice, river basin management gained momentum in Western societies from the second half of 18th century and was strengthened during the industrial revolution; but it is only since the end of the last century, and in particular with diffusion of the IWRM's principles, that the river basin has become central to watershed and ecosystem-management (Molle 2009). From that moment on, indeed, the river basin approach became a mainstream concept in water resources management (Molle 2009) to the point of being institutionalised in the European Union with the formal requirements of the WFD and FD (Moss 2012).

On a conceptual basis, tailoring water resources management on river basin is deemed an optimal solution to consider the ecological externalities that decision-making processes related to the use of natural resources may entail.

Governance scholars have for long-time addressed the issue of how social institutions can improve their capacity to match social and ecological systems and processes being managed (Folke *et al*. 2007). The so-called "Problem of fit" between institutions and ecosystems precisely refers to the query for institutions that are able to consider the interactions and interplay that occur between and within ecological, economic, and socio-cultural systems (Folke *et al*. 2007). As a consequence of this search for an higher fit between institutions and environment, many river basin organisations 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 taht 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 river basin organisations (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, these other areas of fit can be even more relevant (Lebel *et al*. 2013). Given that, some scholars argue that policy makers and researchers should be pragmatic in the search for institutions that can improve the fit with the ecosystems being managed. More relevant for research should be the investigation on 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 and 2004), rather than chasing the perfect fit between institutions and ecosystems (Ostrom *et al*. 2007).

Going back to the directives, they both make river basin approach binding for Member States with the requirement of defining RBDs where RBMPs and FRMPs have to be developed. However, the directives leave also considerable leeway to countries to adapt river basin approach to national specificities. For instance, neither of the directive requires Member States to set up specific river basin organisations for the implementation and the plans can also be developed

at a smaller scale than the RBD. Nevertheless, the European Commission explicitly requires coordinated implementation of the Directives across the RBD. For instance, the Article 3 of the WFD requires 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). The Article 8 of FD states that «For river basin districts, or units of management […] which fall entirely within their territory, Member States shall ensure that one single flood risk management plan, or a set of flood risk management plans *coordinated* at the level of the river basin district, is produced» (emphasis added). Moreover, cooperation between competent authorities that share an international river basin district is expected in order to produce one single international FRMP; however, if cooperation is not reached, separate national plans may be developed.

Consequently, the European Commission is more interested in the effects that the implementation of river basin approach should produce – i.e. more coordinated planning and management of water resources and of flood risk at river basin scale– rather than in the strategies adopted by EU countries to deliver these effects. Hence, the pragmatic approach mentioned above that consider how water governance systems can effectively work across institutional, sectorial and geographical boundaries, seems to be also present in both the EU directives. Following this consideration, the next section reports some empirical considerations on the implementation of the requirement of river basin planning and management in EU countries.

4. Implementing River Basin Management in Europe: some Empirical Considerations

Most of the EU countries complied with the obligations of river basin planning and management in a timely manner. In 2012, European Commission reported that 25 Member States adopted RBMPs related to their national RBDs (European Commission 2012); likewise, 26 Member States were able to produce their national FRMPs by 2015 (European Commission 2019b).

However, formal compliance with the procedural requirements of the directives does not imply that a more coordinated approach to planning and management of water resources at river basin level is achieved. For instance, a study that analysed the implementation of WFD in 13 Member States highlighted that, despite all countries having complied with the obligation of river basin management, "established routines of environmental decision-making" were kept in most of the cases (Jager *et al*. 2016). Similarly, Priest *et al*. (2016) analysed im-

plementation of FD in 6 EU countries and found that, with the exception of few cases, "systematic coordination of actions" in shared international RBDs is not a practice. Analyses of the first cycle of planning processes to comply with WFD and FD highlight that coordination is very often interpreted by Member States as mere collection of actions and measures already established in other planning instruments (European Commission 2015; Priest *et al*. 2016).

These results are not surprising if we consider that governance changes require long period of adaptation to deliver their full effects. The iterative planning process promoted by both directives aims precisely at enhancing institutions' capacity for self-reflection and learning so as to gradually move towards a more integrated river basin planning. Interesting examples of that are the WFD implementation processes occurred in England and Denmark where the first cycles were characterised by very centralised, top-down approaches to implementation, while the second cycles were less centralised and more open to participation (Nielsen *et al*. 2012; Robins *et al*. 2017). In England, for instance, during the second cycle, the government adopted the so-called "Catchment-based approach", re-focusing the scale for water planning from 10 RBDs to 93 individual catchments where the creation of multi-actor groups, called "Catchment Partnerships", was encouraged (Robins *et al*. 2017). Similarly, since 2013 the Danish Ministry of Environment undertook a reform of water governance system establishing 23 new water councils at the sub-RBD level for the elaboration of RBMPs (Graversgaard *et al*. 2017).

The process of adaptation to the requirement of river basin governance obviously had different results depending on whether or not countries had river basin structures already in place before the directives implementation. Where river basin structures already existed, as for example in France, Italy and Spain, the implementation of the directives has usually led to a reconfiguration and strengthening of river basin institutions (Pellegrini *et al*. 2019a). Nevertheless, the fact that domestic water governance systems were already consistent with the requirement of the European Commission has not always implied a smoother adoption of integrated river basin management. Italy provides a good example of that. Despite river basin planning and management being introduced long before WFD (with the Law 183/1989), pre-existing conflicts among government levels for allocation of competences (in particular between central government and regions) hindered a full empowerment of RBD authorities that, in turn, affected their capacity of coordination during the planning processes (Domorenok 2017). Studies conducted on WFD implementation in Italy clearly show that the existence of basin authorities has limited effects on the implementation of IRBM in the absence of a clear legislative framework that enables a coordinated planning and cooperative, rather than competitive, relations between the different

levels of government involved in water resources management and protection (Domorenok 2017; Pellegrini *et al*. 2019b; Rainaldi 2010).

The group of countries where river basin structures were not in place before the directives is probably the most numerous and heterogeneous (Jager *et al*. 2016). Most of the countries opted for what Moss (2012) defines as "a cooperative institutionally soft solution" where specific coordination mechanisms are established among the different authorities involved in the river basin without establishing new river basin authorities. This led to the blossoming of different types of coordination mechanisms among which one of the most evident is the creation of advisory boards aiming to bring together public and private stakeholders for the development of plans (European Commission 2019a; Jager *et al*. 2016). These advisory boards are often established at sub-RBD level where more active engagement of stakeholders for the development of plans could occur, while boards to allow coordination and participation for the whole RBD are less common (Pellegrini *et al*. 2019a).

Interestingly, Sweden represents an exception within the group of countries where river basin structures were not in place. Following WFD, Sweden has greatly reformed national water governance both establishing new authorities at RBD level and creating advisory boards at catchment level. At least in terms of formal compliance with WFD requirements, Sweden can be considered an example to be followed. However, the significant changes that the water governance system has undergone have led to some imbalances in the coordination of other sectors, i.e. between water planning and land-use planning at municipal level (Andersson *et al*. 2012). The possible negative effects related to the establishment of a water governance system based on river basins were also anticipated by European Commission that stated: «By creating a spatial unit for water management, based on river basins, it is likely that spatial conflicts will occur with other policy sectors that have a significant impact on water, but are structured along administrative and political boundaries» (European Commission 2003b).

5. Discussion and Concluding Remarks

The previous section, although not exhaustive, wanted to point out some relevant implications derived from the implementation of the requirement of IRBM formulated by both directives. As first remark, it is important to distinguish between formal implementation of the requirement of river basin planning and management, and the realisation of substantive changes such as a more coordinated decision-making processes related to natural resources. This last aspect, as

said, is often lacking even when full compliance with the directives' requirement was achieved. Both WFD and FD, indeed, belong to a new generation of EU directives whose implementation is mostly based on procedural requirements, rather than on the respect of specific standards, and on a multi-level architecture that involve different government levels and non-state actors. This implementation structure, in particular, makes the effective delivery of policy more problematic as it depends on a long chain of policy actors an on their capacity of coordination (Milio 2010).

Nevertheless, along with procedural requirements, both directives set concrete objectives to be achieved. The achievement of these objectives implies a full consideration of the ecological and social interactions that take place on a river basin scale and, in so doing, the objectives can be considered as the main driver to promote IRBM. Some studies related to FD, however, have highlighted that the significant leeway accorded to EU countries, for instance in defining objectives and measures as well as in the enforceability of FRMPs, may prevent States to really engage in finding more coordinated solutions for flood risk management (Mostert and Junier 2009; Priest *et al*. 2016). Especially for countries where water institutions have not traditionally followed river basin boundaries, the lack of substantive obligations can really make implementation only effective in terms formal aspects – i.e. the fulfilment of river basin planning requirement – while keeping pre-existing management practices (Priest *et al*. 2016).

In the same token, the existence of river basin institution is not, in itself, a guarantee for achieving a greater IRBM, as showed by the Italian case. A recent study on WFD implementation in an Italian RBD has found that more coordinated decision-making was achieved when clear supra-national constraints (e.g. the risk of block of EU funds or of an infringement procedure from European Commission) pushed the different government levels within the RBD to set up more coordinated planning process (Pellegrini *et al*. 2019b).

To conclude, the points raised in this chapter highlight that, even though the requirement of river basin planning issued by the European Commission have undoubtedly made river basin planning binding for all Member States, the full realisation of IRBM depend on several other aspects that go well beyond the formal compliance with EU directives. In this, the existence of binding objectives or constraints for Member States that push for a more integrated and coordinated approach seems to be of a great importance.

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