Water: Conceptualisations, Regulatory Approaches and Scrutinising EU Water Law

Water: Conceptvorming, regelgevende benaderingen en de toetsing van de EU-waterwetgeving

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CIS:	Common Implementation Strategy
ECJ:	European Union Court of Justice
EU:	European Union
GWP:	Global Water Partnership
IWRM:	Integrated Water Resource Management
WFD:	Water Framework Directive

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CHAPTER I

INTRODUCTION

1. Introductory remarks – An incompatible pairing

This study deals with water and its management. It begins with an alleged aporia (ἀπορία). According to the majority of academics and water professionals, the conceptualisation of water is fragmented but its management should be holistic. These two different assertions form a *seemingly* incompatible pairing for water regulation. If a unitary view of water is difficult to attain, why should its management be comprehensive? If our eyes see different types of water, why should we regulate water holistically? There may be real reasons behind this. However, this *prima facie* contradiction served as the spark to further research on the matter.

Admittedly, this study is not the first one to employ aporia as a point of departure for an inquiry. Many illustrious figures used aporia as the starting point of their research in the past. For example, by breaking away from the rationalist and empiricist approaches, Aristotle's *Metaphyiscs* began by analysing the existing aporias. The approach used in this study is not novel. Yet, the method of raising aporia could turn out to be particularly advantageous.[1]

The existence of aporias usually causes us to investigate what is debatable and what is not. Raising aporia differs from scepticism. While the former hinges on existing knowledge, the latter erases all certainties. The consideration of an aporia would therefore enable one to keep the two previous assertions as individually conceivable (i.e. the conceptualisation of water is fragmented and its management must be holistic) and simultaneously to look at their relationship more closely. Eventually, it will be possible to identify whether the previous statements are incompatible.

[1] Vasilis Politis, *Routledge philosophy guidebook to Aristotle and the Metaphysics* (Psychology Press 2004) 71.

The following chapters will thus contribute to the answering of one question – if we conceptualise water as fragmented, should we regulate water resources holistically? This study will eventually argue that we can, but we should not. While water resource integration has become the new paradigm of water regulation, its results are mixed at best. Therefore, integration has not been a panacea for water management. It is only under certain conditions that integration functions well. The thesis will corroborate this point by analysing European Union (hereafter 'EU') water regulation and, in particular, its Water Framework Directive (hereafter 'WFD').

The foregoing sentences introduced the actual content of this study. An *interested* party would very likely wish to jump into the content chapters. Should this be the case, it is kindly suggested to be patient for a little longer. For the ease of reading, one will (have to) proceed with certain standard activities. The introduction of the background, the clarification of certain core concepts, the explanation of the method, a discussion of relevance, and an outline of the study's structure will now follow.

2. Background

Nearly all studies on water start with the same premise: water is unique.[2] The preceding statement is usually enriched by further specification: the importance of water as a resource cannot be overstated and human responsibility towards future generations to maintain and pass on this asset intact is absolute. Lastly, these studies point at the factual problem that we humans have to deal with: water is becoming alarmingly scarce, in both quality and quantity. All these previous statements are also relevant for this study.

In particular, this research would like to focus on the factual problem, i.e. the water crisis. The seriousness of this crisis is beyond dispute. 785 million people in the world lack access to clean and safe water.[3] This and other similar data, together with the challenges posed by climate change and the ever increasing global water poverty,

[2] See e.g. Hubert HG Savenije, 'Why water is not an ordinary economic good, or why the girl is special' (2002) 27 Physics and Chemistry of the Earth, Parts A/B/C 741.

[3] World Health Organization, *Progress on household drinking water, sanitation and hygiene 2000-2017: special focus on inequalities* (World Health Organization 2019) 7.

exacerbate the urgency of the problem.[4] But what does the water crisis depend on? One may be tempted to claim that this is a physical problem. Water is highly variable and unevenly distributed. Technical solutions could then help tackle these issues. This is certainly true. However, it would only mitigate them. Most scholars agree that the water crisis is not (only) based on the poor availability of water but on the failure to properly manage its use.[5] Water regulation thus plays a key role in addressing water crisis and achieving water security.[6] Failure to achieve water security would very likely entail severe damages to both society and economy.[7]

This implies that effective solutions for the management of water resources are needed. This statement holds true in all areas of the world. Water deficit is a 'totalising discourse' in the "Global South" as well as in the North.[8] And that is also why this study zooms into the EU regulatory landscape. A European citizen will be mistaken in thinking that the water crisis is something distant from her. If the country we live in is exempted from water stress, the broader region is certainly not. While the Netherlands was – at least in the past – usually far from experiencing water deficits, some areas of the EU suffer from severe water shortages throughout the year. The European Commission itself acknowledges the existence of a water crisis problem in the region and the need to identify regulatory solutions by stating that 'to sustainably manage the increasing pressures on water resources, new and innovative approaches are needed'.[9]

The previous paragraphs allow one to make a couple of observations. Firstly, current research points to the fundamental role of water regulation. Secondly, the poor results

[4] Joakim Öjendal and Gustav Aldén Rudd, 'Something Has to Yield' in Ken Conca and Erika Weinthal (eds), *The Oxford Handbook of Water Politics and Policy* (OUP 2018) 508.
[5] United Nations Development Programme, *Human development report 2006: Beyond scarcity: Power, poverty and the global water crisis* (Palgrave Macmillan 2006) 2.
[6] Grey and Sadoff define water security as 'the reliable availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks to people, environments and economies'. See David Grey and Claudia W. Sadoff, 'Sink or swim? Water security for growth and development' (2007) 9(6) Water Policy 545, 547-548.
[7] United Nations, *United Nations World Water Development Report 2016: Water and jobs. United Nations world water assessment programme* (Unesco 2016) 28.
[8] L. Mehta, 'Introduction' in L. Mehta (ed), *The Limits to Scarcity. Contesting the Politics of Allocation* (Earthscan 2010), 2.
[9] European Commission, Communication COM(2012) 216 final, 2.

achieved so far demand effective solutions. These two observations, taken together, show that the solution to the water crisis must necessarily come from a water resource management solution. But therein lies the rub! Water is a complex resource, and so is its management. This is not a recent "discovery". Individuals struggled to conceptualise and manage water since time immemorial. Multiple approaches in both conceptualisation and management arose and disappeared over time.[10] Admittedly, none of these approaches solved the water crisis conclusively.[11]

Recently, a new paradigm has emerged in water policy. It is integrated water resource management (hereafter 'IWRM'). Given the cross-cutting nature of water, regulation must integrate all water-related aspects in a single regulation. This is the main rationale behind IWRM. The integration paradigm is currently well-established and it replaced the traditional sectoral approach. The implementation of IWRM would – so the argument runs – help improve the *status quo*.

Several jurisdictions decided deliberately to follow this new approach, not least the EU.[12] By adopting the Water Framework Directive,[13] the EU embraced the concept of water resource integration. Recital (9) of the legislative act is crystal clear in this regard. It states '[i]t is necessary to develop an integrated Community policy on water'. At the same time, a new trend in academic circles and policymaking is emerging. It refers to the fact that water is at the intersection of different domains.[14] Water is not just water. There are various values (say, perspectives)[15] that revolve around it. Thus, the view of water is

[10] See *infra* chapter IV.

[11] Ruth Meinzen-Dick, 'Beyond panaceas in water institutions' (2007) 104(39) Proceedings of the National Academy of Sciences 15200; Agathe Euzen and Barbara Morehouse, 'Special issue introduction Water: What values?' (2011) 30(4) Policy and Society 237, 238.

[12] See *infra* chapter V.

[13] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, [2000] OJ L32/1.

[14] Ben Orlove and Steven C. Caton, 'Water sustainability: Anthropological approaches and prospects' (2010) 39 Annual review of Anthropology 401; François Molle, Peter P. Mollinga and Ruth Meinzen-Dick, 'Water, politics and development: Introducing water alternatives' (2008) 1(1) Water Alternatives 1.

[15] Given the high interdisciplinary of the subject, researchers tend to employ different terms for expressing rather similar concepts. Economists will use value while other social scientists would employ the term 'perspective'. Over this study, preference is given to use the latter because the former may be more confounding.

fragmented. Acknowledging the existence of multifaceted conceptualisations of water would help tackle the water crisis.[16]

A few decades have passed. The EU, however, has not yet achieved effective water management. It seems that the type of integration that was promoted did not achieve the desired results expected by the literature.[17] The majority of scholars and practitioners have not questioned the new approach. Instead, they supported further integration.[18] This is where a question arises. Is this the right course of action? If we conceptualise water as fragmented, should we regulate water resources holistically? This type of question is worth answering. Finding a response would allow us to question existing axioms and identify whether other aspects of water management deserve more attention by researchers and policymakers. This is where this study is heading. After all, it is the EU itself to call for 'new and innovative approaches'.[19] This research responds to this invitation by developing a *theoretical* analysis on current EU water resource management.

The ambition of this study will therefore be to come up with a framework for a deeper understanding of (EU) water management. This research choice entails that the following chapters will not develop a doctrinal legal analysis of water regulatory frameworks and their governing institutions. Instead, this study focuses on concepts and how these reverberate on water regulation. In other words, it aims to discuss the interplay between the conceptualisations of water and the regulatory approaches resulting thereof. This study, however, will be limited to the EU regulatory landscape due to the fact that contextual factors play a determinant role in water management.[20] As Ostrom et al already warned few years ago, the drawing up of solutions overlooking relevant side variables is bound to fail.[21] In this way, a clear benefit of this project is to provide a different key for reading (EU) water management.

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[16] Eran Feitelson, 'A hierarchy of water needs and their implications for allocation mechanisms' in Rafael Ziegler and David Groenfeldt (eds) *Global Water Ethics* (Routledge 2017) 149.

[17] See *infra* chapter V.

[18] William Howarth, 'Going with the flow: Integrated water resources management, the EU water Framework Directive and ecological flows' (2018) 38(2) Legal Studies 298, 299.

[19] European Commission (n 9) 2.

[20] See *infra* chapter II, III, and IV.

[21] Elinor Ostrom, Paul C. Stern and Thomas Dietz 'Water rights in the commons' (2003) 5(2) Water Resources Impact 9.

3. Key terms

Before proceeding with the methodology, this section clarifies the key terms of this research. Some of them have already appeared in the text. The first one is certainly water itself and its conceptualisation. It might be surprising that there is a need to discuss the meaning of water – an understandable paradox. It is usually very clear in our minds what water is. It is a colourless, odourless, transparent substance whose chemical composition is H_20. However, it is not as clear as that. On closer inspection, water is a slippery term that escapes easy definitions. It encompasses multifaceted conceptualisations in science and society. The following chapters will discuss this last claim in greater detail. For the moment, it is sufficient to introduce what is at stake when discussing the conceptualisation of water. To be clear, this study does not argue that the aforementioned (almost) scientific definition is false. It simply argues that the said definition accounts for only a part of the story. As Abbott put it, 'whether we *call* something "water" or not […] depends on more than just the percentage of water it consists of'.[22] This is not the start of a philosophical inquiry.[23] The intention is simply to take this assumption and scrutinise it. The conceptualisation of water therefore refers to how humans perceive water. As the following pages will show, there can be a unitary or non-unitary view.[24] The former indicates that there is a tendency to see water as a single homogenous substance. In the latter, there is a tendency to stress the various perspectives (or values) revolving around water.

Another term that emerged in these first pages is the notion of effective water resource management – effectiveness referring to the extent to which the adopted institutional and legal arrangements in water management successfully pursues the given goals.[25] This term 'water management' is different from water law, water policy, and

[22] Barbara Abbott, 'Water= H_2O' (1999) 108(429) Mind 145, 145.

[23] For that, see Holly VandeWall, 'Why water is not H2O, and other critiques of essentialist ontology from the philosophy of chemistry' (2007) 74(5) Philosophy of Science 906, 910.

[24] Fragmented and non-fragmented view sometimes replace the adjectives non-unitary and unitary, respectively.

[25] Please note that this study makes use of the term 'effectiveness' only for descriptive purposes, as taken over by the empirical work of other scholars.

water governance. It therefore seems opportune to have a few sentences clarifying those distinct notions. Water management encompasses all the activities aimed at managing water resources under a given set of policies and laws. In other words, water management bases its framework for action within water law and water policy. Water law includes all international laws, regional laws, and national laws relating to water resources. An example of a water law is the 1997 UN Convention on the Law of the Non-navigational Uses of International Watercourses or the Water Framework Directive of the European Union. Water policy, instead, refers to the various paradigms that characterise the management of water. The prime example of such paradigms is IWRM. Lastly, water governance has been defined as 'the range of political, institutional and administrative rules, practices and processes (formal and informal) through which decisions are taken and implemented, stakeholders can articulate their interests and have their concerns considered, and decision-makers are held accountable for water management'.[26] Water governance is the 'overarching framework' of any water policy, management and law.[27] All these terms will be present in this study. Hopefully, spelling them out now will make this text more accessible and more readable.

4. Methodology

The first line of this chapter stressed that the subject of this research is water and its management. This statement would suffice to indicate that the analysis carried out in this study is not monodisciplinary. Nearly all disciplines have approached water – it is therefore necessary to consider the issue from the perspective of each and every one of them. This applies to both natural and social sciences. Hydrologists introduced the hydrologic cycle by investigating hydrologic processes and phenomena.[28] Geographers showed the cross-cutting nature of water by connecting the hydrologic concepts with their

[26] OECD, *OECD Principles on Water Governance* (OECD 2015) 5.
[27] Phillip Woodhouse and Mike Muller, 'Water governance – An historical perspective on current debates' (2017) 92 World Development 225, 226.
[28] Robert E. Horton, 'The field, scope, and status of the science of hydrology' (1931) 12(1) Eos, Transactions American Geophysical Union 189.

social dimension.[29] Anthropologists performed ethnographic studies into various water settings to identify the various forms of water valuation and give relevance to their context.[30]

This study cannot ignore these contributions for two important reasons. Firstly, it would be unreasonable to overlook solid recommendations just because they arise from different disciplines. Secondly, lawyers and economists are sometimes accused of holding a dogmatic worldview that does not contribute sufficiently to the advancement of water research. It is not uncommon to hear that the involvement of lawyers is a threat to consensus[31] and that the promotion of economic concepts may fail to account for the different values of water.[32]

Thus, this study – departing from doctrinal legal research – attempts to relate to more than one discipline. Economic analysis – in the form of some insights from economic theory such as rules vs. standards – will be regarded as the natural partner in this legal analysis. Its contribution will be tangible in many chapters, reaching its peak in chapter VI. Beside its main partner, this legal study intends to have some friends. It will interact with other disciplines, making use of research carried out in hydrology, anthropology and political science. This study will also have a suitor, political geography. The legal analysis of this study often takes into account insights from political geographers. However, these insights – originally developed at both a theoretical and empirical level – will only be used conceptually, in order to substantiate the main arguments and enrich them with a different viewpoint.

The blend of law and other disciplines becomes apparent in the substantive chapters. Chapter II will employ the economic conceptual toolkit to explain why water is distinctive from other goods and why it is difficult to develop a homogenous set of policy and legal arrangements. Chapter III will map the various values of water. This mapping exercise

[29] Jamie Linton and Jessica Budds, 'The Hydrosocial cycle: defining and mobilizing a relation-dialectical approach to water' (2014) 57 Geoforum 170.
[30] Orlove and Caton (n 14).
[31] Sarah Hendry, *Frameworks for water law reform* (CUP 2014) 1.
[32] W. Michael Hanemann, 'The economic conception of water' in Ramón Llamas, Luis Martínez-Cortina and Peter Rogers (eds) *Water Crisis: Myth or Reality* (Taylor & Francis 2006) 61.

will include insights from various disciplines, such as anthropology, religious studies and environmental studies. Interestingly, the use of different vocabularies in these specific disciplines will raise the issue of standardising the different terminologies that have been employed so far. Thus, "values", "perceptions" and "perspectives" will be used as synonyms. The chapter will argue that the existence of these various perspectives make water a complex resource to regulate.

Chapter IV will be the most doctrinal chapter. It will assess the Roman legal framework and test it against existing claims in water scholarship according to which the Graeco-Roman world tends to view water as a fragmented resource. In other words, this chapter makes an exegesis of Roman law to assess whether the law applicable in that period could in principle favour a context-sensitive approach. Chapter V intends to assess the achievement of integration in Water Framework Directive's legal practice building on doctrinal legal research in combination with other findings stemming from political science and urban and environmental planning. Chapter VI adopts insights from economic theory (i.e. the theoretical framework of rules vs. standards) to assess whether integration is always the preferred regulatory approach compared to sectoralism.

There is a high degree of variance in water management around the world. This implies different legal and policy approaches built around diverging social preferences. Thus, there is the need to limit the study on a single geographical area. As previously mentioned, this study zooms in on the EU water management. It does so for a couple of reasons. The first one is that the European experience provides a prime example of the regulatory effects of embracing an integration paradigm. Specifically, the adoption of an integrated approach with the entry into force of the Water Framework Directive marked a turning point in the EU water legislative framework – traditionally developed on a sector-specific basis.[33] Secondly, and relatedly, many scholars tend to view the EU water regulation – despite its regional nature – as a possible blueprint for other jurisdictions.[34]

[33] Giorgos Kallis and David Butler, 'The EU water framework directive: measures and implications' (2001) 3(2) Water Policy 125. See *infra* chapter V.

[34] Sonja Heldt, Jean Carlo Rodríguez-de-Francisco, Ines Dombrowsky, Christian K. Feld and Daniel Karthe,'Is the EU WFD suitable to support IWRM planning in non-European countries? Lessons learnt from the introduction of IWRM and River Basin Management in Mongolia' (2017) 75 Environmental Science & Policy 28.

Questioning the underlying rationale of the European approach towards water management, however, does not necessarily mean to analyse all the applicable laws in the relatively vast EU multi-level regulatory framework, nor develop a specific case study.

The analysis put forward in this study could take two different roads (or an intermediate one). It could be either a theoretical critique or an empirical one. A theoretical approach would attempt to reflect on EU water resource management and its paradigms in a bid to develop hypotheses to improve the *status quo*. An empirical approach, instead, would aim at testing hypotheses by conducting a detailed examination of a particular jurisdiction and/or case. This research leans towards the former. The achievement of conceptual clarity is instrumental in permitting the development of testable hypotheses. As previously mentioned, this is more than necessary in water management. The definition of water is already ambiguous, and a specific paradigm has begun to monopolise water management discourse. Thus, it is important to devote enough time to shed more light on the concepts. In other words, the time for testing hypotheses is not ripe yet.

As a result, this study will develop a theoretical analysis by examining the interplay between the conceptualisations of water and the regulatory approaches resulting thereof at the EU governance level. Admittedly, this exercise would capture only a limited part of water regulation in a given legal system. There are, in fact, many other different governance levels that regulate water resources – such as the international and subnational ones. Nonetheless, by focusing on the EU water regulation,[35] the part that this analysis would capture will be the most germane and functional to the study's aim, i.e. the critical examination of the integration paradigm. This type of an analysis would allow for certain policy suggestions, which should be developed through more empirical work at a later stage.

[35] This does not foreclose the possibility to make sporadic references to the laws adopted in a given jurisdiction.

5. Scientific and social relevance

This study aims to make a contribution to the existing literature. Whether the objective will be effectively achieved is dependent on the clarity of the arguments. There are, however, ideal conditions for a successful start. This study deals with water and its management. Specifically, it discusses the interplay between the conceptualisations of water and the regulatory approaches resulting thereof. Eventually, it argues that we can regulate water resources holistically, but we should not. This proposition alone would suffice to make such a contribution.

In fact, the large majority of academics and practitioners alike are currently focusing on advancing the integration of water resource management without questioning its very foundations.[36] This study is not a part of that endeavour. Rather, it asks whether the direction taken by existing research is the most effective one. Presently, hardly anybody has questioned this axiom from a legal perspective.[37] Additionally, the study brings together insights from various disciplines. This seems to be a rather novel approach. It is relatively uncommon for legal research on water resources to go beyond the strict interpretation of the regulatory framework.[38]

These are the two fundamental reasons why this research – as a whole – *can* be relevant to science. There are further reasons represented by the content of the individual chapters. Each chapter contributes to a particular strand of research. For example, chapter IV enriches the literature on the fragmented conceptualisation of water by investigating whether the regulatory framework that existed in antiquity (i.e. Roman law) could have reflected this view. In this process, it seeks to connect different disciplines such as political geography, anthropology and legal history.

Scientific relevance is not everything. This research is intended to be relevant to society, too. Indeed, water is not a limitless resource and this is as true for a country that "lives with water", such as the Netherlands, as it is for any other European state. Water

[36] Howarth (n 18) 299.

[37] See generally e.g. Asit K. Biswas, 'Integrated water resources management: a reassessment: a water forum contribution' (2004) 29(2) Water International 248.

[38] Paolo Turrini, 'Just Dipping a Toe in the Water: on the Reconciliation of the European Institutions with Article 9 of the Water Framework Directive' (2018) 31 Geo. Int'l Envtl. L. Rev. 87, 92.

availability is not guaranteed in the future unless regulation is based and built upon an effective water management. Failing to address this issue can be very expensive in terms of both economic and social costs. For instance, a water crisis can have an adverse impact on developmental gains and it could easily contribute to poverty in many areas.

Since water forms the basis of economic and social development, the challenges posed by water management are very important for society. This is even more so given the unprecedented consequences posed by climate change on water resources.[39] In particular, climate change is expected to increase water scarcity, as well as favour the changing of water conditions in terms of precipitation, snow cover and flow patterns. Although water-stressed countries will be particularly vulnerable to these projections,[40] the EU seems certainly not immune thereto.[41] Therefore, there is a pressing need to develop knowledge in order to overcome these challenges and alleviate the potential severe impact of climate change. A study that aims to question whether the existing paradigms in water policy are as effective as they can be goes precisely in this direction.

6. Structure

This study consists of seven chapters. Chapter II contradicts the idea of treating water as a private good. It does not do that on normative grounds. Rather, it introduces the physical complexities of water. Specifically, the chapter shows that the occurrence of these complexities make water a distinctive commodity. Water cannot be considered in the same mould as a "pure" private good. The management of water resources entails challenges that are related to public goods and common-pool resources. Therefore, the idea of reverting to market-based mechanisms is limited, if not doomed. On the contrary, the success of water management is dependent upon context and social preferences.

[39] Intergovernmental Panel on Climate Change, *Climate change 2014: synthesis report. Contribution of Working Groups I, II and III to the fifth assessment report of the Intergovernmental Panel on Climate Change* (IPCC 2014) 67 ss.

[40] Anton Earle, Ana Elisa Cascão, Stina Hansson, Anders Jägerskog, Ashok Swain and Joakim Öjendal. *Transboundary water management and the climate change debate* (Routledge 2015).

[41] Min Tu, Michael J. Hall, Pieter JM de Laat and Marcel JM de Wit, 'Extreme floods in the Meuse river over the past century: aggravated by land-use changes?' (2005) 30(4-5) Physics and Chemistry of the Earth, Parts A/B/C 267, 268.

Accordingly, social preferences assume a primary role. By embracing this idea, chapter III delves into the various values of water. It shows that water encompasses multiple perspectives, ranging from a religious good to an environmental resource. Such perceptions, however, do not only contribute to how water is valued. They also appeal to various legitimisations and logics of how water is to be managed. In other words, they account for social preferences. Mapping these perspectives and spelling out their corresponding policy preferences also reveals the complexity of regulating water resources. Indeed, it is difficult to reconcile all these different perceptions within a single water regulation. Thus, socio-cultural complexities sit alongside physical ones.

Acknowledging the existence of multiple perceptions of water is a relatively recent development. Prior to that, the modern view of water was unitary. Only recently did we begin to challenge this view and promote a return to a fragmented conception. Chapter IV deals with this topic. It shows that while the understanding of water has varied over time, it is now coming full circle. In more concrete terms, while the modern perception of water corresponds to a single uniform substance, there are signs of a return to the old, pre-modern, heterogeneous conception. This chapter substantiates these claims by analysing Roman water law, events that occurred between the 18th and 19th century which contributed to the formation of a different view, and current trends in the scholarship and policymaking.

While describing the evolution of the conceptualisation of water, chapter IV also demonstrates that the unitary view of water seems to have led to more standardisation in water regulation. However, this process has not resulted in full integration. A sectoral, fragmented approach in water regulation still exists. Chapter V describes the paradigmatic shift that occurred in water management in the mid-1990s. As soon as there was a consensus on the fact that water is a cross-cutting issue, Integrated Water Resource Management became the new mantra. This chapter, however, is not limited to that story. Two decades have passed since the adoption of the first regulatory framework aimed at integration, viz. the Water Framework Directive. For this reason, the chapter assesses whether the EU institutions managed to realise integration in practice and, if not, what are the underlying causes.

Integration has so far had a low rate of success. Yet, many scholars and practitioners continue to promote integration. Chapter VI questions this assertion by arguing that the proposition that integration is always the preferred regulatory approach does not always hold. Specifically, this chapter uses Kaplow's theoretical framework of rules vs. standards to show that sectoralism and integration through standards, as propagated by the Water Framework Directive, do not differ much in terms of regulatory implications and legal costs. The international push towards integration at least in the EU represents "much ado about nothing", as Shakespeare would say. The concluding chapter takes stock of all the previous findings and suggests where the attention of policymakers and scholars should be directed at. While doing so, it advances the idea that establishing a new European agency on water – in line with the more recent institutional developments at the United Nations – might be a good strategy to increase the effectiveness of water management in the EU.

CHAPTER II

WATER AND PROPERTY RIGHTS: AN IMPERFECT MATCH

1. Introduction

The seriousness of the so-called "water crisis" is undeniable. The water deficit affected almost all areas of the entire globe, becoming one of the current greatest challenges. The World Economic Forum shares this view by including it among the gravest global risks in terms of potential impact.[42] Therefore, academics and water professionals have been wondering how to address this water crisis. The problem is certainly far from easy. This is proven by the stubbornly unsatisfactory results achieved all over the world throughout these years. For example, 785 million people lack basic drinking water.[43] The old continent is no exception. Water scarcity affects at least 11% of the European population.[44]

Among the various attempts to tackle this crisis, none have been particularly successful. What are the reasons of this failure? Is this crisis due to the physical geography of water? Alternatively, is it due to the way humans have managed this resource? The literature usually provides a fairly clear-cut response. The reason lies with us humans. The global water crisis is a crisis of governance in which there are institutional factors that impede the effective management of water resources.[45] Some have even started arguing that economics is partly responsible.[46] The argument is that water possesses various complexities that render the implementation of standard economic analysis not applicable.

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[42] World Economic Forum, *The Global Risks Report 2019* (14th edn, World Economic Forum 2019).
[43] World Health Organization (n 3) 7.
[44] European Commission, available at <https://ec.europa.eu/environment/pubs/pdf/factsheets/water_scarcity.pdf> (accessed 17 April 2020).
[45] United Nations, *United Nations World Water Development Report 2016: Water and jobs. United Nations world water assessment programme* (Unesco 2016).
[46] Hanemann (n 32) 74.

These arguments have not gone unchallenged. Some argue that treating water as a private good to be allocated via markets can provide the key to water management.[47] Despite the existence of multiple values, water is a scarce resource whose production involves costs.[48] Therefore, it is difficult to think of a reason why water should be treated differently from other resources: market mechanisms will ensure that the best users – namely, the people who attach the highest value to the unit of good bought – will get water. This may certainly be a way to look at water management.

However, the argument developed in this chapter argues that this is not satisfactory. It tends to concur with other researchers, who claim that this approach may fail to capture several germane aspects of water. It is true that water is *sometimes* a commodity. It is also true that water is distinctive from other commodities. The water sector presents certain complexities that a purely economic analysis may struggle with. More specifically, those complexities may divide economic opinion, as far as what the best approach to the problem might be.

This chapter discusses these complexities in an attempt to show that a unique set of economic prescriptions could be too limiting when it comes to achieving significant progress in water management. The conclusions of this chapter would show that water has many complexities that impede the achievement of a common formula on how to manage water resources. Accordingly, the possibility of collective action will trigger the need to articulate non-technical solutions that would have to encompass both economic *and* societal values. Section 2 reviews what is the perspective of those who advocate to treat water as a private good. Section 3 discusses some of the complexities that make water distinctive. Section 4 concludes.

[47] James Winpenny, *Managing water as an economic resource* (Routledge 2005) and Terence Richard Lee, *Water management in the 21st century: the allocation imperative* (Edward Elgar Publishing 1999).

[48] William K. Jaeger, Andrew J. Plantinga, Heejun Chang, Kathie Dello, Gordon Grant, David Hulse, J. J. McDonnell et al., 'Toward a formal definition of water scarcity in natural-human systems' (2013) 49(7) Water Resources Research 4506.

2. Water as a private good

Water is a scarce resource. It is scarce because it is insufficient to meet humanity's various demands. The World Health Organization set basic access to water at 20 litres per capita per day.[49] If humans had that amount, they could only satisfy their basic needs, such as drinking and sanitation. If the amount of water at their disposal increased, then it would become possible to use the extra amount for cooking, washing utensils or laundry. A larger quantity of water would permit to fill a swimming pool or to garden plants.[50] However, the quantity of water at human disposal is not endless and water has alternative uses. This narrative shows not only that the law of diminishing marginal utility applies but that water is a scarce resource. Thus, the scarcity of water is – and should be – the starting point of any analysis in water management.[51]

The fact that water is a scarce resource triggers the need to analyse water management from an economic perspective. Some international documents set out analogous recommendations. For example, the Dublin Statement endorsed this position by stressing the need to recognise water as 'an economic good'.[52] After all, economics is 'the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses'.[53] This means that hardly anybody would disagree with the statement 'water is an economic good'. Any possible disagreements would probably be based on normative grounds. In other words, she would intend the adjective "economic" not as relating to economics but as a synonym of a private good. She would (mis)interpret the very term "economic".

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[49] World Health Organization, *Guidelines for Drinking-water Quality* (2017) 84. Gleick suggested to increase that amount to 50 litres per capita per day. See Peter H. Gleick, 'The human right to water' (1998) 1(5) Water Policy 487, 496.

[50] The example provided is anthropocentric. In addition to that, environmental demands enter the picture. The next chapter will delve more into them.

[51] Stephen Merrett, *Introduction to the economics of water resources: an international perspective* (Routledge 2004) ch 1.

[52] The fourth Dublin principle states that 'Water has an economic value and should be recognized as an economic good, taking into account affordability and equity criteria'. The Dublin Statement and Report Conference, International Conference on Water and the Environment: Development Issues for the 21st Century (Dublin, 26-31 January 1992)

[53] L. Robbins, *An Essay on the Nature and Significance of Economic Science* (Macmillan 1935), 16.

However, there are some reasons why a person could make that mistake. There has been a tendency to depart from the *undisputable* statement, 'water is an economic good', to arrive to the *disputable* statement, 'water is a private good'.[54] More concretely, the former proposition, corroborated by the Dublin Statement, has served as a justification of the latter.[55] Focusing on the economic dimension of water has pushed some international policy frameworks to advance the establishment of property rights in the water sector. In line with previous research, this study will refer to these ostensible claims as originating from 'water as a private good' perspective.[56]

According to this approach, water is not different from other commodities or resources. The underlying argument is that water is a scarce resource and economics will make sure that its price reflects its true cost.[57] Water should therefore be treated as a private good to be allocated through competitive market pricing. For the proponents of this argument, market mechanisms will ensure that water will be allocated to the best users.[58] Water markets will manage conflicts over water and the principle of consumers' sovereignty will hold true.[59] Within this approach, willingness to pay becomes the overriding criterion. Thus, treating water as a private good would in principle close the door to assigning any "special" status to it. Proceeding in this manner would inevitably cause a backlash from many individuals, who consider water a human right.

Treating water as a private good is more widespread than one might imagine. For example, the powerful push for privatisation of water supply that took off in the 1970s can mainly be ascribed to this theoretical approach. Despite the existence of multiple nuances within this management approach of water supply, it is possible to unify all of

[54] See e.g. James Winpenny, 'Water as an economic resource' in Natural Resources Institute, *Proceedings of the Conference on Priorities for Water Resources Allocation and Management* (Overseas Development Administration 1993) 35, 39.
[55] Philippe Cullet, 'Innovation and Trends in Water Law' in Conca and Weinthal (n 4) 327, 339-342.
[56] Hubert HG Savenije and Pieter Van Der Zaag, 'Water as an economic good and demand management paradigms with pitfalls' (2002) 27(1) Water international 98, 98.
[57] Peter Rogers, Radhika De Silva and Ramesh Bhatia, 'Water is an economic good: How to use prices to promote equity, efficiency, and sustainability' (2002) 4(1) Water Policy 1, 2.
[58] Winpenny (n 47) 32 and Lee (n 47).
[59] The first to propose the term of "consumers' sovereignty" was William H. Hutt, 'The concept of consumers' sovereignty' (1940) The Economic Journal 66.

them under the banner of market-based solutions.[60] Indeed, these ideas emerged due to a series of problems (e.g. underinvestment in water infrastructure, regulatory capture, failure to extend water access to marginalised users) caused by the unsuccessful public management of water provision. Some refer to them as government failure.[61] The establishment of tradable water rights would increase water-use efficiency.[62] Besides, this water management approach was further reinforced by the idea of free market environmentalism in which the establishment of property rights and market-based mechanisms would help alleviate pressure on the environment.[63]

In a nutshell, the idea of treating water as a private good comes naturally to some actors. This approach would contribute – so the argument runs – to stop the negative management practices of the past, when water was undervalued.[64] Allocating water to the best users through competitive markets would also guarantee that water providers could recoup the costs and reinvest their revenues. In this way, a more efficient water provision system would be developed.[65]

However, treating water as a private good may run the risk of providing simplistic answers to complex questions. In other words, it may impel us to shy away from investigating the true role of water in the natural-human system. An overly one-sided economic analysis does not capture the cross-cutting nature of water. Although nobody denies that the economic toolbox may be beneficial, considering water as a private good does not do justice to the complexities water possesses. The following section intends to deal with some of the features that make it difficult to treat water as an ordinary

[60] Karen Bakker, 'The "commons" versus the "commodity": Alter-globalization, anti-privatization and the human right to water in the global south' (2007) 39(3) Antipode 430, 433-40.
[61] Gordon Tullock, Gordon L. Brady and Arthur Seldon, *Government failure: a primer in public choice* (Cato Institute 2002).
[62] Mark W. Rosegrant and Hans P. Binswanger, 'Markets in tradable water rights: potential for efficiency gains in developing country water resource allocation' (1994) 22(11) World development 1613.
[63] Terry Lee Anderson and Donald Leal, *Free market environmentalism: revised edition* (Palgrave 2001). For an opposing view to free-market environmentalism see Michael C. Blumm, 'The Fallacies of Free Market Environmentalism' (1992) 15 HarvJL&PubPoly 371. The reader should also note that the market environmentalism has evolved over time and it became more nuanced in its position of promoting property rights over water. See Karen Bakker, 'The business of water: Market environmentalism in the water sector' (2014) 39 Annual Review of Environment and Resources 469.
[64] Winpenny (n 47).
[65] Lee (n 47).

commodity. Eventually, this exercise will corroborate a point that will be central in the following chapter: water is a context-dependent resource.

3. Water physical complexities

3.1. Introduction

Economic analysis tends to suggest market mechanisms for allocating a scarce resource. This logic should *in principle* also hold in the case of water. However, this is not as simple as it may seem. In order to have a functioning market, certain conditions have to be fulfilled. These conditions can relate to both the good *per se* and the relevant market. While discussing the economics of water, Young and Haveman identify six conditions justifying the establishment of property rights and competitive markets. These are the following:

> '(1) Each industry in the economy exhibits increasing costs; (2) all goods and services produced and traded must be exclusive; (3) goods which exhibit jointness in supply, such that one individual's consumption does not diminish any other individual's use of the good (public goods) are absent; (4) all buyers and sellers must have full knowledge of all the alternatives available to them and the characteristics of these alternatives; (5) all resources must be completely mobile; and (6) ownership rights are clearly attached to all goods and services to be traded in the economy'.[66]

Unsurprisingly, the water sector cannot meet these six conditions fully. There are certain features of water that pose significant challenges to the establishment of property rights and competitive markets.[67] These attributes make that water is not fully comparable with

[66] Robert A. Young and Robert H. Haveman, 'Economics of water resources: a survey' in Allen V. Kneese and James Sweeney (eds), *Handbook of Natural Resource and Energy Economics vol. 2* (Elsevier 1985) 465, 468.

[67] In order not to confuse the reader, there is the need to stress that the term "property rights" should not be interpreted in line with the School of Property Rights. In other words, property rights do not refer to any use right over a scarce resource, but rather to the initial situation where the owner has a "bundle of sticks".

any private good to be traded on a competitive market. By building on existing research, the present section overviews water's various *physical* complexities.[68] The following chapter will complement this analysis by focusing on the sociocultural complexities of water and, eventually, by arguing that water is a complex resource to regulate from a regulatory standpoint.

The distinction between physical and sociocultural complexities should not, however, cause confusion. Although, for clarity, this study defines the complexities tackled in this chapter as *physical*, it should be noted that physical complexities often either overlay normative concepts or tend to trigger a normative debate - a phenomenon which is thought to be typical for sociocultural values. The first point can be best illustrated by pointing to the very same definition of "scarcity", central to economics. As Jaeger et al point out, "scarcity" is already *per se* a term that entails a large degree of normative judgment.[69] Should the use of a more neutral term be desirable, "deficit" would be more appropriate. Indeed, it is societal values that determine whether water is *scarce*, viz. limited in amount, but capable of satisfying unlimited demands.[70] The second point, instead, will become clearer when it will be discussed *infra* how technological progress may lead to question the regulatory treatment of water.

Given the foregoing clarifications, the following subsections will describe the physical characteristics of water and the economic and legal implications that may derive from them. Sometimes those implications are just the outcome of a pure physical feature. At other times, the implications arise from the commingling of the natural world and our normative conceptions.[71] In both cases, finding the appropriate allocation mechanisms for water resources results in an overly complicated economic (and policy) endeavour,

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For the School of Property Rights, see Armen A. Alchian, 'Some economics of property rights' (1965) 30(4) Il politico 816, 818.

[68] Hanemann (n 32); Young and Haveman (n 66); Blair T. Bower, 'Some physical, technological, and economic characteristics of water and water resources systems: implications for administration' (1963) 3 Nat. Resources J. 215.

[69] See Jaeger et al (n 48) 4509.

[70] Ibid.

[71] The reference is here to the questions triggered by the technological development, among others.

dependent on context. The simultaneous occurrence of all these factors makes water a very complex resource that escapes standardised legal and economic solutions.

3.2. Types of goods

Economic analysis tends to distinguish goods in different types to determine whether the market should allocate them.[72] This division, however, was not always a core element of economic analysis. It was the outcome of a long process of reflection on the various attributes a good may possess. Economists usually trace the distinction between private and public goods to Samuelson's work.[73] By putting emphasis on the theory of optimal public expenditure, his research introduced for the first time such a division or – at least – it spelled this division out. The problem of drawing a distinction between private and public – sometimes also defined "collective" or "social" – goods had already been the subject of discussions by economists in the past.[74] For example, Smith referred to the existence of 'public works' that cannot be delivered by individuals.[75] Samuelson was the first to put this concept into a canonical form and make explicit the categorisation of goods.[76] According to Samuelson, private goods are the ones that each of us procures from markets, while public goods will not be provided by private individuals. While the former are efficiently allocated through markets, the latter suffer from a free-riding problem and eventually require regulatory intervention.

A more systematic and technical definition is also possible. In economic theory, a private good is rivalrous *and* excludable. The rivalrous nature of a good means that one

[72] The underlying rationale is that the market must operate autonomously (with minimum regulation) through supply and demand so that the final allocation of goods and services will maximise the net economic gains to society.

[73] Paul A. Samuelson, 'Aspects of public expenditure theories' (1958) 40(4) The Review of Economics and Statistics 332; Paul A. Samuelson, 'Diagrammatic Exposition of a Theory of Public Expenditure' (1955) 37(4) The Review of Economics and Statistics 350; Paul A. Samuelson, 'The pure theory of public expenditure' (1954) 36(4) The Review of Economics and Statistics 387.

[74] See e.g. Carl Menger, *Principles of Economics* (James Dingwall and Bert Hoselitz tr., Grove 1950) 52 ss.

[75] Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations* (1776) Book V, Chapter I, Part III, par. 1.

[76] Samuelson, 'The pure theory of public expenditure' (n 73).

person's consumption will necessarily decrease the availability of the same good for another person. For example, if a person consumes two slices of cake, it will not be possible for another person to consume the entire cake. It does not come as a surprise that the British say that 'you can't eat your cake and have it, too'. Cake is a rivalrous good. However, it is also possible to exclude people from eating the cake, so that only a closed number of individuals could enjoy it.

On the other hand, public goods are conceptualised as non-rivalrous *and* non-excludable. The consumption of a public good by an individual does not automatically lead to a decrease in the quantity of the same good for others. A recurring example in scientific literature is open-air. If somebody breathes open-air, she is not reducing the amount of oxygen available to others. They all can breathe and live. Furthermore, it is not possible to exclude individual actors from enjoying the public good, by way of legal or technological solutions. There are no instruments at human disposal to capture all oxygen and to exclude everyone else from breathing it.

Over the years, economists have enriched this original dichotomy by conceptualising two further kinds of goods. This was to a certain extent anticipated by Samuelson himself when he argued that theorists should 'go beyond the polar cases of (1) pure private goods and (2) pure public goods to (3) some kind of a mixed model which takes account of all external, indirect, joint-consumption effects'.[77] Later, Buchanan extended the theoretical framework by showing that some goods do not fall so comfortably under the definition of public goods.[78] There were certain goods owned by several individuals that could not be defined in terms of public goods. These so-called club goods indeed possessed excludable characteristics while being non-rivalrous. The excludability would derive from the use of charges or tolls. An example of a club good (non-rivalrous and excludable) is a cinema.

In addition, economists focused on the other intermediate case, i.e. common-pool resources. These goods are characterised by their subtractable character (rivalrous) and the costliness of preventing people from enjoying the good (non-excludable). Fish stocks

[77] Samuelson, 'Aspects of public expenditure theories' (n 73) 335.

[78] James M. Buchanan, *The demand and supply of public goods. Vol. 5* (Rand McNally 1968); James M. Buchanan, 'An economic theory of clubs' (1965) 32 Economica 1. See also Mancur Olson, *The logic of collective action: Public Goods and the Theory of Groups* (Harvard University Press 2009).

are a prescient example.[79] The conceptualisation of this particular type of good was further enriched by the discussion of the tragedy of the commons.[80] Specifically, it was argued that free and unrestricted access to a (scarce) common resource would eventually lead to its depletion.[81] Individuals are rational utility maximisers who will tend to consume the good for their own benefit, without bearing the associated costs. Although these considerations should trigger the need of government regulation, Ostrom documented that users can – under certain circumstances – avoid the tragedy by developing their own set of institutions and rules.[82] Table 1 illustrates a typology of the different kinds of goods conceptualised by economists.

	Excludable	**Non-excludable**
Rivalrous	Private goods	Common-pool resources
Non-rivalrous	Club goods	Public goods

Table 1 - Different kinds of goods

[79] H. Scott. Gordon, 'The economic theory of a common-property resource: The fishery' (1954) 62(2) Journal of Political Economy 124; Anthony Scott, 'The fishery: the objectives of sole ownership' (1955) 63(2) Journal of Political Economy 116.

[80] Garrett Hardin, 'The tragedy of commons' (1968) 162 Science 1243. Like Hardin, Lloyd pointed out a similar problem in his paper. William Forster Lloyd, 'Two Lectures on Population' (1833) 6(3) Population and Development Review 473.

[81] The classic example provided by Hardin was communally owned land for grazing. By bringing an additional animal, each herder would receive benefits, while the communally owned land would be degraded. In this way, a decision aimed at maximising the individual utility (i.e. having an additional animal) would lead to the detriment of collective utility (i.e. depletion of the pasture).

[82] Elinor Ostrom, *Governing the commons: The evolution of institutions for collective action* (CUP 1990).

These categories, however, are not as clear-cut as one might imagine.[83] There may be instances in which a certain type of good may fall under different kinds depending on a set of circumstances. Roads are a case on point. A (public) road is usually non-rivalrous and non-excludable. However, the high rate of consumption of roads may lead to congestion, placing the road network at the margin of the public good concept. Likewise, toll roads may be closer to club goods, since the price one has to pay for their use makes it possible to exclude individuals.

This conceptual confusion increases in the case of water. The standard framework seems unable to capture water. Or rather, it is possible to categorise water as a specific kind of good, but this will necessarily depend on the context under consideration. The following chapter will discuss at length the veracity of this proposition. By now, it is sufficient to show that a single economic definition of a good, such as the category of private goods, cannot encompass all the possible manifestations of water.

Concrete examples may corroborate this point. Take water as an economic input for industrial purposes. In this context, hardly anyone would argue against the statement 'water is a private good'. The fact that the paper industry requires a large amount of water resources and uses it as one of the many factors of production makes the previous statement applicable. An analogous discourse would be applicable to bottled water as well. The water of the river Rhine is a different story. Considering this particular type of water as a private good would not make a great deal of sense. Water in the river Rhine seems closest to a public good. Furthermore, an aquifer for irrigating crops may be akin to a common-pool resource according to an economic viewpoint. Many farmers would in principle have unrestricted access to the aquifer, eventually risking its depletion.

Besides, different aspects of the same manifestation of water may possess characteristics that economists would attribute to diverse types of good. For example, the water in a reservoir is a private good, while its storage capacity may be a public good.[84] That there may be two aspects ascribed to two different goods (e.g. reservoir/a private

[83] See e.g. Alan Randall, 'The problem of market failure' (1983) 23(1) Natural Resources Journal 131, 134 ss.
[84] Hanemann (n 32) 71.

good and storage capacity/a public good) is not the main problem. The main problem is the intrinsic difficulty of partitioning these two aspects to design two separate regulatory systems.[85] In this way, categorising water under a given type of economic good becomes a tall order. In economics, most goods are not plagued by such difficulties. Food is usually a private good. The same applies to clothing or cars. Alternatively, when it comes to those goods that may fall under different types of goods, it is relatively easy to partition them so that each is allocated in the most efficient way. For instance, if the high rate of consumption of roads leads to congestion, setting and charging tolls will not be particularly cumbersome. Most of these goods are well-defined in practice.

The possibility of a differential categorisation of water thus yields some specific consequences to the management of water resources. Firstly, the different manifestations of water and the difficulty of separating them out make it difficult to develop a single, homogenous set of applicable legal and economic water-management arrangements. Considering water as a private good would lead regulators to favour certain policy preferences over others. In this vein, allocation through market-based mechanisms may be advisable. However, this is not the case for all the instances in which water manifests itself. Since water possesses public good characteristics, it is not advisable to exclusively rely on markets. Secondly, and relatedly, the management of water resources may change depending on context. It would be highly inefficient to allocate all waters through market-based mechanisms as if they were a pure private good. Individuals ultimately treat water differently, according to the circumstances of use. As previously indicated, the water in the Rhine and the navigational use thereof is different from water used as an economic input for industrial purposes, or water used for human consumption purposes. In this way,

[85] Gary D. Libecap, 'Transaction costs, property rights, and the tools of the new institutional economics: Water rights and water markets' in Éric Brousseau and Jean-Michel Glachant (eds), *New Institutional Economics: A Guidebook* (CUP 2008) 272. See also Samuelson when arguing that 'The benefits from a public or social good, unlike those from a purely private good, are seen to involve external consumption effects on more than one individual. By contrast, if a good can be subdivided so that each part can be competitively sold separately to a different individual, with no external effects on others in the group, it isn't a likely candidate for government activity'. Paul A. Samuelson, *Economics* (11th edn, McGraw-Hill 1980) 151.

the actual understanding of water will determine the content of the applicable regulatory framework.

3.3. Mobility and variability

Water has two important physical characteristics, viz. mobility and variability. Both characteristics have concrete implications for its management, increasing the difficulty of treating water as a private good and establishing property rights. It therefore makes sense to discuss both of them.

The first physical feature of water is mobility. Water tends to move around the globe and it is nearly impossible to arrest its motion. The concept of hydrological water cycle illustrates the physical feature of mobility very well.[86] This cycle describes the exchanges of water within the Earth's hydrosphere. In very simple terms, the globe usually receives water from the aether through precipitation. Rainwater[87] either augments the flow of surface waters or recharges groundwater by penetrating the Earth's surface. Subsequently, the evaporation of water follows, so that moist air can rise to the atmosphere. As soon as water vapour condenses into clouds, the water cycle begins again.

Mobility has concrete effects on humans' use of the resource. Specifically, the use of water generally allows for sequential use. It is very likely that most of water uses will decrease the quality of water without causing its depletion. Conventional terminology tends to distinguish between consumptive and non-consumptive use of water.[88] On the one hand, the human consumption of water entails that a certain amount of water is not available for further use because it has been removed from the environment (e.g. evaporation, incorporation into other products). On the other hand, the existence of a

[86] Please note that the term 'hydrological cycle' is synonymous with 'hydrologic cycle'. A different term is 'hydrosocial cycle', as recently proposed by Linton and Budds. This latter term refers to the high degree of interdependence between physical and societal factors in the water cycle. See Linton and Budds (n 29). Chapter IV reflects further on the concept of hydrosocial cycle.

[87] This certainly occurs also in the case of snow or hail.

[88] As to water use, a further distinction can be drawn between off-stream and in-stream use. The former refers to the uses of water that require a withdrawal or diversion of the same water from the source. An example is the large majority of water used for household needs. The latter is the use of water not requiring any withdrawal or diversion. A striking example is navigation.

return flow allows for the sequential use of the same water. The agricultural sector exemplifies this tendency. Upstream farmers divert water from the stream to use it for their crops. As soon as the crops are watered, part of the water will evaporate and another part will return to the water source (either surface water or groundwater). In this way, this last portion of return flow will be used by downstream farmers. As Noll put it, '[v]irtually all uses of water do not consume water, but instead diminish its quality for subsequent use'.[89]

This physical feature makes water a very peculiar good, compared to others studied by economists. For example, the consumption of food products leads to their exhaustion. The use of water, instead, diminishes its quality but it does not foreclose further use. It is difficult to exclude individuals from using water. Establishing property rights to flowing water is an arduous process, and the creation of a competitive market is nearly impossible. From a legal perspective, the establishment of a property right on a corporeal good would entitle the holder to the right to use, alienate, and destroy it.[90] The mobility of water undermines this framework. This particular consequence is not unknown to legislators. It is hardly likely that legislators would establish rights to water itself but only rights to *use* water.[91] Besides, many jurisdictions recurred to collective rights to regulate access to water resources. The riparian water rights, as set out by the common law systems, are an expression of these considerations.[92] Under this system, water rights are tied to adjoining land. All landowners enjoy the right to divert a *reasonable* amount of water. However, they need to make sure that water abstraction would not impinge on the same rights enjoyed by the other landowners. The specifity of this system is that there is no individual

[89] Roger Noll, 'The economics of urban water systems' in Mary M. Shirely (ed), *Thirsting for efficiency: The economics and politics of urban water system reform* (Elsevier 2002) 43, 57.

[90] Since Roman law, the right to ownership entails the right to exercise those powers (*ius utendi, fruendi et abutendi*).

[91] Jan Laitos and Joseph P. Tomain, *Energy and natural resources law in a nutshell* (West Group 1992) 363.

[92] Please note that the US has mainly two different water allocation systems. The first one is riparian and it has developed in the Eastern part of the country. The West, instead, implemented the appropriative water rights system. where the guiding principle is 'first in time is first in right'. It is then possible for the first person to divert water from the stream (any available desired quantity thereof), regardless of whether subsequent users will have sufficient amounts of water to fulfil their needs. See further Anthony Scott and Georgina Coustalin, 'The evolution of water rights' (1995) 35 Nat. Resources J. 821.

right to a given amount of water, but a collective right shared with (and dependent on the use of) the other landowners.[93]

Conversely, the establishment of property rights may be an option in other contexts. As soon as the sequential use of water is to a certain extent foreclosed, then legislators are more likely to allow for some sort of property rights over the resource. This is the case for water stored in a cistern or water contained in glass and plastic bottles.[94] Except for a few individuals, there is no bewilderment that water in glass and plastic bottles is treated as a private good, bought and sold in markets.

The second physical characteristic of water is variability. The distribution of water is uneven around the globe spatially, temporally and qualitatively. Firstly, there are certain areas that have too much water, while other countries suffer of water scarcity. This situation also occurs in rather limited geographical areas. One needs only think of the EU.[95] Many parts of the Netherlands are below sea level, while arid areas predominate the Southern European landscape. Secondly, the variability of supply is also time-dependent. In Italy, water shortages are the order of the day during the summer season, while this is not the case – at least for the Northern part – in winter.[96] Temporal variability is further reinforced by the human factor.[97] For example, land use significantly affects the availability of water. Thirdly, water varies qualitatively. In term of quality, water is not as homogenous as other resources, like electricity or gas.[98] Its variation in quality is very high and it depends on multiple factors. Figure 1 shows that water in the Northern European countries – especially Belgium, the Netherlands and Germany – is generally more polluted, compared to the Southern and Eastern countries.

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[93] Scott and Coustalin (n 92) 885.

[94] However, please consider that water in a cistern may have a further problem caused by the complementarity of use. Stored water can serve various uses and thus property rights might have a problem capturing all these uses. See Young and Haveman (n 66) 469.

[95] European Environmental Agency, *European waters: assessment of status and pressures. EEA Report No 7/2018* (2018), 74.

[96] Temporal variability is also dependent on the state in which water is found. For example, if we consider snowmelt basins, then there will be a decline of water availability in the winter and an increase in the summer.

[97] Savenije and van der Zang (n 56) 99.

[98] Christopher Decker, *Modern economic regulation: An introduction to theory and practice* (CUP 2014) 360.

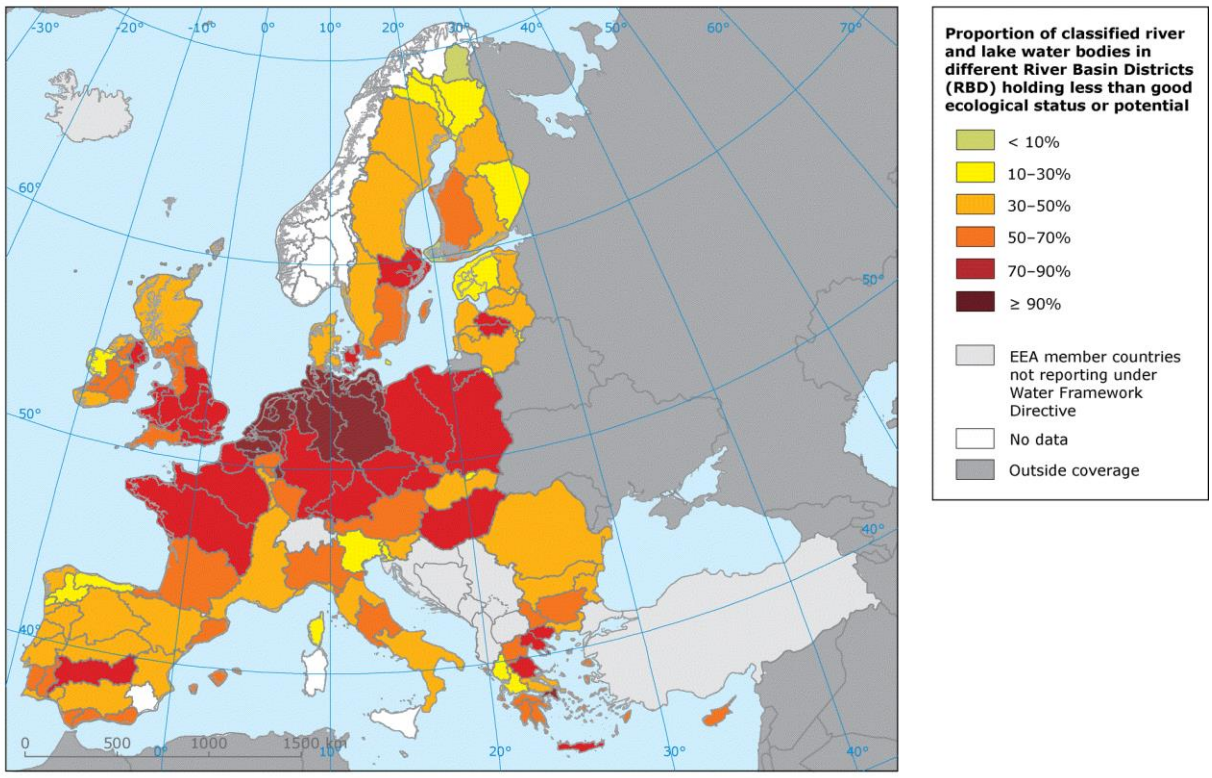

Figure 1 - Good ecological status of river and lake water bodies[99]

From an economic perspective, this feature leads to the uneasy problem of matching supply and demand. Certain technical solutions can partially address the problem. Storage could water down the problem of temporal variability, while inter-basin transfers could help solve spatial variability.[100] Furthermore, certain water uses (e.g. irrigation) do not require the same quality of water as others (e.g. drinking water). However, these technical solutions cannot entirely match supply and demand.[101] On the one hand, affordable storage as well as large-scale diversion are a recent development in the history of

[99] European Environment Agency, available at <https://www.eea.europa.eu/data-and-maps/figures/proportion-of-classified-surface-water-4/fiche-freswater-fig01-water-2012.eps> (accessed 17 April 2020).

[100] Both systems could be used to address qualitative variability too.

[101] Decker (n) 372.

humankind.[102] On the other hand, establishing a system that provides waters of different quality may be difficult to implement in practice.[103]

A further element complicates certain solutions aimed at matching supply and demand. The transport of water is relatively costly compared to the transportation of other resources, and not very remunerative. For example, while gas can be compressed, water is bulky. These conditions cause storage to be favoured over transport at most times and in most places.[104] Two regulatory consequences may arise. First, the establishment of property rights might be too costly; collective rights would be preferable. Second, the prioritisation of storage makes water management highly localised. This implies that all the various water-related problems will have a localised component. Accordingly, there are no one-size-fits-all solutions.

3.4. The emergence of natural monopolies

The complexities of water do not end here. There are certain factors associated with water provision that push for the existence of natural monopolies, thereby excluding the allocation of water resources through competitive markets. To start with, the supply of water is capital-intensive and the (high) costs are fixed. These high fixed costs usually include investment in and maintenance of water infrastructures, as well as the high usage of electricity for pumping water through pipes.[105]

Another factor that contributes to the emergence of natural monopolies is the longevity of water infrastructure. The infrastructure needed for water provision is usually long-lasting, especially in the case of surface water. One only needs to think that the current US groundwater provision runs on infrastructures built in the 1800s, 1900-45 and

[102] Hanemann (n 32) 74.

[103] One possible example is the do-it-yourself (DIY) water movement seeks to divert water pipes for residential uses so that certain water uses could be fulfilled with water already consumed for a different purpose.

[104] Young and Haveman (n 66) 469.

[105] Unlike electricity and gas, in water supply, there is a difference between the short-run and long-run marginal costs. Short-run marginal costs are indeed extremely low due to the low costs of transporting water around, especially if gravity conveys water.

post-1945 time periods.[106] This characteristic shapes the incentives for competent authorities to intervene in the infrastructures. For example, the urgency for providers to expand the capacity of water infrastructure culminates in small time periods.[107] Outside of those periods, there is no reason to make any improvement on the infrastructures.[108] In this way, the *high* costs of intervening in the infrastructures will be borne by the provider once, and then dilute over time.

These two external factors (high fixed costs and longevity of infrastructures) would in principle lead to economies of scale. However, economies of scale are not apparent in all aspects of water provision. For example, economies of scale can be traced in the case of surface water, but not necessarily in the case of groundwater. The reason lies in the fact that augmenting the storage capability of surface water would lead to a decrease in the cost of stored water.[109] Conversely, with groundwater, there are many cases in which economies of scale might be unfeasible. Extending the water infrastructures to serve only one additional consumer in a remote area will certainly not decrease the cost of water distribution. To further complicate the picture, water provision entails activities that are scalable and activities that are not: while the volumetric capacity of providing water resembles a case of economies of scale, the length of pipelines does not resemble one.

Against this background, it does not come as a surprise that the existence of economies of scale in the water industry is contested.[110] In fact, some scholars have shown that there may be diseconomies of scale for the whole system[111] or for certain specific

[106] Gregory M. Baird, 'How to eat an elephant: The infrastructure investment gap' (2010) 102(6) Journal-American Water Works Association 26, 32.
[107] There might be a difference with groundwater.
[108] Water will then be provided at a higher cost. This conclusion derives from the fact that if it is possible to store more water or lose less water due to leakages, it will then be possible to accommodate the demands more easily, thus "reducing" the water deficit. See Jaeger et al (n 48) 4509.
[109] Bower (n 68) 223-224.
[110] Pedro Carvalho, Rui Cunha Marques and Sanford Berg, 'A meta-regression analysis of benchmarking studies on water utilities market structure' (2012) 21 Utilities Policy 40, 41; Malcolm Abbott and Bruce Cohen, 'Productivity and efficiency in the water industry' (2009) 17(3-4) Utilities Policy 233, 236.
[111] David S. Saal, David Parker and Tom Weyman-Jones, 'Determining the contribution of technical change, efficiency change and scale change to productivity growth in the privatized English and Welsh water and sewerage industry: 1985–2000' (2007) 28(1-2) Journal of Productivity Analysis 127, 138; J. L. Ford and J. J. Warford, 'Cost functions for the water industry' (1969) 18(1) The Journal of Industrial Economics 53, 54.

activities like water production.[112] Likewise, others assert that diseconomies of scale apply in certain areas, like the non-residential ones.[113] The divergence in results shows that the framework where water operates is highly heterogeneous and dependent on context, also from an economic perspective.[114]

Notwithstanding these disputes, the conditions indicated above (e.g. high fixed costs because of capital intensity together with longevity of infrastructures and emergence of economies of scale) make the provision of (surface) water particularly prone to be run by a system of *natural* monopolies.[115] The need for a single provider arises every time there are high barriers to entry (attested by high fixed costs) and scale efficiencies (attested by economies of scale). Taking into account all these costs over time, a public centralised provision of water might be preferable to individual provision (private vendors or self-provision).[116] Thus, favouring the establishment of property rights in the water provision sector might not accord with some tenets of economic analysis.

3.5. A multifunctional good

The majority of academic works about water starts with a trivial, yet sometimes overlooked claim: water is essential for human life. This characteristic *per se* has regulatory consequences. In economic analysis, essentialness is a notion that captures this very same characteristic. This concept encompasses both the demand-side and the supply-side. More practically, a good can be essential if it represents a non-substitutable factor of production or a commodity that humans must have. Water falls into both categories: it

[112] William F. Fox and Richard A. Hofler, 'Using homothetic composed error frontiers to measure water utility efficiency' (1986) 53(2) Southern Economic Journal 461, 472.

[113] H. Youn Kim and Robert M. Clark, 'Economies of scale and scope in water supply' (1988) 18(4) Regional Science and Urban Economics 479.

[114] What instead can be sure is that diseconomies of scale started arising after a certain level. More concretely, see Abbott and Cohen (n 110) 236.

[115] Please consider that natural monopolies are not the ones that occur due to unfair business practices (abuse of dominant position, merger and the like). These latter are instead usually prohibited by competition law. See e.g. Article 101 TFEU.

[116] Should the provision be temporary, then it might be more efficient to provide water through vendors, since the upfront costs are considerably lower compared to a system requiring water infrastructure to provide water.

is an essential economic input for industrial processes *and* an essential resource for household uses.

As of the former, there are many industries that need water as an essential input: the production of (say) electricity at nuclear power plants cannot occur without the circulation of heated water. The use of water in nuclear power plants is as pervasive as in many other industries. Most importantly, there is no substitute for it. As to the latter, there is no single commodity that can replace water. Each human needs to have a minimum amount of litres per day to fulfil her basic functions. As will be shown in the following chapter, the recognition of the right to water and sanitation, which entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water, somehow captures the concept of essentialness. There are also other "manifestations" of this concept from a regulatory perspective. In many countries, the legislators set certain restrictions on public utilities when they attempt to disconnect water access, unlike other public services. For example, the 1999 Water Industry Act prohibits in England and Wales the disconnection for non-payment of charges in certain premises such as first domestic houses and hospitals.[117] Under these circumstances, water is a need. Besides, the non-substitutability factor does not only refer to the resource *per se*. It usually also extends to its provision.[118]

However, the essentialness of water is only one part of the story. Water is a multifunctional good providing a bundle of services. It has different uses that do not end with drinking and sanitation. It is certainly a means of satisfying human preferences, too. Many individuals use water to wash their cars or to fill their swimming pools. These are certainly not needs, not in this world. Noll corroborated this concept by showing that water is – to a certain extent – price-elastic.[119] The fact that water is responsive to price means that there are cases where water is used for non-essential needs. In more economic terms, when used for fulfilling human needs, essentialness does not accommodate the

[117] 1991 Water Industry Act c. 56.

[118] It is in principle possible to recur to various form of water provisions. For example, bottle companies can replace the provision of water through pipes. The same would be true if recycled water and water vendors are used. However, all these modes of provision are either too expensive or insufficient to meet demand for water.

[119] Noll (n 89) 55; Janice A. Beecher and Jason A. Kalmbach, 'Structure, regulation, and pricing of water in the United States: A study of the Great Lakes region' (2013) 24 Utilities Policy 32, 33.

marginal value of water.[120] As Hanemann puts it, 'essentialness conveys no information about the productivity or value of water beyond the vicinity of the threshold'.[121]

The fact that water is also a means of satisfying human preferences has some regulatory implications. Society cannot treat water simply as a good that is essential to human life.[122] Water is a private good, too. The resulting regulatory framework should encompass needs connected with water, as well as demands to treat water as a commodity.[123] From a more practical perspective, this implies that regulators must not only consider how many litres each person needs, but also how many litres each person is willing to pay for. Resorting exclusively to market mechanisms would not ensure the treatment of water as a need. Likewise, public management would not be the most efficient solution when water becomes a means of satisfying human preferences. A single way of allocating water seems unable to encompass the cross-cutting nature of water.

3.6. The combination of technological progress and water types from a physical perspective

From a physical perspective, scholars have divided water into several different types. This categorisation, based on the natural sciences, may not immediately entail different economic and legal consequences. Yet, these different physical types of water, if combined with the latest technological advancements, may pose normative questions on the establishment of property rights. Should we treat fresh water resulting from a desalination process in the same way as fresh water that occurs in nature? Should we consider desalinated seawater the same as desalinated brackish water? These and other

[120] This reflection was also at the origin of the diamond-water paradox where it is contended that the market price of diamonds is higher than water even if the former are less valuable to society. See Smith (n 75) Book I, Chapter IV, par. 13.
[121] Hanemann (n 32) 78.
[122] Musgrave proposed the term "merit good" to capture the essentialness aspect. Merit goods are those commodities or services provided based more on a concept of need rather than on the willingness to pay. However, since the concept has so far been unconventional in neoclassical economics, this chapter will not delve into that. See Richard A. Musgrave, *The Theory of Public Finance* (McGraw-Hill 1959) 13-15.
[123] Jeffrey M. Peterson and Nathan Hendricks, 'Economics of Water' in Conca and Weinthal (n 55) 351.

similar doubts regarding how to treat each type of water may emerge and call for a differential regulatory treatment.

Starting with the categorisation resulting from natural science, one of the main important divides is between blue, green and grey water. Despite an artificial division, the conceptualisation helps one to distinguish the various forms of water resources found within the hydrological cycle. It therefore makes sense to divide fresh water[124] into two different types of water, these being blue water and green water.[125] The term blue water refers to all naturally occurring liquid water originating in runoff, with the exception of seawater and brackish water. In plain words, blue water consists of the water in rivers, lakes, and groundwater. The notion of green water comprises the rainfall which ends up in soil moisture in the unsaturated zone. Finally, the last type of water is grey water, which should not be confused with black water (i.e. wastewater from toilets). It consists of all wastewater generated by human – household and commercial – use such as kitchen sinks and washing machines. Although grey water has limited use for domestic purposes, its reuse in irrigation for farming is quite common.

In addition to these three types of water, a further distinction within blue water can be made between surface and groundwater. The former is any water on the surface of the Earth, such as the water found in rivers or lakes. In this regard, it must be noted that the term surface water also includes ocean and wetlands, which are not considered to be blue water. It follows that surface water encompasses some blue water, as well as seawater and brackish water. Lastly, the term groundwater stands for any fresh water found beneath the surface of Earth. Figure 2 illustrates the various types of water and the connections between them. It is advisable to place a caveat on this breakdown. All the types of water are in fact not in a vacuum - they interact closely with one another. The hydrologic cycle allows for the continuous exchange of water flows within the hydrosphere, thus covering

[124] The term fresh water refers to any naturally occurring water that is not salty. Please note that the term fresh water does not coincide with potable (or drinking) water. In order to be drinking water, the majority of fresh water must undergo a purification treatment.

[125] Malin Falkenmark and Johan Rockström, *Balancing water for humans and nature: the new approach in ecohydrology* (Earthscan 2004). The distinction between blue and green water has originally been introduced to assess the distinct environmental impact of each type of water. In this way, it was possible to highlight the consumptive use of green water.

all types of water. For instance, seawater, brackish water and fresh water are all integral part of the hydrologic cycle.

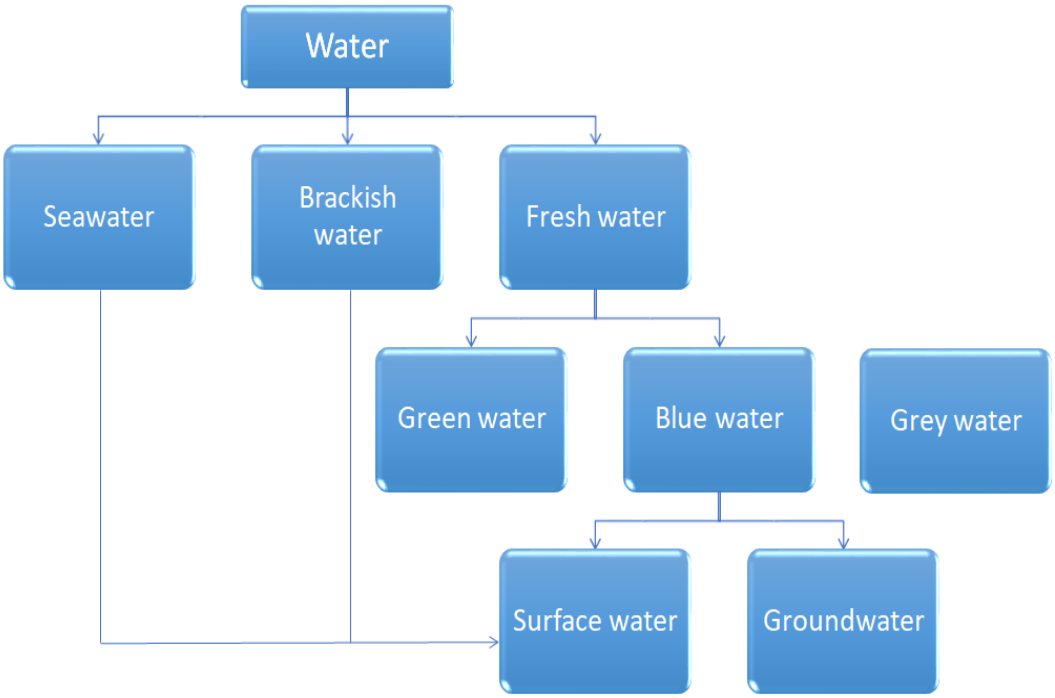

Figure 2 - Different types of water

Despite a wide range of types, popular attention has mainly focused on blue water, which represents only one-third of fresh water resources and less than the 3% of the total hydrosphere.[126] However, in recent years and as a result of technological progress, attention has gradually shifted towards other types of water.[127] Current technological advances have shown that natural fresh water resources are not the only source of water supply. Additional quantities of water can also be provided through the so-called

[126] Malin Falkenmark and Johan Rockström, 'The new blue and green water paradigm: Breaking new ground for water resources planning and management' (2006) 132(3) Journal of Water Resources Planning and Management 129; Igor A. Shiklomanov, 'World freshwater resources' in Peter H. Gleick, *Water in Crisis: A Guide to the World's Fresh Water Resources* (OUP 1993) 13.

[127] Eran Feitelson, 'What is water? A normative perspective' (2012) 14(S1) Water Policy 52, 60.

anthropogenic processes.[128] These processes include – but are not limited to – desalination, wastewater recycling and artificial groundwater recharge. The existence of new (fresh) water production methods raises the question of how to treat these additional sources of water.[129] The analysis of these anthropogenic processes will show that each particular type of water may require a specific regulatory treatment.[130] Some regulatory experiences are also a testament to a different understanding of types of water. For example, the Israeli water rates are differentiated by *inter alia* types of water (fresh water, recycled or brackish).[131]

Natural fresh water and water resulting from an anthropogenic process share the same physical characteristics. However, there is a tendency to make a distinction between these two types of water. The main difference focuses on the extent of human intervention necessary to produce natural fresh water and water resulting from an anthropogenic process. Whilst the former is found in nature as a natural resource and requires very limited intervention for it to be safe to drink, the latter resembles the output of an industrial process which requires sizable investments. The variance in "production method" may thus result in differentiated perceptions on water regulation. The traditional desalination process not only changes the basic natural flow affecting water geography, but it is also cumbersome in terms of investments.[132] It is no surprise that the production of desalinated water often exceeds the financial capabilities of some countries.[133] Within this context, a

[128] Eran Feitelson and Ariahna Jones, 'Global diffusion of XL-capacity seawater desalination' (2014) 16(6) Water Policy 1031; Menachem Elimelech and William A. Phillip, 'The future of seawater desalination: energy, technology, and the environment' (2011) 333(6043) Science 712; G. Wade Miller, 'Integrated concepts in water reuse: managing global water needs' (2006) 187(1-3) Desalination 65.

[129] Feitelson (n 127) 60.

[130] Miller (n 128) 75.

[131] See Eran Feitelson and Gad Rosenthal, 'Desalination, space and power: the ramifications of Israel's changing water geography' (2012) 43(2) Geoforum 272, 279.

[132] Ibid 272. The construction of desalinated plants entails very high fixed costs (financial costs and interest repayments). Some of the main factors influencing the cost are energy use, plant capacity, feedwater salinity and raw water quality. See e.g. Noreddine Ghaffour, Thomas M. Missimer and Gary L. Amy, 'Technical review and evaluation of the economics of water desalination: current and future challenges for better water supply sustainability' (2013) 309 Desalination 197; Ioannis C. Karagiannis and Petros G. Soldatos, 'Water desalination cost literature: review and assessment' (2008) 223(1-3) Desalination 448; Hisham T. El-Dessouky and Hisham Mohamed Ettouney, *Fundamentals of salt water desalination* (Elsevier 2002).

[133] Akili D. Khawaji, Ibrahim K. Kutubkhanah and Jong-Mihn Wie, 'Advances in seawater desalination technologies' (2008) 221(1-3) Desalination 47.

desalination plant appears to be the result of an entrepreneurial (and political) decisions. That is to say, the production of such water is primarily intended to serve economic preferences, since it cannot be regarded as a real substitute for fresh water.[134] Embracing this view leads to the perception that the use of fresh water obtained from desalinated seawater is different and should be subject to the system of supply and demand.[135] It follows that some individuals may consider the producers of desalinated water as the true owners of this resource. In line with this view, Aviram et al define desalinated water as a 'manufactured good', stressing its proximity to other commodities subject to market disciplines.[136]

A slightly more complicated discourse emerges with respect to other anthropogenic processes, such as wastewater recycling. One may argue that the situation of fresh water is not so dissimilar to this anthropogenic, though more intermediate, case. Investments in diverting and pumping *purified* water into pipes are also required for fresh water. Yet, the anthropogenic process in question combines a high degree of human intervention with a *different starting material*. The industrial input of wastewater recycling is not fresh water, but polluted water. In other words, the (fresh) water resulting from wastewater recycling may appear as the end product of an industrial process, possibly yielding consequences that are similar to those observed for desalinated water.[137]

In addition, taking an environmental perspective for wastewater recycling adds another layer of complexity to the analysis: it seems that this industrial treatment resembles a necessity more closely than it resembles an economic activity.[138] Framing the issue in those terms may allow one to regard wastewater recycling not as the result of an

[134] Desalinated water can certainly help alleviate water scarcity. However, it usually replaces the water supply only in certain sectors, such as the domestic one. For a critical overview of the debate on the actual function of desalinated water see Yosef Dreizin, Abraham Tenne and Daniel Hoffman, 'Integrating large scale seawater desalination plants within Israel's water supply system' (2008) 220(1-3) Desalination 132.
[135] Feitelson (n 16).
[136] Ram Aviram, David Katz, and Deborah Shmueli, 'Desalination as a game-changer in transboundary hydro-politics' (2014) 169(4) Water Policy 609, 611. Although it is argued that while desalination may call for the privatisation and commercialisation of water, this is certainly not an automatic consequence. Producers are free to choose between profit-maximising and "political" prices.
[137] It is no coincidence that previous research stresses the need to discuss desalination and wastewater treatment altogether. See Feitelson and Rosenthal (n 131) 282.
[138] Feitelson (n 16).

entrepreneurial (and political) decisions.[139] Rather, wastewater recycling can become an essential precondition to decreasing environmental pollution. The salience of that anthropogenic process for environmental purposes is also noticeable in the existing EU legislative framework. For example, Article 12 of the Urban Wastewater Treatment Directive promotes water reuse.[140] Accordingly, a couple of normative questions arise. Should the recycled water belong to those who produce it, or should it return to the hydrological cycle?[141] Should recycled water serve to address human needs or should it be used for nature conservation purposes?

Despite the absence of clear answers, this discussion is relevant to the present analysis. It shows that these physical water types, in combination with technological progress, lead individuals to hold diverse perceptions of water or, at least, to question whether different types of water should be treated according to the same economic and legal prescriptions. It seems that the regulatory treatment of water is affected by context.

4. Why economics cannot be the whole story: concluding observations

The fact that water presents so many complexities makes this substance distinctive from other commodities. The concurrent existence of these complexities tends to limit – if not to foreclose – the establishment of property rights and competitive markets in the water sector. As da Cunha puts it, the 'law of supply and demand does not play freely [in the water sector]'.[142] The problem of water management is then not necessarily one of physical shortage. Rather, it is about finding the most appropriate solutions for the allocation of scarce water resources. Given the typical features of water, economics

[139] One may also comfortably argue that environmental considerations do not change the framework, thus ruling out the reasoning that follows. Specifically, they can simply generate (new) demand to which entrepreneurs respond with new offers.

[140] Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment [1991] OJ L 135. This EU legislation does not set specific obligations. Some Member States have to adopt their own regulations. See, for example, the Italian D.M. 12 June 2003, n. 185 concerning technical measures for the reuse of wastewater.

[141] Feitelson (n 16).

[142] Luis Veiga da Cunha, 'Water: a human right or an economic resource?' in M. Ramón Llamas, L. Martinez Cortina and Aditi Mukherji (eds), *Water ethics* (CRC Press 2009) 97, 99.

should develop appropriate solutions by accommodating this heterogeneous framework.[143]

Besides, the complexities of water usually give rise to challenges usually intrinsic in public goods or common-pool resources. It is not controversial to say that collective action has problems. For example, individuals have an incentive to free-ride. In other words, acting from an economically rational perspective, each individual will try not to contribute to the provision of the public good but rather only to utilise it. And what can occur at an individual level is very likely to occur at the macro level, too. For example, governments tend to rent-seeking when it comes to water provision.[144] Furthermore, it will be very difficult to identify the optimal group size. From an institutional perspective, large groups will have a tendency not to provide the good *per se*, whereas small groups will underprovide it.

All these considerations mean that there is a need to articulate non-technical solutions in a bid to correct collective action problems. Previous literature has not overlooked this. For example, Hardin proposed centralised coercion and clearly defined property rights.[145] Along the same lines, Posner argued for privatisation.[146] The emergence of property rights, however, does not necessarily lead to a more efficient solution. As Demsetz shows, the benefits of property rights sometimes do not outweigh their costs (e.g. costs of delineation, identification, and protection of property rights).[147] Therefore, other researchers focused on institutional arrangements.[148] They suggest that the existence of certain institutional factors will contribute to more successful management. Ostrom, for example, suggests eight specific factors for a stable management of common pool

[143] Peterson and Hendricks (n 123) 370.
[144] Pablo T. Spiller and William D. Savedoff, 'Government Opportunism and the Provision of Water' in Pablo T. Spiller and William D. Savedoff (eds) *Spilled water: institutional commitment in the provision of water services* (Inter-American Development Bank 1999) 1.
[145] Hardin (n 80). Along the same line, see Olson (n 78).
[146] Richard A. Posner, *Economic Analysis of Law* (Wolters Kluwer Law & Business 2014).
[147] Harold Demsetz, 'Some aspects of property rights' (1966) 9 The Journal of Law and Economics 61; Harold Demsetz, 'Towards a Theory of Property Rights' (1967) 57(2) American Economic Review 347.
[148] Elinor Ostrom, 'How types of goods and property rights jointly affect collective action' (2003) 15(3) Journal of Theoretical Politics 239; Arun Agrawal, 'Common resources and institutional sustainability' in Elinor Ostrom, Thomas Ed Dietz, Nives Ed Dolšak, Paul C. Stern, Susan Ed Stonich, and Elke U. Weber, *The drama of the commons* (National Academy Press 2002) 41; Ostrom (n 82).

resources: (1) the existence of clearly defined boundaries, (2) effective coordination between appropriation and provision rules and local conditions, (3) collective-choice arrangements enabling all participants to take part in the decision-making process, (4) effective monitoring, (5) a system of sanctions for infringers, (6) cheap and accessible conflict-resolution mechanisms, (7) minimal recognition of the rights to organise, and (8) small size for common property resources CPRs.[149]

The underlying message of these last analyses is that there is no panacea applicable to all the various contexts.[150] Multiple approaches are possible and can be equally successful. Effective water management depends on context and individual preferences.[151] These latter affect water management significantly since they may, together with exogenous factors, tilt the balance towards a given policy. The following chapter takes this very claim seriously and it intends to demonstrate that this is indeed the case. Eventually, this analysis will bring us to question whether it makes sense to recur to an integrated approach of water regulation.

For the moment and for the purposes of this study, however, it suffices to summarise this chapter. An economic viewpoint can identify what the problems of water management are; economics only, however, cannot provide complete solutions to these problems.[152] Economic theories can explain why the establishment of property rights and market-based mechanisms cannot always guarantee the most efficient[153] solution in water management. Equally, economic analysis can explain the role of policy and collective action[154] as crucial in managing water resources. Yet, this is not the whole story. Welfare analysis

[149] Ostrom (n 82).
[150] Meinzen-Dick (n 11).
[151] Peterson and Hendricks (n 123) 370.
[152] See generally Friedrich Hayek, *Studies in philosophy, politics and economics* (University of Chicago Press 1967).
[153] According to economists, a system becomes efficient as soon as the marginal value of water (net of acquisition or transaction costs) is the same in all its competing uses. See e.g. Ronald C. Griffin, *Water resource economics: The analysis of scarcity, policies, and projects* (MIT press 2016).
[154] Olson (n 78). Furthermore, Field developed a cost-minimisation model in which he showed the most important cost-variables for the choice between pooling and dividing the resources (i.e. commons and property rights). See Barry C. Field, 'The optimal commons' (1985) 67(2) American Journal of Agricultural Economics 79.

will teach us that our solutions are always suboptimal.[155] The answer suggested by economic analysis will often not be the satisfactory (say, perfectly efficient) solution. Instead, what needs to be considered is that institutions and regulatory frameworks play a determinative role in water management.[156]

From this analysis, two main consequences follow. Firstly, it is not advisable to treat water as a private good. Water at times qualifies as a private good but also as a public good, a club good and a common pool resource. Context is determinative of the appropriate categorisation of water. It follows that water management seems to require a more sophisticated form of analysis that would adapt to contextual factors. Secondly, a purely economic perspective is insufficiently comprehensive. There is no economic solution to the problem of water management, but there are tailor-made solutions that are ingrained in a given context. Therefore, sociocultural complexities sit alongside physical ones when it comes to water regulation.[157] To conclude, water plays a complex role in the interface between humans and nature and its complexity reverberates on its economic and legal treatment.

[155] Harold Demsetz, 'Information and efficiency: another viewpoint' (1969) Journal of Law and Economics 12.

[156] Ostrom (n 82).

[157] Again, the complexities considered here are called physical for ease of the discourse, but this study is well aware that those complexities hide some normative considerations as the sociocultural complexities.

CHAPTER III

WATER MANAGEMENT: A COGNITIVELY COMPLEX EXERCISE

1. Introduction

Water management plays a key role in human civilisation. For example, the United Nations stresses the importance of a sustainable management of water resources through the adoption of Sustainable Development Goal 6.[158] Other international documents share this view.[159] The development of effective water management combining economics, environment and equity has thus become a primary objective for the international community and individual states. Achieving that target would entail not only an improvement in living conditions but also economic growth and environmental safety.

In this context, scholars and practitioners alike have started puzzling over the means to achieve this goal. The answers are several, and they do not necessarily overlap. As the previous chapter showed, physical complexities impede the emergence of a common set of standardised legal and economic arrangements to manage water. Yet, the establishment of common management rules in water management is under siege not only by physical complexities. Sociocultural complexities sit alongside the physical ones.

Water is indeed a more complex resource than one may expect.[160] While we tend to think of water as a single resource, the conceptualisation of water seems to be fragmented. Water in fact escapes easy definitions. An epistemological analysis of water shows that individuals may have multiple perceptions of water that make the road towards a common view inherently slippery. Such perceptions, however, not only contribute to how water is

[158] UNGA Res 66/288 (11 September 2012) U.N. Doc. A/RES/66/L.56, paras 119-124.

[159] See e.g. The Rio Declaration on Environment and Development, U.N. Doc.A/CONF.151/5/Rev. 1 (1992).

[160] Rajendra Pradhan and Ruth Meinzen-Dick, 'Which rights are right? Water rights, culture, and underlying values' (2003) 9(19) Water Nepal 37.

known but also appeal to various legitimisations and logics of how this resource is to be managed.[161]

In this vein, water policy architecture generally mirrors the view of water that a given society has decided to adopt: the way we see water influences our policy preferences on water regulation.[162] For example, considering water a marketable commodity would very likely lead us to favour water allocation through market processes. Accordingly, perceiving water in a particular way has a substantial impact on concrete policy measures.[163] These different perceptions are a constituent part of the sociocultural complexities. Nevertheless, the discourse on the distinctive physical features of water and the resulting economic prescriptions has eclipsed the discussion on the various perceptions that individuals have of water substantially.[164]

Against this background, this chapter shows that there are multiple perceptions of water and it is *also* these perceptions that make water complex to regulate. Section 2 examines the sociocultural complexities surrounding water regulation. In other words, the aim of this section is to systematise and reconsider the various perceptions of water as identified in the literature. After this mapping exercise, which leads to a fragmented conceptualisation of water, Section 3 illustrates how these different perceptions increase the complexity of regulating water resources. Although the need for regulation in water management is indisputable, different views of water may lead to policy preferences that are difficult to reconcile. Section 4 concludes the chapter.

[161] Jamie Linton, *What is water? The history of a modern abstraction* (UBC Press 2010); Pradhan and Meinzen-Dick (n 160) 38.
[162] Feitelson (n 127) 53; Jerome Delli Priscoli, 'Reflections on the nexus of politics, ethics, religion and contemporary water resources decisions' (2012) 14(S1) Water Policy 21.
[163] Bakker (n 60).
[164] Joachim Blatter, Helen M. Ingram and Pamela M. Doughman, 'Emerging approaches to comprehend changing global contexts' in Helen M. Ingram and Joachim Blatter, *Reflections on water: new approaches to transboundary conflicts and cooperation* (MIT Press 2001), 16.

2. Sociocultural complexities

2.1. Introductory remarks

The modern standard definitions of water emphasise its scientific, physical nature. Water, a homogenous substance (H_20), possesses certain molecular properties granting it many distinctive features, such as transparency, odourlessness and colourlessness. However, defining water from a physical perspective is only part of the story. The various functions of water together with a socio-ethical debate[165] affect individual views. For example, the water used to wash some parts of the body may serve different functions and, consequently, take different meanings: it can either form part of a religious rite or be a hygiene measure. As previously claimed, water encompasses multifaceted conceptualisations in science and society, thus being at the intersection of diverse interconnected domains – including, for instance the economic, political and religious ones.[166] As a result, previous research proposes to conceive water as a 'total social fact'.[167] Specifically, the definition of 'total social fact' refers to the one put forward by Mauss a few decades ago:

> In these 'total' social phenomena, as we propose calling them, all kinds of institutions are given expression at one and the same time – religious, juridical, and moral, which relate to both politics and the family; likewise economic ones, which suppose special forms of production and consumption, or rather, of performing total services and distribution. This is not to take into account the aesthetic phenomena to which these facts lead, and the contours of the phenomena that these institutions manifest.[168]

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[165] By socio-ethical debate, this study refers to the various meanings and values attached to water by individuals. Scholars have usually referred to them in terms of "non-conventional values" of water. See e.g. Kira Artemis Russo and Zachary A. Smith, *What water is worth: Overlooked non-economic value in water resources* (Springer 2013).

[166] Maria de Lourdes Melo Zurita, Dana C. Thomsen, Timothy F. Smith, Anna Lyth, Benjamin L. Preston and Scott Baum. 'Reframing water: contesting H2O within the European Union' (2015) 65 Geoforum 170; Jessica Barnes and Samer Alatout, 'Water worlds: Introduction to the special issue of Social Studies of Science' (2012) 42(4) Social Studies of Science 483; Veronica Strang, *The meaning of water* (Berg 2004) 5.

[167] Orlove and Caton (n 14); Molle et al (n 14).

[168] Marcel Mauss, *The Gift: The Form and Reason for Exchange in Archaic Societies* (Routledge 1990) 3.

Building on this position, this study argues that the study of water should depart from a mere technical discussion, scrutinising the various interconnected domains which ultimately impact on individuals' view of water. In fact, discussions about water span a broad range of subjects, not being solely limited to technical and scientific issues.[169] Social science research plays a major role, too, attempting to highlight the relevance of the socio-ethical aspects of water.

Existing research corroborates this view by showing that an integrated multisectoral approach, with a keen eye on the sociocultural aspects, would enrich the existing, well-developed scientific discussion.[170] In line with this approach, the Valuing Water Initiative of the United Nations High Level Panel on Water stressed the importance of incorporating non-economic values attached to water.[171]

While chapter II focused on physical complexities of water, this chapter carves out and subsequently discusses the sociocultural complexities stemming from the socio-ethical debate. Indeed, this socio-ethical debate about water, which pertains to the realm of norms and values, results in diverse perceptions of water. For instance, as it will be shown soon, water can be a religious symbol, a basic human need or an object of great power.[172] Each of these perceptions, in turn, entails a different conceptualisation of water.[173] It follows that, on closer inspection, water should be treated in a fragmented manner.

In this regard, it is possible to refer to how a kaleidoscope works to clarify the previous statements. A kaleidoscope is an optical instrument for producing different

[169] Ryan Lefers, Robert G. Maliva, and Thomas M. Missimer, 'Seeking a consensus: water management principles from the monotheistic scriptures' (2015) 17(5) Water Policy 984, 984.
[170] Franz Krause and Veronica Strang, 'Thinking relationships through water' (2016) 29(6) Society & Natural Resources 633; Linton (n 161); Strang (n 166).
[171] UN High Level Panel on Water, *Roadmap of the Valuing Water Initiative* (2017) available at <https://sustainabledevelopment.un.org/content/documents/15595Road_Map_Valuing_Water_Initiative_vs_1.1_March_8th_updated_May_19th_2017.pdf > (accessed 27 April 2020).
[172] Zurita et al (n 166); Karen Bakker, 'Water: Political, biopolitical, material' (2012) 42(4) Social Studies of Science 616, 617.
[173] Aaron T. Wolf, 'Spiritual understandings of conflict and transformation and their contribution to water dialogue' (2012) 14(S1) Water Policy 73, 86.

changing patterns by multiple reflections in inclined mirrors enclosed in a tube. In this specific case, the different socio-ethical approaches should be considered as the mirrors of the kaleidoscope. As soon as the tube is turned and its mirrors change position, there is a different image. Similarly, the various socio-ethical approaches lead the viewer to have a specific perception of water, ultimately resulting in different conceptualisations.

The following subsections aim at systematising the various perceptions of water. While in no way pretending to be exhaustive, this analysis discusses the perceptions which seems to be the most debated in the literature. One should, however, note that this remains a very rapid and crude classification. The water world is richer than one may imagine.[174] Yet, this mapping exercise paves the way to Section 3, which highlights how each single perception may lead us to treat water differently, prioritising some policy objectives rather than others. The analysis eventually shows that each single perception of water has concrete repercussions for its management. In other words, the polysemous nature of water make it difficult to develop a common set of standardised legal and economic arrangements for managing water effectively. The management of water resources may depend on different perceptions and, accordingly, on contextual factors.

2.2. The spiritual perception

One fundamental aspect of the socio-ethical debate is the spiritual sphere. Although it is suggested that the majority of religions do not promote an environmental ideology, they usually exhibit a relatively tight relationship with natural resources.[175] Religious precepts aim at governing human behaviour vis-à-vis God and other human beings.[176] Because of this, several ethical and moral standards governing humans' activities are discussed,

[174] For example, certain authors went as far as to focus on water as an aesthetic element. See e.g. Shmuel Burmil, Terry C. Daniel and John D. Hetherington, 'Human values and perceptions of water in arid landscapes' (1999) 44(2-3) Landscape and Urban Planning 99.

[175] Emilio Chuvieco, 'Religious approaches to water management and environmental conservation' (2012) 14(S1) Water policy 9; Harold Coward, 'Ethics and Nature in the World's Religions' in Eckart Ehlers and Carl Friedrich Gethmann (eds), *Environment across Cultures* (Springer 2003).

[176] Although one may claim that the religious precepts aimed at governing relations between human beings became part of some monotheistic faiths at a later stage, this does not falsify the statement.

including the "right" attitudes towards the environment and the use of water. These attitudes are, in other words, part and parcel of religious teachings.

The number of religious faiths is however almost limitless and there are several religious denominations within each religious tradition. One need only think of Christianity and the various denominational families including Catholicism, Lutheranism, Calvinism, Orthodox and the like. Because of this high degree of heterogeneity, there is a spectrum of approaches in which the various attitudes towards the use of water are defined. Conducting an analysis that incorporates and discusses the wide diversity of religions is a tall order. Therefore, the following analysis will mainly be devoted to discussing the common religious concepts relating to water, especially in the case of monotheist faiths and as already identified in the literature.[177] The focus on monotheist faiths is also driven by the fact that this dissertation often refers to the EU as an example: it is then reasonable to assume that the religious faiths capable of instilling a specific perception of water in the EU population are to a large extent the monotheistic ones. Therefore, the result of this analysis will lead to a comprehensive assessment of the spiritual perception of water as triggered by Abrahamic faiths.

At a general level, the spiritual perception of water hinges on two major features, regardless of the religious approach adopted by the believer: the spiritual value of water and the attention to environmental stewardship. Both characteristics are extensively discussed in water research since cultural and religious beliefs are one of the main factors driving individuals' behaviours and decisions in water governance.[178]

As to the first feature, it is possible to argue that water possesses symbolic properties in almost all religions.[179] Associating flowing water with the act of cleansing and rebirth

[177] Armin Grunwald, 'Water ethics–Orientation for water conflicts as part of inter-and transdisciplinary deliberation' in Reinhard F. Hüttl, Oliver Bens, Christine Bismuth, and Sebastian Hoechstetter (eds), *Society-Water-Technology: A Critical Appraisal of Major Water Engineering Projects* (Springer 2015); Chuvieco (n 175).
[178] Lefers et al (n 169) 985; Robert G. Maliva and Thomas M. Missimer, 'Religious and cultural influences on water management' in Robert G. Maliva and Thomas M. Missimer (eds), *Arid Lands Water Evaluation and Management* (Springer 2012) 871, 871-2.
[179] Delli Priscoli (n 162) 32; Linton (n 161).

is a common heritage of many religions around the world.[180] One may think, as an example, about baptism in Christianity[181] or about the rituals of washing hands in the Jewish faith[182]. All these rituals and ceremonies show the prominent role that water plays in almost all religions.[183] Besides, the sanctity of water is also apparent in the religious scriptures. For the monotheistic faiths, water indeed has a spiritual value which goes beyond economics.[184] In the New Testament, the Tanakh and the Qur'an, water symbolises the spirit of God and it represents a reward for the righteous people.[185] Water possesses an intrinsically spiritual value, leading human beings to treat this resource with great respect, especially in case of 'decisions regarding water use and consumption'.[186] It seems that although only a limited amount of water is used for religious purposes, a spiritual perception has a strong normative connotation, shaping the view of water to a considerable degree.[187]

Religious precepts also promote environmental stewardship. Although White originally claimed that the Judeo-Christian literature accounts for the full exploitation of natural resources, the recent interpretations of the religious scriptures support the theory of an environmental responsibility for human beings.[188] Similarly, the majority of Muslim scholars agree that the Qur'an embodies responsible attitudes to the environment.[189] With regard to water, the attention towards environmental conservation involves avoiding

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[180] Lida Schelwald-van der Kley and Linda Reierkerk, *Water – A Way of Life: Sustainable Water Management in a Cultural Context* (CRC Press 2009).

[181] See e.g. New Testament, Matthew 3:11; New Testament, Mark 16:16; New Testament, Luke 3:3; New Testament, John 1:31; New Testament, Acts 19:4.

[182] Tanakh, Psalms 26:6.

[183] Besides the monotheistic religions, water plays a prominent role also in other religions. For example, millions of people go every year to Ganges River to perform ablutions due to its restorative power. See e.g. Orlove and Caton (n 14) 403.

[184] Lefers et al (n 169) 988.

[185] See e.g. Tanakh, Isaiah 44:3-4; Tanakh, Psalms 23:2; New Testament, John 3:5; New Testament, Revelation 22:1; Qur'an, Al-Mujādila 58:22; Qur'an, Muhammad 47:15.

[186] Lefers et al (n 169) 990.

[187] Feitelson (n 127) 56.

[188] The controversy arose on White's paper in 1967. The focus of the debate was on the correct interpretation of the first chapter of Genesis and its possible relationship with the second one. See Lynn White, 'The historical roots of our ecological crisis' (1967) 155(3767) Science 1203.

[189] Ibrahim Ozdemir, 'Toward an understanding of environmental ethics from a Qur'anic perspective' in Richard D. Foltz, Frederick M. Denny and Azizan Baharuddin (eds), *Islam and ecology: A bestowed trust* (Harvard University Press 2003) 3.

wastage. Human beings should use water resources efficiently, so that no one is excluded from water access. Considerable emphasis is indeed placed on both water resource management and water conservation.[190] For example, the Qur'an contains the line: 'Children of Adam! Take your adornment at every place of worship; and eat and drink, but be you not prodigal; He loves not the prodigal'.[191] The focus on water saving is even clearer in a *hadith*[192] in which a God messenger warns a Muslim not to waste water even for holy ablutions.[193] In this context, the religious teachings aim at shaping the discourse on the reduction of water use, stressing its spiritual value.[194]

Attributing a spiritual value to water and the promotion of environmental stewardship do not, in principle, preclude the possibility of water ownership. The purchase of drinking water is a common feature in several passages of the fundamental scriptures of monotheists, i.e. the Hebrew Bible:[195]

> Please let us pass through your land; we will not pass through fields or vineyards, nor will we drink well water. We will walk along the king's road, and we will turn neither to the right nor to the left until we have passed through your territory." Edom replied to him, "You shall not pass through me, lest I go out towards you with the sword!" The children of Israel said to him, "We will keep to the highway, and if we drink your water, either I or my cattle, we will pay its price. It is really nothing; I will pass through on foot." (Hebrew Bible, Numbers 20:17-19).

[190] Basil H. Aboul-Enein, '"The earth is your mosque": narrative perspectives of environmental health and education in the Holy Quran' (2018) 8(1) Journal of Environmental Studies and Sciences 22, 27.
[191] Qur'an, Al-A'raf 7:31. The English translation is from Arthur John Arberry, *The Koran Interpreted* (Allen & Unwin 1955).
[192] The term *hadith* refers to the record of sayings and traditions of the Prophet Muhammad. Within Islam, the *hadith* are a source for religious law second only to the Qur'an.
[193] Musnad, ii, 22; Ibn Maja, Tahara, 48, No: 425; i, 147.
[194] Chuvieco (n 175) 9-10.
[195] Please note that the Hebrew Bible is part of the religious scriptures in all the three monotheistic faiths. Aside from being the Tanakh for the Jewish religion, the principles set out in the Hebrew Bible are endorsed in both the New Testament and the Qur'an. In this regard, see New Testament, Matthew 5:17; Qur'an, Al-Ma'idah 5:44 and 46, Al-'Ankabut 29:46. For the English translation please see the Hebrew Bible, available at <https://www.chabad.org/library/bible_cdo/aid/63255/jewish/The-Bible-with-Rashi.htm> (accessed 27 April 2020).

> You shall buy food from them with money, that you may eat, and also water you shall buy from them with money, that you may drink. (Hebrew Bible, Deuteronomy 2:6).
>
> You shall sell me food for money, that I may eat; and give to me water for money, that I may drink; I will only pass through by my feet. (Hebrew Bible, Deuteronomy 2:28).

From these passages, it is possible to make two main comments from a more regulatory standpoint.[196] The first one is that communities (or nations) are responsible for the water resource management within their borders. In this vein, the interpretation of Islamic *hadiths* has gone further, claiming that it is the responsibility of the regional government to provide its citizens with adequate water supply.[197] Second, these communities enjoy property rights over fresh water. Individuals outside of such communities are entitled to purchase water. In other words, it seems that the religious scriptures allow for the transferability of property rights over water between individuals.[198]

However, this issue is far from being settled. The monotheistic faiths have always treated the discourse on water ownership with caution, being very attentive to the risk arising from its excludable character. According to religious thinking, rights of ownership shall never prevent individuals from having access to water.[199] Water is also regarded as a right belonging to all human beings.[200] In this regard, some *hadiths* even allow the use of arms in case water access is refused.[201] In addition, an interesting aspect, which corroborates the special, heterogenous nature of water when discussed in terms of private ownership, is the position adopted by some Muslim jurists. According to their view, water does not sit well within the concept of private ownership: only full possession of water

[196] Lefers et al (n 169) 996-8.
[197] Walid A. Abderrahman, 'Water demand management and Islamic water management principles: A case study' (2000) 16(4) International Journal of Water Resources Development 465, 466.
[198] Other passages confirm this view. See also e.g. Hebrew Bible, Lamentations 5:4.
[199] Hebrew Bible, Isaiah 21:14.
[200] Pope Benedict XVI in its *Caritas in Veritate* stresses that access to water is a universal right of all human beings. Benedict XVI, *Caritas in veritate*, (Libreria Editrice Vaticana 2009), 51.
[201] Yahya Ben Adam, 'Kitab al-kharaj' in A. Ben Shemesh (ed) *Taxation in Islam: Yahya Ben Adam's Kitab al-Kharaj* (Brill 1967) 75-77.

may lead to ownership of water.[202] It follows that it is impossible to own a source while ownership is allowed in case of a tank. This differential regulatory treatment partly recalls Roman law that will be analysed in the following chapter.

In summary, the spiritual approach towards water is twofold. On the one hand, religious teachings stress the sacral value of water. This holds particularly true in areas affected by water shortages. On the other hand, these religious commandments aim to provide some guidance on the sustainable use of water, reflecting an acute awareness of its scarcity.[203] This emphasis on environmental responsibility is also noticeable in water ownership rights. More precisely, individuals can sell and buy fresh water as long as they do not waste or misuse it.[204] These religious principles therefore contribute with a specific frame on how to relate to water as a substance.[205] In this regard, the spiritual perception requires a balanced synergy between respect for the sanctity of water and consciousness of its finite nature.

2.3. The human right to water discourse

On July 28, 2010, the United Nation General Assembly recognised the human right to water and sanitation.[206] Only a few months later, the UN Human Rights Council passed a new resolution in which the Council not only recognises the right to water and sanitation as a human right, but also urges states to guarantee sufficient funding for the actual delivery of water and sanitation services.[207] These two international legal instruments are together the culmination of a long process aimed at ensuring that each individual has a right to 'sufficient, safe, acceptable, physically accessible and affordable water for

[202] Thomas Naff and Joseph Dellapenna, 'Can there be confluence? A comparative consideration of Western and Islamic fresh water law' (2002) 4(6) Water Policy 465, 477.
[203] Ibid. 476; Grunwald (n 177) 12.
[204] Lefers et al (n 169) 996.
[205] Coward (n 175); Chuvieco (n 175) 9.
[206] UNGA Res 64/292 (28 July 2010) U.N. Doc. A/RES/64/PV.108.
[207] Human Rights Council Res. 15/9, U.N. Doc. A/HRC/RES/15/9 (Oct. 6, 2010).

personal and domestic uses'.[208] Also, they show the salience of the human right to water discourse in approaching water issues.

Indeed, the literature is unambiguous in acknowledging the human rights arena as one of the most influential themes in global water governance.[209] Yet, one should note that the human right to water discourse is more heterogenous. What this means is that, as the last part of this subsection will show, many individuals may have somewhat different ideas on what implications of a human right to water are. This differential understanding does not, however, preclude us from identifying an umbrella concept of the human right to water, possessing clearly defined features.

Perhaps the most important of these common features is that water is perceived as a 'life-giving and non-substitutable' resource.[210] In plain words, the perception of water in the human right to water discourse is that of a necessity for human survival that must be accessible by every human being.[211] The focus on its essential character gained momentum, especially after the privatisation trends that have occurred since the 1970s, as mentioned in the previous chapter. The main rationale behind a right to water is the concept of human security and water equality.[212] In a world where many people do not currently have adequate access to water to meet their basic needs and to live a dignified life, efforts must be made to ensure water supply to every human being. Realising a human-rights-based approach would thus be the means for achieving such objective. It is against this background that human rights demands are framed.

The right to water, however, is a concept that is rather difficult to pin down. What does a human right to water exactly mean? Would it be sufficient to have access to a certain minimum amount of water to enjoy the said right? Attempting to define more clearly the right to water and its legal implications has been the subject of extensive

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[208] Committee on Economic, Social and Cultural Rights, 'General Comment 15, The right to water' (29th Session, 2003), UN Doc. E/C.12/2002/11, par. 2.

[209] Joyeeta Gupta, Aziza Akhmouch, William Cosgrove, Zachary Hurwitz, Josefina Maestu and Olcay Ünver, 'Policymakers' reflections on water governance issues' (2013) 18(1) Ecology and Society 35.

[210] Farhana Sultana and Alex Loftus, 'The Right to Water: Prospects and Possibilities' in Farhana Sultana and Alex Loftus (eds), *The right to water: Politics, governance and social struggles* (Routledge 2013) 1, 1.

[211] Feitelson (n 127) 53.

[212] Elena Lopez-Gunn, Lucia De Stefano, and M. Ramón Llamas, 'The role of ethics in water and food security: balancing utilitarian and intangible values' (2012) 14(S1) Water Policy 89, 91.

research.[213] A few references to those discussions could turn out to be useful in increasing understanding of the actual perception of water in the human rights discourse. To start with, it is common knowledge that the right to water indicates a relationship between the individual and a given amount of water.[214] Previous research has set the level of water provision necessary to meet *basic* human needs at 20 litres per capita per day.[215] This amount seemed too modest for some scholars, who pushed for increasing it at 50 litres per capita per day.[216] Besides having considerable social utility, this debate underlines the idea that the right to water is not about access to water itself, but rather about the actual satisfaction of human needs, in accordance with human dignity.[217] Water is, in other words, instrumental to fulfil certain specific purposes, such as drinking and sanitation. As a proof of this, one may think of the wording used by the abovementioned General Assembly's Resolution: the right to water 'is essential for the full enjoyment of life and all human rights'.[218] In this vein, water becomes a precious resource which shall be allocated in an equitable manner.

The human rights framework thus calls upon states to address two key features in water regulation: equality and non-discrimination.[219] Whilst there is an implicit acknowledgment of water scarcity, the human right to water discourse is principally concerned with distributing affordable and potable water to all human beings.[220] In practice, this means that individuals who are unable to pay under the full-cost recovery scheme should have adequate access to clean and safe water.[221] They can demand it from

[213]See e.g. Inga Winkler, *The human right to water: Significance, legal status and implications for water allocation* (Bloomsbury Publishing 2014).
[214] Jamie Linton, 'The Human Right to What? Water, Rights, Humans and the Relation of Things' in Sultana and Loftus (n 210) 45.
[215] World Health Organization, *Guidelines for Drinking-water Quality* (2017) 84.
[216] Gleick (n 49) 496.
[217] Chad Staddon, Thomas Appleby, and Evadne Grant, 'A right to water? Geographico-legal perspectives' in Sultana and Loftus (n 210) 62, 65.
[218] UNGA 64/292 (n 206).
[219] Benjamin Mason Meier, Georgia Lyn Kayser, Urooj Quezon Amjad, and Jamie Bartram, 'Implementing an evolving human right through water and sanitation policy' (2013) 15(1) Water Policy 116, 123.
[220] Malcolm Langford, 'The United Nations concept of water as a human right: a new paradigm for old problems?' (2005) 21(2) International Journal of Water Resources Development 273, 275.
[221] Oriol Mirosa and Leila M. Harris, 'Human right to water: Contemporary challenges and contours of a global debate' (2012) 44(3) Antipode 932.

legally accountable public authorities who are the duty holders under international law.[222] From all this, it is clear that the first priority of the human right to water discourse is clear-cut: universal access to water for all individuals, regardless of their ability to pay.[223] As evidence of this, General Comment No. 15, which provides a non-binding yet authoritative interpretation of the normative content of the right to water, stresses that one of the dimensions of water accessibility is economic accessibility.[224]

Framing the argument along these lines, however, has given rise to a certain more "political" articulation of the claims connected with the human right to water. Specifically, there has been a tendency from the water justice movement to coincide anti-privatisation claims with human rights demands.[225] That overlap is noticeable also in the literature, where Barlow describes the water justice movement as

> Environmentalists, human rights activists, indigenous and women's groups, small farmers, peasants and thousands of grassroots communities fighting for control of their local water sources. Members of this movement believe that water is the common heritage of all humans and other species, as well as a public trust that must not be appropriated for personal profit or denied to anyone because of inability to pay[226]

Thus, opponents of water privatisation are prone to appeal to a human right to water in order to substantiate their arguments.[227] According to their view, the human right to water can be a means of limiting – if not foreclosing – the application of economic principles, such as the full-cost recovery in water management. Although the regulatory experience showed that the recognition of a right to water does not preclude recourse to water

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[222] Sultana and Loftus (n 210) 5.

[223] Feitelson (n 16) 2; Mirosa and Harris (n 221) 936; Salman M.A. Salman, 'The human right to water and sanitation: is the obligation deliverable?' (2014) 39(7) Water International 969, 976.

[224] Committee on Economic, Social and Cultural Rights (n 208) par. 12(c)(ii).

[225] Mirosa and Harris (n 221) 937.

[226] Maude Barlow, *Blue covenant: The global water crisis and the coming battle for the right to water* (McClelland & Stewart 2009), 11-12.

[227] Jarmo J. Hukka and Tapio S. Katko, 'Refuting the paradigm of water services privatisation' (2003) 27(2) Natural Resources Forum 142; Gupta et al (n 209) 37.

pricing,[228] water governance discussions have crystallised around 'the dichotomy between economic efficiency and basic welfare or human rights'.[229]

In conclusion, the human right to water discourse, although multifaceted, shares some common general concerns. The priority is to provide every single individual with adequate access to water, this being an essential resource for life. This objective, also implemented in legal terms under the wording human right to water, mirrors a certain normative approach to water. Individuals perceive water as a sort of sacred resource, being attentive to its inner value in both society and nature.[230] The human right to water discourse does not overlook the scarcity of water completely. There is an implicit recognition of its finite nature. That recognition is instrumental to treat water as having a special significance, which everyone must be able access to. In other words, attention shifts to the fragility of an essential resource rather than its efficient use.

2.4. The environmental perspective

The environmental perspective on water resources is becoming an increasingly important part of the debate on water. In the past, individuals tended to perceive water as a resource to exploit for the development and well-being of societies. Policy debates overlooked the primary role that water occupies in biodiversity and ecosystem services.[231] It is only in recent times that the intimate connection between water and ecosystems has become the subject of serious discussion in water governance. Water, in fact, serves multiple functions, both in societies and in natural landscapes.[232] These functions, evident or hidden, are generally intertwined. The use of water to achieve human needs, such as socio-economic production, often entails tampering with the landscape. Drainage systems and

[228] Karen Bakker, *Privatizing water: governance failure and the world's urban water crisis* (Cornell UP 2010). From a more regulatory perspective, see the Report of the independent expert on the issue of human rights obligations related to access to safe drinking water and sanitation, A/HRC/15/31.
[229] Pradhan and Meinzen-Dick (n 160) 38.
[230] Sultana and Loftus (n 210) 5.
[231] Johan Rockström, Line Gordon, Carl Folke, Malin Falkenmark and Maria Engwall, 'Linkages among water vapor flows, food production, and terrestrial ecosystem services' (1999) 3(2) Conservation Ecology 5.
[232] See e.g. Malin Falkenmark and Carl Folke, 'The ethics of socio-ecohydrological catchment management: towards hydrosolidarity' (2002) 6(1) Hydrology and Earth System Sciences Discussions 1, 2.

water piping facilities may, for example, have concrete side-effects from an environmental perspective.[233] As a result, a responsible policymaker needs to devote greater attention to the environmental uses of water, not confining herself to its anthropogenic ones.[234]

Despite its dominant focus on nature, the environmental discourse may encompass various positions. The seminal book by Dryzek, for example, provides a classification of different viewpoints by distinguishing between the progressive and the radical and between the prosaic and the imaginative.[235] Each has its diversities in terms of language and theories. For example, the deep ecology philosophy of Naess certainly differs from environmental pragmatism.[236] However, it seems appropriate to leave the careful analysis of the heterogeneity of environmental discourses for the future. This study mainly concerns common environmental concepts associated with water. To this end, it makes sense to take water ethics as a point of reference, this being a philosophical position whose principles are shared by several environmental discourses.[237] Specifically, water ethics takes inspiration from environmental and land ethics[238] and aims at emphasising and safeguarding the position of water within the ecosystem.[239] Water ethics, however, does not embrace too radical a vision of the environment. Previous research argues that a fully-fledged bio-centric perspective gave way to a more intermediate, even anthropocentric one.[240]

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[233] The reference here is certainly not to the visual changes that human intervention may bring to the landscape as such (e.g. windmills equipped with water-lifting technology which are inherently embedded in the Dutch landscape). Instead, the reference is to the deterioration of ecological conditions.

[234] Pradhan and Meinzen-Dick (n 160) 38.

[235] See John S. Dryzek, *The politics of the earth: Environmental discourses* (OUP 2013).

[236] For deep ecology see e.g. Arne Naess, *Ecology, Community and Lifestyle* (CUP 1989) and for environmental pragmatism see e.g. Andrew Light and Eric Katz, *Environmental Pragmatism* (Routledge 1996).

[237] Adrian C. Armstrong, 'Further Ideas towards a Water Ethic' (2009) 2(1) Water Alternatives 138, 138. According to Schmidt and Peppard, there is not a single discourse on water ethic: the term consists of 'multiple normative frameworks'. See Jeremy J. Schmidt and Christiana Z. Peppard, 'Water ethics on a human-dominated planet: rationality, context and values in global governance' (2014) 1(6) Wiley Interdisciplinary Reviews: Water 533, 534.

[238] See e.g. Aldo Leopold, *A Sand County almanac, and sketches here and there* (OUP 1949).

[239] Adrian C. Armstrong, 'Ethical issues in water use and sustainability' (2006) 38(1) Area 9, 13.

[240] Grunwald (n 177) 18. Here, the anthropocentric perspective does not certainly coincide with the dominion of humans over nature.

Water ethic identifies socially responsible environmental stewardship as a means of preserving the environment. If, for example, over-abstraction and water pollution damage the environment by drying up rivers and deteriorating ecological conditions, then it must be the responsibility of society to avoid that undesirable situation. Individuals should therefore be the duty-holders in monitoring human environmental impacts, in terms of both water quality and quantity.[241] According to this view, water does not merely serve human activities. It also fulfils a role in ecosystem dynamics. Water ethics thus calls for the integration of the rights of 'nature' with various human needs. In other words, it aspires towards the replacement of the current ethical system in a bid to achieve ecologically sound water management that takes into consideration both the natural environment and human well-being.[242]

These considerations are also noticeable in the policy and regulatory arena, where they hinge on the concept of ecological water management.[243] Since the 1990s, environmental concerns started being integrated into water management approaches, which were traditionally focused only on anthropogenic uses. For example, one of the key environmental responsibilities has become the maintenance of a minimum environmental flow, which is to be interpreted as the natural water regime of any watershed in terms of quality, quantity and timing necessary to maintain the ecosystem.[244] As it will be shown in chapter V, this is also what happened in the Water Framework Directive,[245] where the aim of achieving good ecological status, together with other environmental considerations, was the overriding objective of EU regulation. Other regulatory expressions supporting an environmental view are the precautionary principle, which

[241] Jerome Delli Priscoli, James Dooge and M. Ramón Llamas, *Water and ethics: overview* (UNESCO 2004) 16.
[242] David Groenfeldt, 'The next nexus: Environmental ethics, water management and climate change' (2010) 3(3) Water Alternatives 575, 576.
[243] See e.g. IUCN, *Vision for water and nature: a world strategy for conservation and sustainable management of water resources in the 21st century* (2000). Available at <https://portals.iucn.org/library/sites/library/files/documents/2000-010.pdf> (accessed 27 April 2020).
[244] Angela H. Arthington, Stuart E. Bunn, N. LeRoy Poff and Robert J. Naiman, 'The challenge of providing environmental flow rules to sustain river ecosystems' (2006) 16(4) Ecological Applications 1311; Sandra Postel and Brian Richter, *Rivers for life: managing water for people and nature* (Island Press 2012).
[245] Directive 2000/60/EC (n 13).

aims at protecting the ecosystem by taking preventing action in the face of uncertainty,[246] and some claims for extending rights to water itself[247] as has recently occurred in certain parts of the world.[248]

In summary, the environmental perspective leads us to view water as a part of a bigger picture. Water is not any longer just a resource instrumental to human development and societal needs. Water is embedded into an ecosystem on which society depends. A utilitarian perspective falls short of an effective appreciation of the natural and environmental strands.[249] If water is to be managed effectively, it is not possible to overlook ecological status. The focus placed on water conservation and the prevention of water pollution shows that quality *and* quantity of water fluxes are essential elements to take into consideration. It follows that the attention towards conservation purpose is certainly more salient than the other perceptions analysed so far.

2.5. Water as a political tool

Water is a strategic natural resource for human civilisation. Societies rely on access to water resources for both human survival and economic development. In his well-known book *Oriental Despotism*, Wittfogel argued that the evolution of centralised administrations in Asia depended on the need to realise large-scale irrigation works.[250] Although the main claims of the book have been subject of criticism lately, the idea underlying his theory cannot be contested: water management helps shape the development of societies.[251] Other scholars corroborate this point. For example, Delli

[246] See e.g. David Kriebel, Joel Tickner, Paul Epstein, John Lemons, Richard Levins, Edward L. Loechler, Margaret Quinn, Ruthann Rudel, Ted Schettler and Michael Stoto, 'The precautionary principle in environmental science' (2001) 109(9) Environmental health perspectives 871.

[247] See e.g. Christopher D. Stone, 'Should Trees Have Standing – Toward Legal Rights for Natural Objects' (1972) 45 Southern California Law Review 450.

[248] For the Whanganui River in Aotearoa/New Zealand, see e.g. Liz Charpleix, 'The Whanganui River as Te Awa Tupua: Place-based law in a legally pluralistic society' (2018) 184(1) The Geographical Journal 19.

[249] Armstrong (n 237).

[250] Karl August Wittfogel, *Oriental despotism: A study of total power* (YUP 1957).

[251] Ellen Churchill Semple, *Influences of Geographic Environment, on the Basis of Ratzel's System of Anthropo-geography* (Holt 1911).

Priscoli claims that 'the Dutch water boards have operated since the Middle Ages and are widely acknowledged to have provided a model for modern Dutch democracy'.[252]

Interestingly, there is another relevant aspect arising from this reflection. Water often takes on a political dimension. But what does the term "political" mean in this regard? Despite being an elusive term, political tends to entail an adversarial relationship between individuals looking for power. However, it is not always necessary to embrace entirely Carl Schmitt's concept of the political.[253] The essence of politics can also encompass a (more) dialectical relationship: politics-as-war is only one of the modalities of the political.[254] This interpretation becomes particularly appropriate in water governance. The water governance system, which involves a balance of diverging and conflicting positions among relevant stakeholders and water users,[255] is usually the outcome of political dialogues between different parties and ideologies.[256] Thus, water can well be a political tool under more "peaceful conditions".

This latter statement should not give rise to misunderstandings either. By no means does this suggest that conflicts are absent in water governance. The intention is to show that water can sometimes be perceived as a political tool. Indeed, the finite nature of water often results in conflicts over control[257] of this resource. For example, tensions between upstream and downstream users relating to control and sharing of water resources have been commonplace throughout history. It is sufficient to mention that a database developed by the Pacific Institute tracked the conflicts related to water and it identified

[252] Delli Priscoli (n 162) 36.

[253] Schmitt purports that the political domain corresponds to an opposition between *Freund* and *Feind* (friend and enemy). The view of the author is, in other words, a conflictual one, as politics-as-war. See Carl Schmitt, *The concept of the political* (University of Chicago Press 2008).

[254] Giovanni Sartori, 'The essence of the political in Carl Schmitt' (1989) 1(1) Journal of Theoretical Politics 63.

[255] Emma S. Norman, Christina Cook and Alice Cohen, *Negotiating water governance: Why the politics of scale matter* (Ashgate Publishing 2015); Mark Zeitoun and J. A. Allan, 'Applying hegemony and power theory to transboundary water analysis' (2008) 10(S2) Water Policy.

[256] Molle et al (n 14) 3.

[257] The term 'control' indicates, using the words of Mollinga, 'any human intervention in the hydrological cycle that intentionally affects the time and/or spatial characteristics of water availability and/or its qualities'. See Peter P. Mollinga, 'Water, politics and development: Framing a political sociology of water resources management' (2008) 1(1) Water alternatives 7, 10.

more than 900 conflicts starting from 3.000 BC.[258] As Bakker puts it, water has always been in the midst of 'contested relationships of power and authority'.[259]

Besides, in some of these conflicts, water is not necessarily an end in itself. Control over water can be misused for other political purposes.[260] As a more critical perspective of hydropolitics[261] suggests, certain actors may take control over water to pursue other, more personal objectives. The concept of power therefore takes centre stage in these discussions.[262] Although a precise understanding of power remains controversial,[263] scholars in political science theory tend to distinguish three different dimensions.[264] These three dimensions have subsequently seeped into the water literature.[265]

The first, and most overt, dimension of power refers to the ability to force the other counterparties to perform certain actions. This kind of power may rely on superior military power, greater financial resources, as well as a better structural position. This latter option may for example refer to an upstream riparian or single user who unilaterally decides to divert the flow of water from the shared basin. Secondly, holding power can also mean having (at least partial) control of the applicable regulatory framework. The exercise of the second face of power aims, in other words, at setting the political and legal framework.

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[258] Pacific Institute, Water Conflict available at <https://www.worldwater.org/water-conflict/> (accessed 27 April 2020).

[259] Bakker (n 172) 616.

[260] Elena Lopez-Gunn, 'Agua Para Todos: A New Regionalist Hydraulic Paradigm in Spain' (2009) 2(3) Water Alternatives 370.

[261] Sneddon and Fox were one of the first scholars to advance the notion of critical hydropolitics. See Chris Sneddon and Coleen Fox, 'Rethinking transboundary waters: A critical hydropolitics of the Mekong basin' (2006) 25(2) Political geography 181.

[262] Mollinga (n 257); Michael Ekers and Alex Loftus, 'The power of water: developing dialogues between Foucault and Gramsci' (2008) 26(4) Environment and planning D: society and space 698.

[263] The theorisation of "power" started with the seminal work of Dahl, in which he defined power as the capacity of a party to move another party in an unintended direction. In this way, the concept of power resembles that of domination. However, this latter term may be misleading since it implies more an act of coercion and not authority. See Robert A. Dahl, 'The concept of power' (1957) 2(3) Behavioral Science 201. For an overview of the nature of 'power', see instead Felix Berenskoetter and Michael J. Williams, *Power in world politics* (Routledge 2007).

[264] Peter Bachrat and Morton S. Baratz, 'The two faces of power' (1962) 56(4) American Political Science Review 941; Steven Lukes, *Power: A Radical View* (2nd edn, Palgrave MacMillan 2004); Steven Lukes, 'Power and the Battle for Hearts and Minds' (2005) 33(3) Millennium 477.

[265] See e.g. Filippo Menga, 'Domestic and international dimensions of transboundary water politics' (2016) 9(3) Water Alternatives 704 and Insa Theesfeld, 'Perceived power resources in situations of collective action' (2011) 4(1) Water Alternatives 86.

This is something that seemed to have happened in Chile, where large farmers helped introduce the new regulatory framework and subsequently acquired most of the newly established groundwater rights.[266] Lastly, the third form of power lies with the actors who have an influence on the preferences and cognitions of other counterparties. According to Zeitoun, this act of "nudging" can be found in the management of the Jordan River, where Israel holds a control position over water resources while making a good image of itself.[267] At a more individual level, one may instead imagine that American farmers benefitting from the prior appropriation system will very likely shape other individuals' wants. In other words, by enjoying a priority of diversion, the "senior" individuals will limit alternative water uses for the subsequent users, thus indirectly influencing the preferences of the latter.

All these dimensions of power show the existence of different ways to achieve control over water resources, with a view to some other objective.[268] The hegemonic individual can exert these forms of power in isolation or simultaneously. Furthermore, the asymmetry of power between the actors involved may result in conflicts of various intensities.[269] For example, the so-called "water wars" are the clearest and most direct expression of a water conflict. However, a common purpose in all these different types of conflicts can be identified: hegemonic individuals (and societies) seek to maximise their own objectives through resource capture strategy. Water is perceived as a precious resource on which humans and economic activities depend. In this way, water – and especially its scarcity – becomes a powerful means of achieving non-water related goals.[270] In other words, water can become an inherently political tool at multiple levels:

[266] Jessica Budds, 'Power, nature and neoliberalism: the political ecology of water in Chile' (2004) 25(3) Singapore Journal of Tropical Geography 322, 333.
[267] Mark Zeitoun, *Power and Water: The Hidden Politics of the Palestinian-Israeli Conflict* (I.B. Tauris 2008).
[268] Mark Zeitoun and Jeroen Warner, 'Hydro-hegemony-a framework for analysis of trans-boundary water conflicts' (2006) 8(5) Water Policy 435.
[269] Shim Yoffe, Aaron T. Wolf and Mark Giordano, 'Conflict and cooperation over international freshwater resources: Indicators of basins at risk' (2003) 39(5) Journal of the American Water Resources Association 1109.
[270] Zeitoun and Allan (n 255) 443.

as the previous examples attested, this perception of water can exist across international boundaries, within single countries and among individuals.

To sum up, the management of water resources is not exclusively in the remit of benevolent individuals. A critical view of hydropolitics shows that hegemonic actors can also deploy a water capture strategy to achieve their own, non-water related objectives. The perception of water as a political tool hinges on a serious water deficit. Since civilisations and human lives depend on access to water in terms of both quantity and quality,[271] control over water resources may be instrumental to gain power.[272] Within this context, individuals are fully aware of the importance of constant and safe access to water. Water is a strategic natural resource. However, the actors having direct control over water might use this knowledge to deliver opposite results: restricting access to water and exacerbating problems of environmental protection can serve other, more personal objectives.

2.6. The economic view

Water is a scarce resource. The amount of water at human disposal is insufficient to satisfy all its competing uses. Scarcity, then, makes water an economic good. International declarations reflect this position. For example, the Dublin Statement in its Principle No. 4 states that:

> Water has an economic value in all its competing uses and should be recognised as an economic good. Within this principle, it is vital to recognise first the basic right of all human beings to have access to clean water and sanitation at an affordable price. Past failure to recognize the economic value of water has led to wasteful and environmentally damaging uses of the resource. Managing water

[271] Bakker (n 172) 617.

[272] Erik Swyngedouw, 'Dispossessing H2O: the contested terrain of water privatization' (2005) 16(1) Capitalism Nature Socialism 81; Timothy Forsyth, *Critical Political Ecology – the Politics of Environmental Science* (Routledge 2003).

> as an economic good is an important way of achieving efficient and equitable use, and of encouraging conservation and protection of water resources.[273]

Viewing water as an economic good thus calls for greater attention on efficient water allocation, with a clear benefit in terms of conservation. The rationale behind this perception is that overlooking the economic dimension will lead to progressive depletion. Though incontrovertible, research shows that this statement has triggered some individuals to take an extra step and perceive water not only as an economic good, but also as a commodity.[274] In other words, among those who view water as an economic good, there exists a sizable group of individuals who see water as a private good.

This latter approach has already been extensively discussed in the previous chapter, which raised some significant concerns over the effectiveness of its legal and economic prescriptions. However, the aim of this section is to systematise the various perceptions of water and therefore these include viewing water as an economic good. Therefore, it is imperative to make a few significant references before moving to the following section.

The abovementioned Principle No. 4 of the Dublin Statement shows that viewing water as an economic good does not always translate into the advancement of property rights. Yet, its more radical perspective does advocate the creation of property rights over this resource. According to this viewpoint, water resembles any other object that is bought and sold in the market. Market mechanisms will ensure that water is allocated to the best uses and its price will reflect its true cost.[275] In this vein, one may argue that privatisation is the most efficient way of allocating water and that it will prevent the depletion of water resources.

In brief, the economic view of water has nuances. Its most radical perspective is perceiving water as a private good. Certain manifestations of water itself facilitate this perception. For example, the market of bottled water or the use of water in industrial

[273] The Dublin Statement on Water and Sustainable Development, 1992. Development Issues for the 21st Century, International Conference on Water and the Environment, Dublin. 26–31 January.
[274] Cullet (n 55) 339-342.
[275] Winpenny (n 47) and Lee (n 47).

processes might lead individuals to perceive water as a commodity. This perception stresses that water is like any ordinary good whose price shall be determined by the market. In this vein, the allocation of water to the best uses through competitive markets will also guarantee that sufficient water resources will be preserved for the future demands.[276]

3. Complexity to regulate

3.1. A preliminary clarification: from individual to societal perceptions

The previous section discussed the multiple perceptions of water. Individuals view water differently, focusing on certain aspects rather than others. For example, environmentalists hold resource conservation in high regard, but the opposite is true for those who view water as a political tool. These various perceptions are therefore bound to specific conceptualisations of water. Building on this knowledge, this section intends to take a further step forward and show how these very same perceptions may affect water regulation.

The discussion of the various perceptions of water has so far been carried out at both individual and societal level. Hereinafter, instead, they will mostly be referred to as belonging to society. This choice is due to the fact that water regulation is (usually) the result of the will of the majority of the electors. It is the society and not the single individual who decides what water regulation to adopt.

In societies, as in single individuals, there may be concurrent perceptions. All these perceptions do play a role, as will soon be shown, but a *prevalent*[277] perception has to emerge. An example of water perceptions at the inter-state level can be illustrated by perceptions of water in the EU, where different states tend to have different perceptions of water. It is commonly thought that Southern European countries tend to perceive water as a scarce resource and as an essential input for their own industrial and farming activities while Northern European countries are more likely to view water as an environmental

[276] Lee (n 47).

[277] With the term prevalent, this study means that the perception of water in a given individual or country results to be predominant among others, regardless of the reasons why this occurred.

good to be protected.[278] Despite this differentiation, the environmental perspective ultimately prevailed: ecological conservation is the main focus of the Water Framework Directive.[279] Chapter V will delve more deeply into the regulatory and non-regulatory reasons for that. For now, it is enough to observe that the coexistence of multiple perceptions among states did not impede the emerge of a prevalent view.

It is now possible to inquire why the coexistence of different perceptions make water regulation a complex, context-dependent endeavour. As the following pages will show, every single perception yields specific policy preferences that are difficult to reconcile. To facilitate the explanation and only for illustrative purposes, this chapter makes use of a graph where all the described perceptions and their resulting policy preferences will be positioned. Thus, it is to the building of this graph that the next subsection turns.

3.2. Building a graph

According to a well-established economic principle, any economic system has limited resources. We do live in times of scarcity and the water world is no exception. Countries cannot have an unlimited amount of high-quality water because they are constrained by their existing resources and technology. Water management is thus subject to economic rules. too: societies have to make choices when it comes to regulating water. The finite nature of water, together with the presence of *competing* objectives, entails trade-offs.

Although numerous conflicting objectives may exist, the current debates, and in particular the discussion on integrated water resource management, have tended to narrow on three main and coequal goals. These are equity outcomes, conservation outcomes, and efficiency outcomes.[280] In terms of definitions, equity refers to the availability of water for all individuals on Earth. If equity is maximised, all individuals would have the same, equal access to water of the same quality. Conversely, if inequity is maximised, society would end up with a single individual in possession of water. The equity goal is self-

[278] Ben Page and Maria Kaika, 'The EU Water Framework Directive: Part 2. Policy innovation and the shifting choreography of governance' (2003) 13(6) European Environment 328, 333-334.
[279] See (n 13).
[280] François Molle, 'Nirvana concepts, narratives and policy models: Insights from the water sector' (2008) 1(1) Water Alternatives 131, 132.

evidently salient to the analysis of the water regulatory system. Suppose that the regulator somehow increases the volume of water that is available for human use and consumption worldwide. In an inequitable distribution, this would produce no appreciable improvement in living standards. The gains would only accrue to a handful of individuals, with most remaining deprived.

Conservation denotes reducing the use of water. For conservation to be maximised, humanity would have to stop using water altogether in the present. In this way, the entire stock of water would be conserved for the future. Conversely, in a world without conservation, the entire supply of water would be used immediately, leaving none for the future. As with equity, it is hard to understate the salience of conservation for the water regulatory system. Human beings need water for their biological survival. The depletion of the entire stock of water would doubtless herald the demise of humanity, and indeed most organic lifeforms.

Efficiency is somewhat more complex. It is possible to argue that there are two interpretations of efficiency: the technical and the allocative.[281] Technical efficiency can be interpreted as the reduction of water wastage. Allocative efficiency denotes, put simply, maximising the value of the uses of water. In this latter case, water is used efficiently if it is allocated so that nobody can be made better off without making somebody else worse off. That particular criterion, however, might be too strict. For instance, a distribution in which one individual holds all water could potentially be efficient, provided that the person in question would be made worse off if some of their water is expropriated. The contention that a distribution such as this one is socially desirable would be difficult to sustain. Alternatively, it is possible to posit that the water regulatory framework becomes more efficient if, upon redistribution, those who are better off can compensate those who are worse off. In simpler terms, a change in the water regulatory system is efficient if its aggregate benefits exceed its aggregate costs.

[281] Maria Cecilia Roa-García, 'Equity, efficiency and sustainability in water allocation in the Andes: Trade-offs in a full world' (2014) 7(2) Water Alternatives 298, 300.

The graph this chapter builds is limited to the first two criteria: equity and conservation.[282] Efficiency is not taken as a criterion, neither the technical nor the allocative one. The former can be realised under any water management, irrespective of whether it pursues equity or conservation. Technical efficiency is, in other words, already assumed in the graph. Allocative efficiency is excluded for three main reasons. Firstly, it is not at all apparent that allocative efficiency is as important a desideratum as conservation or equity. As pointed out earlier, a distribution of water that entails its concentration in the hands of one individual may be perfectly efficient. A distribution of water that ensures the biological survival of future generations may well be inefficient, given that the unborn are generally not included in efficiency calculations and that they cannot compensate those who are worse off. Secondly, conservation partially overlaps with efficiency. It appears inevitable that an efficient allocation of water would involve a degree of conservation: those who waste water cannot be said to be using it efficiently in either of the senses of the term. Accordingly, the adoption of efficiency as a separate criterion would likely cause the analysis to overweigh conservation to the detriment of other desiderata. Finally, if the trade-off is between equity and conservation, then the only behaviour that the model will not capture is the practice of maximising waste and inequity at the same time.[283] It is very hard to see how this may even be desirable.

For these reasons, the model is limited to equity and conservation. Both objectives have been central to water regulations around the globe. On the one hand, the main driving factor of the South African 1998 National Water Act[284] was to ensure equal access to water.[285] On the other hand, the EU Water Framework Directive aimed to re-establish ecological integrity through its Article 1: '[t]he purpose of this Directive is to establish a

[282] The construction of a tri-dimensional graph is not very helpful for illustrative purposes.

[283] This last conclusion may seem harder to grasp than it actually is. The graph captures a trade-off between conservation and equity, so the result can 'move' along the axes in two ways: either it is possible to conserve more but less equitably, or it is possible to get more equitable allocation but with major waste. What you cannot do is waste more and become more inequitable.

[284] Government of South Africa, *National Water Act. 36* (Department of Water Affairs and Forestry 1998).

[285] Synne Movik, 'Allocation discourses: South African water rights reform' (2011) 13(2) Water Policy 161, 165.

framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater'.

Although water regulations often bring about both, the equity outcome and the conservation outcome work against each other in a world of scarcity. Water can be consumed to address the demands of each individual or it can be left *in situ* for conservation purposes. Between these two alternatives, there is a trade-off. However, the specific "quantity" of equity and conservation will depend on the choice of the society concerned. At one extreme, a society can decide to divert virtually all its resources to augment water consumption for all individuals. Following this decision, an increase in equity would involve an opportunity cost of no conservation. Alternatively, it is possible to attain only conservation with a lower (or better, no) consumption of water.

These two examples are just some of the various possibilities on how a society could pursue these two objectives. Table 2 exemplifies some of the possibilities in this regard.[286] Possibility A represents the case where a society decides to divert all the resources to increase the consumption of water as much as possible. Possibility F indicates that a society chooses to allocate resources to preserve water resources at the highest possible level. The intermediate possibilities (B, C, D and E) are more balanced and it is possible to observe that a progressive reduction in water consumption may correspond to a progressive increase in water conservation. In other words, by diverting resources from one objective (e.g. equity) to another (e.g. conservation outcome), a society can decide to move from (e.g.) B to E as a final position.

[286] Since the development of the graph is merely for illustrative purposes, this chapter – mistakenly perhaps – assumes that there is the need to assign correct relative weights to conservation and equity outcomes.

Possibilities	Conservation outcome	Equity outcome
A	0	15
B	1	14
C	2	12
D	3	9
E	4	5
F	5	0

Table 2 - An example of possible conservation and equity outcomes

All these possibilities can also be shown graphically. Figure 3 illustrates the interrelationship between the equity outcome and the conservation outcome. The vertical axis represents the equity outcome. The horizontal axis indicates the conservation outcome. Connecting all the alternative possibilities in the diagram would allow identifying the production-possibility frontier[287] in this abstract model. All these points represent an efficient position: the objectives of equity and conservation are pursued at their maximum, given the available resources and technology. The resulting slope would then depict optimal trade-offs: the choice between all these points becomes a matter of preferences and priorities. It is up to the society to decide how to balance the equity outcome and the conservation outcome, that is whether to choose between points A through F.

[287] The production-possibility frontier refers to the set of maximum levels of production achievable by an economic system whereby the existing resources and technological knowledge are stable.

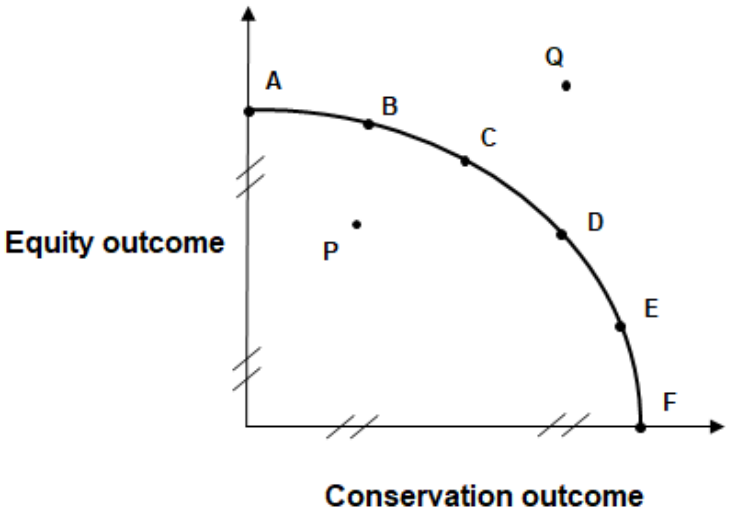

Figure 3 - Production of possibilities frontier[288]

The production-possibility frontier also shows that points located within the slope (e.g. point P) are not efficient solutions. In other words, the choice of point P would imply that a society has not adopted an efficient management. Conversely, the points outside of the slope (e.g. point Q) are those that are, as things stand, unattainable. This impossibility has nonetheless a temporary character: an increase in resources and technological knowledge could result in a movement of the curve. For example, the development of new water supply systems, both in terms of intermediate technology or advanced, could enhance the capability in the pursuit of both equity and conservation outcomes. How large the shift of the production of possibilities frontier will be is dependent on increases in technology – such as the possibility to build a desalination plant – or resources.

[288] The curvature of the production possibilities frontier has been drawn with an outward-bending shape because it might be reasonable to assume that the opportunity cost between equity and conservation outcomes is increasing.

3.3. The positioning of the perceptions

The graph having been put in place, the time is ripe to position the various perceptions on it. While doing so, it is essential to assume that each of the perceptions previously discussed yields specific policy preferences. More concretely, holding a certain perception of water would lead the regulator to pursue certain objectives distinct from the ones arising from another perception. This assumption seems to be supported by the current literature.[289] For example, Chuvieco argues that a spiritual perception possesses a 'bounding force' in shaping the approach towards a conservation outcome.[290] Reisner showed that holding different perceptions of water may lead to two different results in terms of water management.[291] Namely, both the city of Phoenix and Tucson attempted to promote water conservation but only the citizens of the latter city, who were more used to viewing water as a scarce resource in the ecosystem, managed to decrease significantly their use of municipal water.[292] In line with these considerations, Delli Priscoli claims that the water policy measures adopted are at the crossroads of values and beliefs.[293]

From a graphical perspective, instead, clusters of elongated shape best represent these various perceptions. The reason is twofold. Firstly, each perception has various nuances as previously discussed. For instance, the human right to water discourse includes the water justice movement that has a more distinct stance on privatisation trends and, accordingly, slightly different policy preferences. Secondly, policy preferences may also depend on additional infrastructural elements: each perception may have nuances connected with exogenous factors that it is not possible to know in great detail at the moment. For example, previous research shows that the operationalisation of environmental protection does not entirely depend on citizens' values, but also on other factors, such as existing political structures.[294] It follows that it is impossible to position

[289] See e.g. Pradhan and Meinzen-Dick (n 160) 38; Feitelson (n 127) 53; Dante A. Caponera, *Principles of Water Law and Administration* (Balkema 1992) 11.
[290] Chuvieco (n 175) 10.
[291] Marc Reisner, *Cadillac desert: The American West and its disappearing water* (Penguin 1993).
[292] Ibid.
[293] Delli Priscoli (n 162).
[294] William E. Kilbourne and Suzanne C. Beckmann, 'Review and critical assessment of research on marketing and the environment' (1998) 14(6) Journal of Marketing Management 513.

the perceptions as individual points in the graph.[295] Each cluster (say, perception) may thus encompass an efficient policy preference as well as an inefficient one depending on the specific context.

Building on the descriptions provided in the previous section, it is now possible to rank the various perceptions along both axes. The analysed perceptions relate to these objectives differently. For example, the human right to water discourse seems to be the most concerned with universal access to water. From this perspective, the main target for water policy coincides with the actual implementation of equity and non-discrimination, regardless of ability to pay.[296] This does not necessarily mean that this discourse overlooks ecological well-being. However, the final result is that the human right to water discourse tends to favour a equity outcome over a conservation one. When competition for water usage rises due to diminishing water resources, trade-offs between outcomes are unavoidable.[297] The human right to water discourse prefers a equity outcome.

A similar approach on water policy arises from a spiritual perception. From a spiritual standpoint, water possesses an intrinsic value: the respect towards water derives not only from its instrumental role to human life, but also from being a part of God's creation.[298] It follows that the spiritual perception recognises water as both a basic human need and a symbol representing the creation of the universe.[299] Monotheistic faiths advocate universal provision of water while stressing the responsible environmental stewardship of this resource. In view of this, it seems appropriate to position the spiritual perception to the right of the cluster of the human right to water discourse, as shown in Figure 3. Yet, as can be seen from the visual representation, these two clusters tend to partially overlap: the specific context will always determine the correct positioning of both.

The third perception to position in the graph is the environmental perspective. The concept of ecological water management is central to this approach. This focus readjusts

[295] To identify more accurately these clusters, quantitative research in this regard is needed.
[296] Feitelson (n 16) 150; Mirosa and Harris (n 221) 936; Salman (n 223).
[297] Russo and Smith (n 165) 74.
[298] Richard A. Hughes, 'Pro-justice ethics, water scarcity, human rights' (2009) 25(2) Journal of Law and Religion 521, 536-540; Russo and Smith (n 165) 54.
[299] Pradhan and Meinzen-Dick (n 160) 48-49.

the balance in favour of the conservation outcome. Unlike the other perceptions analysed so far, the environmental perspective endorses a commitment to future generations as a part of the desired conservation goal.[300] For all these reasons, the position of this perception is next to the spiritual cluster: it leans towards the safeguard of water within the ecosystem rather than boosting its anthropogenic uses.

Another cluster to position is the is the economic view. This cluster should be positioned closer to the environmental perspective. An economic view of water, and especially its more radical perspective, tends to favour the efficient allocation of this resource. The consequence of that approach is that the conservation objective prevails over the equity one: waters will have to go in the hands of the best users, regardless of any equity consideration. However, it is still possible to imagine that in a specific context the environmental view would be more concerned with the conservation outcome compared to the economic view.

The last perception is that of water as a political tool. Within this context, water is a strategic natural resource whose control serves various non-water related interests. In order to exploit fully a water capture strategy and reap all the resultant benefits, the scarcity of water resources must be inflated as much as possible. Increasing scarcity would lead to a failure to realise the set objectives of equity and conservation but it would, ultimately, cause some agent to gain more bargaining power vis-à-vis other parties. The resulting policy approach is therefore the maintenance of a status where neither the equity nor the conservation outcome is pursued. The lower the equity, the higher the control over other individuals. In more economic terms, the position of this cluster will be in the lower left-hand quadrant of the graph because the position of this cluster is intentionally inefficient. This positioning also instructs us that such an approach is of a different nature than the other perspectives. While the policy preferences stemming from all the other different perceptions reflect a prevailing perception that will anyway benefit the whole society, this last preference will tend to create breaks into society benefitting only the predominant group.

[300] Russo and Smith (n 165) 6.

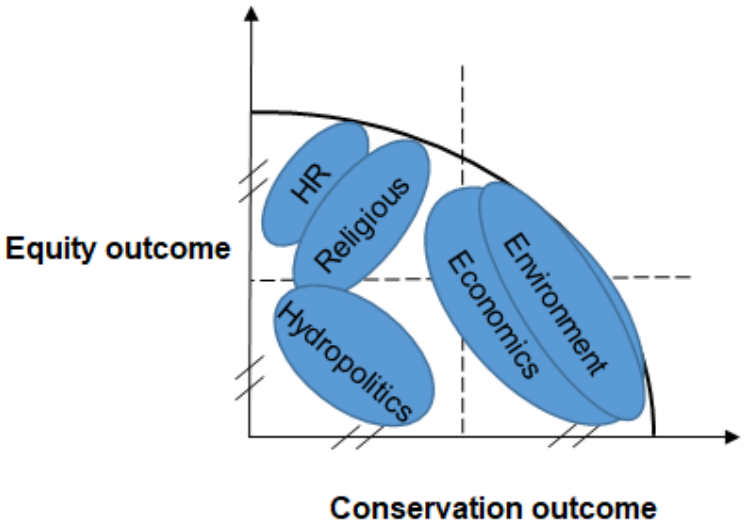

Figure 4 - Positions of perceptions in the trade-off between equity outcome and conservation outcomes

Figure 4 represents a heuristic – a heterogeneous picture of the diverse approaches to water management. The five clusters presented above display the variation of priorities in each single perception. They show that the existence of multiple perceptions may lead to different policy preferences that are difficult to reconcile.[301] When the regulator has a specific perception of water, its regulatory treatment would favour certain policy objectives distinct from those stemming from the other perceptions. Specifically, viewing water as, say, a religious good may yield a different policy approach than perceiving it as an economic good. The existence of different perceptions therefore results in greater difficulties for regulators to select policy objectives.

Furthermore, the positioning of these clusters in the graph help illustrate the potential interlinkages between these perceptions. A striking example occurs with the spiritual and human right to water discourse clusters. Both perceptions approach the policy issue of equity in a very similar manner: water is (also) a basic human need to which all individuals

[301] Woodhouse and Muller (n 27) 226.

shall have access to.[302] Another possible overlap can be realised between the environmental perspective and the economic view. This overlap may refer to the philosophy of market environmentalism, which asserts that 'environmental goods will be more efficiently allocated if treated as economic goods – thereby simultaneously addressing concerns over environmental degradation and inefficient use of resources'.[303]

In addition to these rather clear instances, it is also possible to have an overlap between two perceptions that seem at first glance very distant from each other. This can be the case of the spiritual perception and water as a political tool. It is indeed reasonable to think that the view of water as a religious symbol cannot sit comfortably with water as an instrument of oppression. Yet, some religious precepts allow the use of water as a weapon, under the condition that once the enemies have surrendered, they could regain access to water.[304]

The existence of these linkages has a twofold importance. Firstly, it shows that societies (and individuals) who hold different perceptions may share a certain policy preference. The validity of a given perception may sometimes extend beyond its own "community". For example, perceiving water as a religious good may yield the same regulatory consequences as viewing water from the eyes of the human right to water discourse. Secondly, linkages may sway individuals towards the identification of a shared policy option in the drafting of water regulation. Provided that setting water objectives is more complex and dependent upon exogenous factors, water regulation should forestall, as much as possible, conflicts among different views.[305] Since it does not seem feasible to embrace all the various perceptions in a single position, the linkages between the various perceptions offer a more general base for the selection of a policy approach.[306]

Water regulation will then vary across space, since there is not a single *shared* set of legal and economic arrangements to manage water.[307] The single contexts where the

[302] Pradhan and Meinzen-Dick (n 160) 49. See further *supra*. Besides, a full alignment of the two perceptions will depend on the context-specific circumstances.
[303] Bakker (n 60) 432.
[304] Naff and Dellapenna (n 202) 478.
[305] Grunwald (n 177) 15.
[306] Gupta et al (n 209) 36.
[307] Barnes and Alatout (n 166) 484.

perceptions arise will determine – together with other exogenous factors – the chosen regulatory treatment for water resources. Furthermore, Figure 4 shows that all the policy choices that are located in an inefficient position could be improved, and graphically brought them together on the production-possibilities curve. However, the final decision on what type of efficient policy a society will choose will be a matter of preferences and context. In other words, all the perceptions can in principle yield *efficient* water management, so the choice depends on context, co-determined by other exogenous factors.

Before concluding, a last observation should be made. The current discussion takes into consideration only the policy preferences that arise from sociocultural complexities. Nevertheless, as discussed in the previous chapter, water also possesses physical complexities. The latter, once integrated in the discussion, may further complicate the distribution of policy preferences. For example, the Islamic faith (belonging to the spiritual perception) yields different policy preferences depending on the specific type of water concerned. Muslim jurists tended to differentiate water according to the source: the main distinction is whether God or man provides water.[308] The former corresponds to natural fresh water, while the latter refers to desalinated water and the like. This distinction of types of water entails some regulatory consequences from a spiritual perception: while the sale of natural fresh is subject to certain limitations, water provided by man is not constrained in this way.[309]

4. Conclusion

The concept of cognitive complexity could be helpful in explaining what this chapter aimed to accomplish. Cognitive complexity is a psychological characteristic that indicates the ability of a person to perceive things.[310] A person who measures highly on cognitive complexity tends to distinguish various constituent elements and to observe the various

[308] Shaukat Farooq and Zafar I. Ansari, 'Philosophy of water reuse in Islamic perspective' (1981) 39 Desalination 273.
[309] Wolf (n 173) 82.
[310] Bieri was the first to propose this concept. See James Bieri, 'Cognitive complexity-simplicity and predictive behavior' (1955) 51(2) The Journal of Abnormal and Social Psychology 263.

relationships among these elements. She can discern nuances and subtle differences. Therefore, this chapter performed a cognitively complex exercise. It distinguished the various elements of water. Water is not only H_20, but it can well be a basic need, an environmental good or a marketable commodity. All these perceptions have been analysed and their resulting policy preferences investigated. This also allowed us to observe the existing relationships among perceptions and, most importantly, their relationship with water regulation.

All this led to two main findings. The first one relates to the great deal of variance in water perceptions, providing insights into how individuals understand water. Water is a complex resource, possessing a fragmented conceptualisation arising from a socio-ethical debate. Water seems to be more than a single element. It is a 'total social fact'[311], connecting various domains and resulting in multiple perceptions. As the following chapter will show, this finding is not a new discovery but rather a re-discovery: the conceptualisation of water, and accordingly its regulation, has changed over time.

The second main finding of this chapter is that the coexistence of multiple perceptions make water a complex resource to regulate. The variety of water perceptions calls for a set of differing policy preferences. Each perception has its own policy preferences. There is not a single set of preferred legal and economic arrangements. There are many. Yet, these "normative realms" are not isolated, but they partially engage with each other. This leads to the question of whether it is possible to reconcile all these different perceptions. The tentative answer offered by this chapter is negative. Policy preferences seem irreconcilable and the final choice depends on context-specific perceptions, co-determined by other exogenous factors. This finding will become particularly relevant in chapter VI, which inquires whether an integrated regulation of water at the EU level should be devised. For the moment, it is possible to conclude by arguing that sociocultural complexities complement physical ones in the management of water. Water is a complex resource, and so is its management.

[311] Mauss (n 168) 3.

CHAPTER IV

FLOWING WATERS IN HISTORY

1. Introduction

We usually conceptualise water as a single resource.[312] The homogeneity of water, as an idea, is ingrained deeply into modern society. Individuals primarily represent water as abstract and universal: its essence is the same everywhere. Our lexicon corroborates this process of abstraction. In common parlance, the definition we employ to describe water does not in fact change if we refer to the water found in an oasis in the Spanish Tabernas desert or in the Greek Pierian spring. In both cases, it is water, viz. H_20.

However, the previous chapter shows this is not the case with regard to the spatial factor. Multiple perceptions may exist within the conceptualisation of water. As a complement to that, the current chapter shows that the conceptualisation of water also changes over time. Indeed, the conceptualisation of water as a monolithic compound, one that is invariable in space and time, mostly refers to the modern era.

The understanding of water has changed over the centuries. Its modern understanding seems to be the outcome of a process of abstraction supported by certain developments that occurred as recently as the 18th and 19th century.[313] Pre-modern societies had not yet arrived at a uniform, broad concept of water. Rather, they dealt with water in the specific situation(s) they found it. Furthermore, it seems that the understanding of water is now coming full circle. While the modern conceptualisation of water corresponds to a single uniform substance, there are signs of a return to the old, pre-modern, fragmented conception. In other words, we are once again beginning to speak of waters, in the plural.

[312] This chapter refers to the modern conception of water that originated in Western Europe and North America and then expanded across the globe.
[313] Linton (n 161).

Researchers of political geography and environmental studies have extensively discussed this shift in the conceptualisation of water.[314] However, this subject should command greater attention from other disciplines too, including the legal field. It is in fact reasonable to assume that the evolution of the understanding of water would not limit to the conceptual level, but it could reverberate on water regulation. After all, law does not develop in a vacuum, but in response to social and historical events.[315] This chapter therefore aims to fill this gap by showing that water regulation is dependent on contextual factors that change not only across space but also over time. In other words, law can reflect different perceptions of water.

The observations resulting from this analysis will be important: while the regulatory framework in ancient Rome tended to accommodate a view of water as a heterogenous entity, the existing legal systems seem to favour a more uniform understanding of water. From a more general point of view, water regulation is tailored to historical contexts.[316] In this way, this chapter is a complement to the previous ones. The regulation of water resources depends on distinctive physical features, as well as both spatial *and* historical factors.

The remainder of this chapter is structured as follows. Section 2 describes the pre-modern understanding of water in the Graeco-Roman world. It shows what a fragmented view of water in the past means and the consequences it entails. Section 3 expands on the thematic analysis by analysing the legal provisions concerning water in Roman law. In other words, it describes how Roman law tackled the mutability of water by focusing on its context-dependent factors. Subsequently, Section 4 illustrates the events which led to the adoption of a more unitary understanding of water as identified in the literature and describes how the legal systems of civil law countries have accommodated this shift. Section 5 argues that current trends in the scholarship and policymaking are a push for a return to a fragmented conceptualisation. Section 6 concludes the chapter.

[314] Christopher Hamlin, 'Waters' or 'Water'? – Master narratives in water history and their implications for contemporary water policy' (2000) 2(4-5) Water Policy 313; Linton (n 161).
[315] Lynn Mather, 'Law and society' in Robert E. Godin, *The Oxford Handbook of Political Science* (OUP 2011) 290, 290.
[316] Euzen and Morehouse (n 11) 238.

2. The pre-modern understanding of water in the Graeco-Roman world

The understanding of water has not remained constant over the past centuries. As sketched out in the introduction, a modern understanding of water replaced the pre-modern view only between the 18th and 19th century. At this point, one may ask whether the conceptualisation of water which emerged in that period was so different. This section purports to show that this is the case: water was never understood as a single and universal identity in pre-modernity. Rather, public discourse emphasised the various context-dependent features of water, thus favouring a more fragmented conceptualisation.

The relationship between water and humanity has always been multifaceted. Although humans have striven to get to know all the properties of water, the multiplicity of meanings attached to water and its key role in human civilisation made this substance difficult to understand.[317] At the outset, individuals related to water in a direct and unscientific way. They came into contact with water in its various concrete manifestations. This way of approaching water led society to develop a non-unitary understanding of water. Water was mutable. Its actual appearance depended on specific circumstances, such as its origin and composition.[318] For instance, individuals regarded water from a specific natural spring as different to the water of a river.[319] Water was not a single monolithic chemical compound, but a substance vested with varying qualities.

An empiricist approach was apparent in the pre-modern understanding of water. Hippocrates, who is widely regarded as the father of medicine, provides a clear example. He believed that persons suffer specific diseases, depending on the environment in which they live. Specifically, he identified different diseases stemming from the intake of various waters: for instance, drinking swampy water would result in an enlarged spleen and dullness to percussion.[320] Analogously, Hippocrates claimed that drinking the 'right'

[317] Johann Tempelhoff et al, 'Where has the water come from?' (2009) 1 Water History 1.

[318] R.G. Tanner, 'Philosophical and cultural concepts underlying water supply in antiquity' (1987) in Water for the Future: Hydrology in Perspective (IAHS Publication No. 164 1987).

[319] This approach may not have been completely disappeared given the modern tendency to prefer (specific brands of) bottled mineral water over tap water.

[320] Francis Adams, *The genuine works of Hippocrates* (W. Wood 1886). Chapter VII of provides a detailed classification of waters, including the example in the main body of the text. In addition to this classification,

kind of water could improve the health of diseased persons: each kind of water possessed different organoleptic properties and hygiene qualities. Water was therefore not a homogenous substance. Multiple kinds of water had separate and distinct functions.

The work carried out by Hippocrates was important. His work not only distinguished medicine from religion and theurgy. It also discriminated between different types of water. That tendency was shared by different ancient authors such as Vitruvius and Pliny the Elder.[321] Water was perceived not as a single entity, but as a more complex resource that has various ramifications. The conceptualisation of water included a wide range of substances, each possessing different, context-dependent features. For this reason, individuals often made use of the plural form to refer to water resources – one need only think of the title of the work attributed to Hippocrates himself, 'Airs, *Waters*, and Places' [emphasis added]. The term "waters" seemed more suitable for capturing all water manifestations. There is – so the argument runs – not just one water but many, each one with different characteristics.

Alternatively, it was also possible to use the term "water" in the singular. In this instance, however, the definition was loose enough to embrace a wide range of substances. For example, ancient Greek natural philosophy identifies coldness and wetness as the main properties of water.[322] Under this theory, all substances possessing the qualities of coldness and wetness are water. Yet, closer inspection reveals that a vast array of substances which come into contact with water will tend to acquire those properties. For instance, if mud encounters water, it becomes cold and wet, that is, it turns into muddy water. What it is currently conceived as an accidental substance in water (i.e. mud) was,

Chapters II and III further advance the idea of the existence of multiple waters. They explain how the type of water is also dependent upon climate and the geographical situation of cities.

[321] Morris Hicky Morgan, *Vitruvius. The ten books on architecture* (Harvard University Press 1914) 244-50; J. Bostock, *The Natural History. Pliny the Elder, with Copious Notes and Illustrations* (Henry G. Bohn 1855) 471-3; Harry M. Hine, *Studies in the text of Seneca's "Naturales quaestiones"* (Teubner 1996) 80-1.

[322] Ancient Greek natural philosophy considered water as one of the four basic elements. Likewise, Thales of Miletus proposed the primary substance theory. He considered water the originator (αρχή) and vital element (στοιχεϊον) for all human beings. See Jonathan Barnes, *The Complete works of Aristotle. The revised Oxford translation* (Princeton University Press 1984) 982a2-3.

in the past, a quality of a specific type of water.[323] The term "water" in the singular was, in other words, an umbrella concept that covered all the different types of water.

Therefore, the Graeco-Roman world tended to treat water not as a homogenous substance, but as a heterogeneous entity with variable physical properties. This diverse understanding of waters was due to the different features that are naturally occurring and, in turn, characterise water itself. It might well be that a specific type of water possessed certain qualities that were not common to other waters. Religion and folklore have reinforced this tendency to differentiate among water types over the years. The multiple water cults in Western history granted an aura of sacrality only to waters that were bound to a specific place.[324] For example, drinking from the Castalian spring in Delphi causes Apollo and the Muses to grant the drinker poetic inspiration. A similar differentiation between water types also occurred for mineral springs, whereby each spring was thought to have different effects in the treatment of maladies. In this way, ancient Greeks and Romans tended to favour a fragmented conceptualisation of water. Such a view made it easier to accommodate all the contextual factors of water and prevailed over a unitary one.[325]

3. The pre-modern understanding of water in Roman law

3.1. Water and Roman times

The previous section portrayed the pre-modern understanding of water in the Graeco-Roman world. The conclusion is that the context-dependent features of water played a prominent role and were decisive in shaping the actual understanding of water among individuals. Yet, scientific literature has limited itself to illustrate this aspect by taking spiritual beliefs and philosophy as its main point of reference.[326] This tendency, although extremely useful in opening new avenues of research, has two main limitations. First, it mostly focuses on the ancient Greek experience due to the propensity of ancient Rome to

[323] Hamlin (n 314).
[324] For the UK experience nowadays, see e.g. Strang (n 166) 83.
[325] Barbara C Malt, 'Water is not H2O' (1994) 27(1) Cognitive Psychology 41.
[326] Hamlin (n 314); Linton (n 161).

re-enact Greek spiritual beliefs and philosophy without introducing major "innovations" to them. Second, it does not capture all aspects of water as a 'total social fact'.[327] To put it more clearly, studies have so far overlooked whether this empiricist view was reflected in other domains. The following paragraphs will therefore describe in more detail how this section intends to fill the gap in the literature.

Whilst it is often acknowledged that ancient Rome, together with ancient Greece, is the cradle of Western civilisation, it is mostly the ancient Greeks who bequeathed us philosophy and democracy. The cultural heritage of ancient Romans is harder to trace. Romans had a rather pragmatic approach to governance. Their breakthroughs were mainly mundane, technical discoveries. Roman legacy spans areas as diverse as military strategy (e.g. tortoise approach) and Western European writing (e.g. Roman alphabet). It follows that studies on the conceptualisation of water in the pre-modern era that tend to focus on spiritual beliefs and philosophy will run the risk of overlooking contribution from ancient Rome.

This would be unwise. The Roman experience can provide interesting observations, enriching the current knowledge on the pre-modern view of water. Romans regarded water as an essential element of their society.[328] For example, the use of water was prerequisite for the Roman thermal baths, which were the hub of the political Roman life.[329] In addition, the prominent role of water was also noticeable in Roman law. By symbolically implying the deprivation of water and fire, the *aquae et igni interdictio* was a punitive measure entailing the loss of citizenship – and consequently all civil rights.[330]

In fact, some scholars have attempted to complement the analysis on the fragmented conceptualisation of water in ancient Greece with the analysis of Roman hydrology.[331] This should not come as a surprise. Water and its mastery were a central element in the

[327] The definition of a 'total social fact' refers to the existence of interconnected domains. See Mauss (n 168) 3.

[328] See generally e.g. Alain Malissard, *Les romains et l'eau: fontaines, salles de bains, thermes, égouts, aqueducs* (iUniverse 1999).

[329] Maura Medri, *Le Terme Pubbliche nell'Italia Romana (II secolo a.C. – fine IV d.C.)* (Roma Tre Press 2019).

[330] See Gaius, *Institutiones* I, 161.

[331] Tanner (n 318). For the Roman experience, see e.g. Dylan Kelby Rogers, *Water Culture in Roman Society* (Brill 2018).

development of Roman society. Romans built many aqueducts over the years and some of them are still in use today. For example, it is notorious that the Aqua Virgo – built in 10 B.C. – still functions and even supplies the Trevi Fountain in Rome. The construction of aqueducts required considerable expertise in civil engineering since their creation had to ensure a stable water supply. Roman hydrology served a twofold purpose: it fulfilled human needs, including the provision of water for public toilets and baths, and it represented tangible proof of the might of Rome.[332] As Frontinus stresses, the Roman mastery of water was remarkable compared to the "superfluous" pyramids in Egypt and the "useless" monuments of Greece.[333]

The study of Roman hydrology provided interesting findings. Part of the literature advances the idea that Roman hydrology acknowledged a pre-modern view of water: when collecting water from different, yet adjacent sources, ancient Romans built multiple aqueducts – one for each source.[334] The need of having multiple separate aqueducts, that persisted for the whole period of the Roman Republic and Empire, was also confirmed by Frontinus.[335] Despite the undeniable need to meet the growing demands of water, it seems that Romans decided not to mix different kinds of water in a single aqueduct. And this did not escape the attention of scholars. According to these scholars, the existence of multiple waterworks ensured that each aqueduct was carrying a single type of water, thus protecting its particular properties.[336]

Yet, the literature tends to omit another domain that determined the relationship between water and the Roman society. Equally important was Roman law. In fact, the regulatory framework always has been a direct expression of the shared values and beliefs of a given society.[337] It follows that the choice to devote this section to the analysis of

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[332] Nicholas Purcell, 'Rome and the management of water: environment, culture and power' in John Salmon and Graham Shipley (eds), *Human Landscapes in Classical Antiquity. Environment and Culture* (1996) 180.

[333] R.H. Rodgers (ed), *Frontinus De aquaeductu urbis Romae* (CUP 2004), 75.

[334] Here, one has to make a crucial caveat. We are not discussing the architectural engineering *per se* but, in line with the rest of this chapter, the philosophy underpinning water management.

[335] Rodgers (n 333) 99.

[336] See A. Trevor Hodge, 'Engineering Works' in Örjan Wikander (ed), *Handbook of Ancient Water Technology* (Brill 2000), 67; Tanner (n 318).

[337] Sir Maurice Byers, 'From the Other Side of the Bar Table: An Advocate's View of the Judiciary' (1987) 10 University of New South Wales Law Journal 179, 182.

Roman law becomes readily explicable. In addition, analysing Roman law will turn out to be handy for drawing a comparison with modern legal systems since it represents the set of norms that gave the foundations to most Western legal systems. As Nicholas notes, Roman law 'gave to almost the whole of Europe a common stock of legal ideas, a common grammar of legal thought and, to a varying but considerable extent, a common mass of legal rules'.[338]

As a result, the following subsections put the Roman experience of water into context and discuss the relevant regulatory framework. The aim of this analysis will be to investigate whether Roman law favoured an approach that was particularly attentive to water as a heterogenous entity. In this vein, a preliminary remark is necessary. Expecting to find legal provisions that expressly refer to the fact that water is not a homogenous substance would be naïve. The exegesis of Roman law may, however, enable one to argue that the regulatory framework existing at that time tends to distinguish waters by putting an emphasis on the context in which water manifests itself. This tendency indirectly corroborates a more fragmented conceptualisation of water.

3.2. The property categories of water in Roman law

In ancient Rome, there were many types of waterscape. It follows that Romans entered into contact with fresh water in multiple ways. Water was used to irrigate crops, as a navigable route, as a resource for quenching human or animal thirst, as well as for many other purposes. Its mutability reverberated on social conceptions. As previously outlined, the context-dependent features of water played a primary role in the pre-modern view allowing for the differentiation of water resources. But can this fragmented understanding of water be reflected in the law? At first glance, one may be tempted to argue that this is not possible. Law, as it is known today, tends to use general principles and abstract concepts to describe physical and social phenomena.[339]

[338] Barry Nicholas, *An Introduction to Roman law* (OUP 1962) 2.

[339] See generally e.g. Christopher Columbus Langdell, *A selection of cases on the law of contracts: With references and citations* (Little, Brown, and Company 1871); Thomas C. Grey, 'Langdell's Orthodoxy' (1983) 45 University of Pittsburgh Law Review 1.

Yet, this is mainly a thing of the present. The methodological approach of Roman lawyers tends to be different from more modern regulatory initiatives. It does not begin with the problem of definition. Ancient Romans mostly focused on the "pathological stage".[340] Roman law consisted largely of case-law, since the actual laws, passed by people's assemblies (up to 98 CE) or given by the Emperor, only formed a small part of it.[341] The jurist Javolenus gives full account of this approach: '*Omnis definitio in jure civili periculosa est; parum est enim, ut non subverti possit*'.[342] Providing any legal definition was dangerous due to the ease of subversion. A paucity of definitions characterised Roman law and fresh water was no exception. This approach seems to have had two major consequences in the case of water regulation. Firstly, it favoured a greater attention to the contextual factors in which water manifests itself: absent any pre-existing binding legal definition of water, Roman jurisprudence had to assign water to specific property categories based on the particular nature of the places. As the following subsection will explain in more detail, this was particularly important, not to say essential, for establishing the available rights and remedies. Secondly, and relatedly, the legal remedies provided by Roman law were inextricably linked with the contextual factors, ultimately reinforcing a differentiation between waters.

This subsection focuses on the first aspect and, thus, it starts describing the system of property categories applicable to water in Roman law. The analysis aims to show how contextual factors were determinative of the categorisation of water. Although the relevance of the context in categorising water may partly apply to modern regulatory systems, it is mostly historical, as in the case of the Canal du Midi in France.[343] In fact, as it will be shown *infra*, modern regulations tend to subsume water under a single category and assign – in a residual manner – only a few instances of water manifestations to another property category.

Roman law provides for a relatively large number of property categories. The most basic distinction (*summa rerum divisio*) is between religious goods (*res divini iuris*) and

[340] Riccardo Orestano, *Introduzione allo studio del diritto romano* (3th edn, Il Mulino 1987), 148 e 151.
[341] Vincenzo Arangio-Ruiz, *Societas re contracta e communio incidens, vol. IV* (Castglia 1934), 379.
[342] Dig. 50.17.202 (*Iavolenus 11 epist*).
[343] Article L.2111-11 Code général de la propriété des personnes publiques.

the goods that are governed by human law (*res humani iuris*).[344] While most of water manifestations are qualified as goods governed by human law, there are also some instances where water follows the regulatory treatment of a religious good.[345] In other words, Romans qualified most of the waters as *res humani iuris* but a few of them fell under the property category *res divini iuris* due to their specific location. An example of the latter is the water in the spring of Juturna.

The distinction between religious goods and "human goods" was only the very first step in the differential categorisation of water manifestations. The category *res humani iuris* entailed different property (sub)categories. In this regard, Marcianus – a Roman jurist – introduced a typology of goods that was included under title eight of the first book of the Digest.[346] This provision establishes a closed number of property categories within *res humani iuris* and expressly includes running water (*aqua profluens*) under the legal qualification of *res communes omnium hominum iure naturali*. This specific property category will be further addressed later in this chapter. For the moment, it suffices to note that running water – together with air, sea, and the seashores – is under a different category than the other ones of *res publicae*, *res universitatis*, *res privatae*, and *res nullius*:

> 'Quaedam naturali iure communia sunt omnium, quaedam universitatis, quaedam nullius, pleraque singulorum, quae variis ex causis cuique adquiruntur. 1. Et quidem naturali iure omnium communia sunt illa: aer, aqua profluens, et mare, et per hoc litora maris'[347]

[344] The Spring of Juturna is one of the most famous and important sacred springs in Rome. As to the general application of religious law to *res divini iuris* see Gaius, *Institutiones* II, 3-8.

[345] Cynthia Bannon, 'Fresh Water in Roman Law: Rights and Policy' (2017) 107 The Journal of Roman Studies 60, 61.

[346] Some authors have raised the problem of textual diversity between the aforementioned passage and the one included in the Institutes of Justinian, where the category of *res publicae* is missing. Yet, it is widely believed that the removal of *res publicae* was unintentional.

[347] Dig. 1.8.2 (*Marcianus 3 Institutionum*). While referring to specific passages of the Digest, this study will add the translation in English beside the Latin text. Alan Watson, The Digest of Justinian, vol. 1-4 (University of Pennsylvania Press 1998). [Some things belong in common to all men by *jus naturale*, some to a community corporately, some to no one, but most belong to individuals severally, being ascribed to someone on one of various grounds. 1. And indeed by natural law the following belong in common to all men: air, flowing water, and the sea, and therewith the shores of the sea].

From this excerpt, water seems bound to a certain kind of (sub)category. Yet, a closer review of the passages left by Roman jurists make it clear that water was not bound to that property category and, accordingly, did not have a single legal treatment. This also implied that qualifying water under one category of property would not prevent its inclusion in a different, antithetical category: the multifaceted concrete manifestations of water made it possible to subsume it under a multiplicity of categories.

Rivers (*flumina*) are an example in point since they could potentially belong to two distinct property categories. While rivers most of the time were considered *res publicae*, this was not always the case. Roman law included some rivers under the category of private property (*res privatae*). As Marcianus himself indicates, nearly all rivers qualified as public property: '*flumina paene omnia et portus publica sunt*'.[348] This passage is not the only evidence of rivers being assigned to private property. The fact that rivers can be private property could be inferred from several other passages of the Digest[349] but also because land surveyors (*gromatici*) document that watercourses of a certain size (*flumina non mediocria*) were included in the assignation of lands to private individuals.[350] Rivers were not the only manifestations of waters that could be categorised under two different property categories. This was also the case for all the other waters – including streams (*rivi*),[351] torrential rivers (*torrentes*),[352] lakes (*lacus*),[353] ponds (*stagni*),[354] canals

[348] Dig. 1.8.4.1. The corresponding fragment in the Justinian's Institutes can be found in 2.1.2: *Flumina autem omnia et portus publica sunt*. It follows that there was an interpolation in one of the two passages, most likely this latter one.

[349] See e.g. Dig. 43.12.1.4, 6, 7, 10, 11 (*Ulpianus 68 ad ed.*); Dig. 43.13 (*Ulpianus 68 ad ed.*); Dig. 43.14 (*Ulpianus 68 ad ed.*).

[350] Sextus Iulius Frontinus, *De controversiis agrorum pars altera*, ed. Lachmann, (Formis academicis 1844) 51,3-52,13.

[351] Dig. 10.1.6

[352] Dig.43.12.1.3 (*Ulpianus 68 ad ed.*).

[353] Dig. 43.14.1.6 (*Ulpianus 68 ad ed.*) 'Possunt autem etiam haec esse publica' [These can all be public too] This statement refers to the previous passages Dig. 43.14.1.4-5 (*Ulpianus 68 ad ed.*).

[354] Ibid.

(*fossae*)[355] and springs (*fontes*)[356]. Roman jurists, by admitting that waters can be public, have implied that these waters can fall under the category of private property as well.

However, the fact that all these waters could potentially fall under both *res private* and *res publicae* should not surprise us. The large majority of modern legal systems have established a similar bifurcation: water can be either a public or a private property. What instead is peculiar in Roman law is that there is no presumption of the public character of certain types of water, and that public waters may fall under different property categories, each with distinctive remedies depending on the specific context. As will be shown *infra*, this does not occur with modern regulation where states tend to assign most waters as public *a priori*, unless specifically listed.

Ancient Rome tended to treat water differently. For example, the law existing at that time qualified rivers under a different property category than other water manifestations. Specifically, it considered rivers as *res publicae iuris gentium* – a subcategory of *res publicae in usu publico*. This specific nomenclature stemmed from the fact that the categorisation of the rivers as public property depended on natural morphological characteristics.[357] In other words, the condition for rivers to be public was the existence of a perennial flow. This very same characteristic, which should not be confused with the navigability of the watercourse,[358] was not the criterion for all other waters qualifying as public. All other waters were qualified as public property only for public use, legitimate title or for a presumption that it had been public for a very long time (*vetustas*).[359] For example, the fact that lakes had perennial waters did not make them public property, but was only determinative for their labelling as "lakes" and not as "ponds".[360]

[355] Ibid.

[356] Dig. 43.24.11.pr (*Ulpianus 71 ad ed.*).

[357] Dig. 43.12.1.3 (*Ulpianus 68 ad ed.*): 'Fluminum quaedam publica sunt, quaedam non. publicum flumen esse cassius definit, quod perenne sit: haec sententia cassii, quam et celsus probat, videtur esse probabilis' [Some rivers are public, some not. Cassius defined a public river as a perennial one; this opinion of Cassius, which Celsus also approves, is held to be acceptable].

[358] The fact that navigability is not the criterion to qualify a river as public property can be inferred from e.g. Dig. 43.12.1.12 (*Ulpianus 68 ad ed.*) and 43.13.1.2 (*Ulpianus 68 ad ed.*).

[359] For the concept of *vetustas* see e.g. Dig. 39.3.2.8 (*Paulus 49 ad ed.*).

[360] Dig. 43.14.1.3-4 (*Ulpianus 68 ad ed.*).

This approach of Roman law attributed significant relevance to contextual factors in the categorisation of waters. Firstly, the qualification of each water manifestation, apart from rivers, could not be presumed *a priori* based on natural morphological characteristics. The legitimate title and, especially, the public use that would make a given lake or canal public property would depend on context-specific interests. Secondly, the fact that qualification as public property did not depend on a natural morphological characteristic would not qualify them as *res publicae iuris gentium* – as it was the case of rivers. Contrary, all these other (public) waters could be qualified as either *res in usu publico* or *res publicae in patrimonio fisci* depending on the specific circumstance and with the consequence of having a differential regulatory treatment depending on the qualification they had.[361]

The categorisation framework for public waters just laid out also shows another relevant point, namely, the lack of a comprehensive category of public waters.[362] Various qualifications existed, depending on the concrete manifestation of water. Springs are a case in point. Springs followed in principle the same regime as most public waters: they were public based on the public use, the legitimate title or *vetustas*. However, it has been argued that the river springs had to be considered as *res publica iuris gentium* – i.e. the same category as rivers – due to their inherent bond with the rivers themselves.[363] Thus, (public) springs could in principle be subject to the regulatory treatment of either rivers (*res publica iuris gentium*) or that of all the other public waters, depending on the specific context (*res in usu publico* or *res publicae in patrimonio fisci*).

Another hybrid position, though of a different nature, was the one of water in the civic aqueducts. Ancient Romans defined civic aqueducts as *aqua publica* to stress that the infrastructures of the aqueducts followed the same regulatory scheme as the conveyed water, being "legally incorporated" by the latter. The consequence was that not only water but also all other (natural and artificial) infrastructures for water distribution, such as

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[361] On the existence of these two types of *res publicae* see e.g. Dig. 18.1.6.pr (*Pomponius*) and Dig. 50.16.17.pr (*Ulpianus*).

[362] Giuseppe Grosso, *Corso di diritto romano. Le cose* (Rivista di Diritto Romano online edition 2001), 46. <https://www.ledonline.it/rivistadirittoromano/allegati/dirittoromano0102grosso.pdf> (accessed 29 May 2020).

[363] Ibid.

distribution tanks (*castella*) or public fountains (*salientes*), were categorised as *res publicae* like other public waters. However, it was possible that – after the Republican era[364] – both public and private concessions existed, thus granting public aqueducts a sort of "special legal status".[365] Because of this, special (public) laws, which could range from *leges publicae* to imperial edicts, regulated civic aqueducts as well as the entire water distribution system. For example, unlike public rivers, access to water was only possible once it had arrived at the ultimate destination (e.g. public fountains).[366] Prior to that, water was under the ownership of the responsible authority and therefore could not be used.[367] Likewise, it was not possible to raise any servitude of water conduit (*aquae ductus*) or to draw water (*aquae haustus*), unless there was official permission.[368] In this way, ancient Romans considered the water in public aqueducts as markedly different from all other public waters.[369] This is not the case today in Italy, where aqueducts are considered as public domain as any other river and regardless of the purpose they serve.

Roman law, then, qualified and, accordingly, regulated water in its individuality. There was no single property category applicable for all waters, nor was there a single definition of water. Water in a river was regulated as a river, not as water.[370] The same applied to all the various manifestations of water such as lakes, springs and the like. This

[364] Some authors believe that diverting water for private use started being regulated through concessions from the state in the time of Jusitinian. See Emilio Albertario, *Studi di diritto romano* (Giuffrè editore 1937) 161.

[365] Lauretta Maganzani, 'Acquedotti e infrastrutture idrauliche nella Roma dei Cesari: aspetti e problemi di diritto pubblico e privato', in Gianfranco Purpura (ed) *Revisione ed integrazione dei Fontes Iuris Romani Antejustiniani – FIRA* (Giappichelli 2012) 85, 87.

[366] According to Pomponius, it was possible to take water for private use in public rivers, unless they were navigable. Dig. 43.12.2 (*Pomponius 34 ad sab.*) 'Quominus ex publico flumine ducatur aqua, nihil impedit (nisi imperator aut senatus vetet), si modo ea aqua in usu publico non erit: sed si aut navigabile est aut ex eo aliud navigabile fit, non permittitur id facere' [Nothing prevents water from being drawn off from a public river (unless the emperor or the senate forbid it), provided that it will not be water in public use. But if the river is navigable or another river derives its navigability from it, it is not permissible to do this].

[367] Christer Bruun, 'Roman emperors and legislation on public water use in the Roman Empire: clarifications and problems' (2012) 4 Water History 17.

[368] Dig. 43.20.1.40-42 (*Ulpianus 70 ad ed.*). See also Marco Fiorentini, 'Struttura ed esercizio della servitù d'acqua nell'esperienza giuridica Romana' in *Contributi Romanistici* (Universita degli Studi di Trieste 2003) 51, 57.

[369] Grosso (n 362) 46.

[370] Alvise Schiavon, 'Acqua e diritto romano: "invenzione" di un modello?' in Gianni Santucci, Anna Simonati and Fulvio Cortese (eds) *L'acqua e il diritto* (Università degli Studi di Trento 2011) 117, 129.

tendency of the law helps put an emphasis on the context-dependent features and, in turn, reflects a fragmented conceptualisation of water. In addition, this interpretation could provide an interesting reading key to a long-standing issue of Roman law and water. It is with a brief reference to such debate that this subsection comes to a conclusion.

Previously, it was said that Marcianus included running water (*aqua profluens*) under the legal qualification of *res communes omnium hominum iure naturali*. This way of categorising water has caused considerable debate among experts of Roman law. The absence of a single property category for water seems to have created some confusion to the modern legal mind. Thinking about water as a substance that may swiftly change property categories was questioned, especially in the realm of public law (from *res publica* to *res communes omnium* and vice versa).[371] The criticism of scholars focused on the existence of the category of *res communes omnium*.[372] Ancient Roman law – so the argument runs – did not foresee such a category, the concept being more philosophical and literary than practical.[373] The (modern) legal theory behind this claim is that running water could not ground a legitimate economic interest and, accordingly, establish rights *in rem*.[374]

Although this interpretation has come to dominate the field, certain authors stress that water could *in principle* fit two distinct legal categories.[375] Specifically, Scherillo claimed that running water can ontologically differ from the riverbed as well as other water manifestations and, therefore, be the object of different legal qualifications.[376] Likewise, Schiavon suggests that running water was qualified under a different property category

[371] Apparently, the category of *res communes omnium* did not cause so much confusion to Bracton in the English law of Middle Ages. See Joshua Getzler, 'A History of Water Rights at Common Law' in Joshua Getzler (ed) *Servitude Doctrine in Early Law* (OUP 2004) 67.

[372] Silvio Perozzi, *Istituzioni di diritto romano, Vol. II* (Athenaeum 1928) 596; Vincenzo Arangio Ruiz, *Istituzioni di diritto romano* (Jovene 1927) 155; Ubaldo Robbe, *La differenza sostanziale fra 'res nullius' e 'res nullius in bonis' e la distinzione delle res pseudo marcianea 'che non ha né capo né coda'* (Giuffrè editore 1979) 212.

[373] Pietro Bonfante, *Corso di diritto romano. Vol. 2 la proprietà, Sezione 1 e 2* (Sampaolesi 1926) 60.

[374] Ibid. 7. In this regard, Wiel refers to goods which cannot be regarded as object of property within the term negative community. See Samuel C. Wiel, 'Running water' (1908) 22 Harvard Law Review 3, 192.

[375] Grosso (n 362) 36.

[376] Gaetano Scherillo, *Lezioni di diritto romano. Le cose* (Giuffrè editore 1945) 86.

because it could not directly belong to the Roman *civitas* like the other public rivers.[377] This position is further corroborated by the fact that the category *res communes omnium* already appears in the writings of other, more ancient jurists, such as Ulpian.[378] Whatever the true answer, this analysis showed that the fragmented conceptualisation of water that ancient Romans seemed to possess, could allow for the existence of an additional property category. It should not be too surprising that running water was treated differently from other water manifestations.

3.3. The legal remedies of Roman water law

The previous subsection discussed the property categories of Roman law with regard to water. It showed that contextual factors were key for their legal qualification. Presently, some might expect a discussion of subjective rights over fresh water. This approach would reflect a modern legal *Weltanschauung.* Instead, the Roman regulatory framework always prioritised remedies over rights, the latter being subsumed by the former.[379] It therefore makes more sense to discuss remedies applicable to waters and show how they were only limited to particular kinds of water, implicitly suggesting that the view of water had to be heterogenous. Although the differentiation between waters, when it comes to legal remedies, is not a unique trait of Roman law, this regulatory approach is not so pervasive in modern jurisdictions.

The legal remedy that is most intimately concerned with water is the interdict (*interdictum*, plural form *interdicta*). The reason is twofold: the interdict's original purpose and its definitive structure. As to the original purpose, the interdict had to complement the ordinary remedies of private law (e.g. actions). Absent any other legal remedy, the interdicts provided legal protection for some factual positions relating to things under public property. This also meant that the interdicts were the only legal remedy for individual factual positions arising from those waters falling under the

[377] Schiavon (n 370) 179.

[378] See e.g. Dig. 41.1.14 (*Neratius libro 5 membranarum*); Dig. 43.8.3 (*Celsus libro 39 digest*); Dig. 47.10.13.7 (*Ulpianus 57 ad ed.*).

[379] Giuseppe Provera, 'Diritto e azione nell'esperienza giuridica romana' Rivista di diritto romano <https://www.ledonline.it/rivistadirittoromano/allegati/proveradirittoazione.pdf> (accessed 29 May 2020).

property category of *res publicae*. But over time, the use of interdicts extended to other property categories. In this way, the interdicts reached their definitive form: binding injunctions issued by the praetor aimed at settling potential legal disputes.[380] Thus, the definitive structure of the interdicts was sufficiently flexible to protect various factual positions (as possession) arising from different property categories, including the multiple manifestations of water.

However, the connection between interdicts and property category was not completely severed: the availability of remedies hinged on categorisation.[381] It is easy to infer from the following passage of Ulpian that ancient Romans made a distinction of *interdicta* based on the particular types of good:

> 'Videamus, de quibus rebus interdicta competunt. et sciendum est interdicta aut de divinis rebus aut de humanis competere. divinis, ut de locis sacris vel de locis religiosis. de rebus hominum interdicta redduntur aut de his, quae sunt alicuius, aut de his, quae nullius sunt. quae sunt nullius, haec sunt: liberae personae, de quibus exhibendis ducendis interdicta competunt. Quae sunt alicuius, haec sunt aut publica aut singulorum. publica: de locis publicis, de viis deque fluminibus publicis. quae autem singulorum sunt, aut ad universitatem pertinent, ut interdictum quorum bonorum, aut ad singulas res, ut est interdictum uti possidetis, de itinere actuque'[382]

[380] These legal remedies emerged after the period of *decemviri* and they mingled with the *actiones populares* in the *cognitio extra ordinem* period. They resemble modern summary procedures. See Luigi Capogrossi Colognesi, 'Interdetti' in Enciclopedia del Diritto, XXI (Giuffrè editore 1971), 901; Mario Fiorentini, *Fiumi e mari nell'esperienza giuridica romana. Profili di tutela processuale e di inquadramento sistematico* (Giuffrè editore 2003).

[381] Mario Talamanca, *Istituzioni di diritto romano* (Giuffrè editore 1990) 382; Andrea Di Porto, 'Interdetti popolari e tutela delle res in usu publico. Linee di un'indagine' in Ferdinando Zuccotti (ed) *Diritto e processo nella esperienza romana. Atti del Seminario torinese (4-5 dicembre 1991) in memoria di Giuseppe Provera* (Jovene 1994) 510.

[382] Dig. 43.1.1.pr (*Ulpianus 67 ad ed.*): [Let us see to what things interdicts apply. It should be known that they apply to things both divine and human. Divine are such as sacred and religious places. Interdicts with respect to things human apply either to what belongs to somebody or to what belongs to nobody. Belonging to nobody are free persons for whose production, or taking away, interdicts are available. Things belonging to somebody are either public or private property. Public are public places, roads, and publicly owned rivers.

In other words, specific interdicts were reserved for goods falling under such-and-such property categories. For example, the interdicts aimed at protecting a collective interest (*publicae utilitatis causa*)[383] in the realm of public goods (*res publicae*) built on the distinction between *res in usu publico* and *res in patrimonio fisci*.[384] This unveils a point that is particularly salient to the present contribution. Water was protected by a particular interdict only if it fell under a specific property category. There was no single legal protection of water as such. Everything depended on property categories, which in the case of water depended on its concrete manifestation.[385] For example, the interdicts *publicae utilitatis causa* did not protect the possibility to use water *per se* but only the use of public waters that were qualified as *res in usu publico* such as rivers.[386]

Thus, the connection between a legal remedy and a particular property category indirectly led to the labelling and institutionalisation of various types of water. Remaining with the *flumen* example, it was necessary to identify the features that made water a river in order to trigger the interdicts *publicae utilitatis causa*.[387] Roman jurisprudence did in fact provided a solution to the issue. In this context, Ulpian states:

> 'Flumen a rivo magnitudine discernendum est aut existimatione circumcolentium. 2. Item fluminum quaedam sunt perennia, quaedam torrentia. Perenne est, quod semper fluat, aenaos, torrens ο χειμάρρους:

Interdicts with respect to private property apply either universally, as does the interdict for *bonorum possessio*, or to individual things, as do the interdicts for the possession of land, or for right of way in person or with cattle].

[383] See Dig. 43.1.2.1 (*Paulus 63 ad ed.*) 'Publicae utilitatis causa competit interdictum 'ut via publica uti liceat' et 'flumine publico' et 'ne quid fiat in via publica'.

[384] The interdicts are proper to *res in uso publico*. Andrea Di Porto, *Res in usu publico e 'beni comuni'. Il nodo della tutela* (Giappichelli 2013) 35.

[385] We can reach this conclusion through a syllogism. The legal remedies depend on the property category; the property categories of water depend on the context-dependent features of water; therefore, the legal remedies are a matter of context.

[386] See e.g. Dig. 43.12.1.1-4 (*Ulpianus 68 ad ed.*) and the interdict *de fluminibus* (Dig. 43.12.1.20 divides between prohibitory and restitutionary interdicts).

[387] Nicola De Marco, *I loci publici dal I al III secolo. Le identificazioni dottrinali, il ruolo dell'usus, gli strumenti di tutela* (Satura 2004) 89.

> si tamen aliqua aestate exaruerit, quod alioquin perenne fluebat, non ideo minus perenne est. 3. Fluminum quaedam publica sunt, quaedam non. publicum flumen esse Cassius definit, quod perenne sit: haec sententia Cassii, quam et Celsus probat, videtur esse probabilis'[388]

According to the Roman jurist, the use of the term *flumen* – and accordingly of its applicable interdicts – is limited to those watercourses that have a minimum dimension as well as being recognised by society as rivers. The criteria are rather specific, although they allow for some flexibility.[389] The criterion of social recognition not only invoked the context-specific interest of a given community, as many scholars pointed out,[390] but also allowed for an actual "territorialisation" of water. A watercourse was regarded as a river whenever that specific society deemed it to be one. As a result, the relevant regulatory framework was not narrowly applied to any watercourse, but it was mostly dependent upon contextual factors. For instance, certain navigable rivers, as the Cremera and the Allia, were categorised as brooks, thus not enjoying the legal protection provided by certain remedies.[391]

There are also other passages which show that the legal remedies offered by Roman law were bound to particular kinds of water. The interdicts *de aqua cottidiana et aestiva* provide an example in this regard.[392] These interdicts distinguish between two different

[388] Dig.43.12.1.1-3 (*Ulpianus 68 ad ed.*): [A river is distinguished from a stream by size, or by the opinion of the surrounding inhabitants. 2. Some rivers are perennial, some torrential. Perennial is what is always flowing, "ever-running" in Greek; torrential is "winter-flowing." But if some rivers should dry up in summer which normally flow perennially, they are nonetheless perennial. 3. Some rivers are public, some not. Cassius defined a public river as a perennial one; this opinion of Cassius, which Celsus also approves, is held to be acceptable]. This is also confirmed in Dig. 43.12.3pr (*Paulus 16, ad Sabinum*) 'Flumina publica quae fluunt ripaeque eorum publicae sunt' [Public rivers are those which are always flowing, and their banks are public].

[389] Grosso (n 362) 45.

[390] Filippo E. Vassalli, *Sul rapporto tra le res publicae e le res fiscales in diritto romano* (Giuffrè editore 1960) 28.

[391] Bonfante (n 373) 91.

[392] Please note that originally this interdict simply protected the right to divert water. However, the broad interpretation by Labeo extends the field of application to water pollution. See Dig. 43.20.1.27 (*Ulpianus 70 ad ed.*): 'Labeo putat per hoc interdictum prohiberi quem, ne quid in illo fundo faciat fodiat serat succidat putet aedificet, qua re ex re ea aqua, quam ille hoc anno per fundum tuum sine vitio duxit, inquinetur vitietur corrumpatur deterior fiat: et similiter de aestiva aqua debere interdici ait' [Labeo thinks that through this

kinds of water: daily and summer waters.[393] The text from Ulpian helps clarify this distinction, further corroborating an 'ontological' criterion. Summer waters are distinct, as are summer pastures, summer clothes, and such like.[394] Despite this ontological distinction, the interdicts aim to protect the same factual position.[395] The choice of the appropriate legal remedy depends on the kind of water at hand.

This, however, should not be too surprising in this specific case. Meaning that a differentiation between daily and summer waters has been "transposed" in modern legislations as well. For example, the Article 1080 and 1085 of the Italian Civil Code provide for the servitudes of daily and summer waters, respectively. Instead, what should be subject of reflection is the limited scope of the interdicts *de aqua cottidiana et aestiva*. There, Ulpian argues that these interdicts only protect perennial waters (*aqua viva*) that can be drawn off a source:

> 'Loquitur autem praetor in hoc interdicto de ea aqua sola, quae perennis est: nulla enim alia aqua duci potest, nisi quae perennis est. Quamquam ad perennes aquas dixerimus hoc interdictum pertinere, ad eas tamen perennes pertinet, quae duci possunt. ceterum sunt quaedam, quae, etsi perennes sunt, duci tamen non possunt, ut puta puteales et quae ita sunt summersae, ut defluere extra terram et usui esse non possint. sed huiusmodi aquis, quae duci non possint, haustus servitus imponi potest'[396]

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interdict someone may be prohibited from doing, digging, sowing, cutting down, and pruning in such a farm, where by so doing he may pollute, vitiate, spoil, or worsen the water which such a one drew off through your farm without wrongdoing. And he says that a similar interdict is due for summer water].

[393] While the part applicable to daily waters can be found in Dig. 43.20.1.2, the one about summer waters is in Dig. 43.21.3-6. For a complete overview of this difference, see Fiorentini (n 380) 142.

[394] Dig. 43.20.1.3 (*Ulpianus 70 ad ed.*): '…aestiva autem ea est, qua aestate sola uti expedit, sicuti dicimus vestimenta aestiva, saltus aestivos, castra aestiva, quibus interdum etiam hieme, plerumque autem aestate utamur…' [Summer water is water that is only expedient to use in summer, just as we speak of summer clothes, summer pastures, summer camps, which are sometimes used even in winter but mostly in summer].

[395] Compare with the text in Dig. 43.20.1.3 (*Ulpianus 70 ad ed.*): '…cottidiana ab aestiva usu differt, non iure…'.

[396] Dig. 43.20.1.5-6 (Ulpianus 70 ad. Ed.): [The praetor in this edict speaks of only such water as is perennial. For no water can be drawn off other than what is perennial. 6. Although we have said that this interdict applies to perennial waters, it applies to such perennial waters as can be drawn off. There are others

In other words, the scope of application of these interdicts was limited only to certain types of water. Firstly, the two interdicts exclude still waters (e.g. water in cisterns) since they are not perennial. Secondly, they exclude perennial waters that cannot be drawn off a source, like underground and well waters.[397] These same limitations cannot be found in the Italian Civil Code. On the contrary, the Italian Court of Cassation repeatedly specified that the limitations of Roman law do not operate in the current legal system.[398] In other words, the equivalent Italian legal remedies are applicable to any type of water, regardless of whether waters are perennial. Table 3 shows the diversity of approaches and the consequent generalisation in the conceptualisation of water.

Interdicts *de aqua cottidiana et aestiva*	**Article 1080 and 1085 Italian Civil Code**
Perennial waters that can be drawn off a source =>	No specific requirements =>
NO still waters (e.g. cisterns)	YES cisterns (Cass. Civ., sez II, n. 1315, 29 January 2003)
NO underground or well waters	YES well waters (Cass. Civ., sez. II, n. 14654, 22 June 2007)

Table 3 - Differential treatment of waters in Roman law as compared to Italian law

which though perennial cannot be drawn off, such as well waters and underground waters which could not flow above ground and be of use. But a servitude may be imposed for raising waters of this kind which cannot be drawn off].

[397] This excluded underground waters originating form kerst springs. See Dig. 43.20.1.8 (*Ulpianus 70 ad ed.*) 'aqua sudoribus manando in aliquem primum locum effluere atque ibi apparere incipit' [The source of water is where it originates. If it originates from a spring, it is the spring itself]; Fiorentini (n 368) 64.

[398] See the Italian Court of Cassation when arguing that 'nel nostro ordinamento non è richiesto il requisito, posto dal diritto romano, che l'acqua – oggetto della presa – sia "viva", ossia legata in perpetuo ad una porzione del fondo'. Cass. Civ., sez II, n. 1315, 29 January 2003.

But the interdicts *de aqua cottidiana et aestiva* are not an exception in Roman law. Limiting the applicability of a legal remedy to specific types of water was the norm. The inderdict *de fonte* was limited to perennial waters too.[399] Another example outside of interdicts is the *actio aquae pluviae arcendae*, which was already present as of the Twelve Tables (450 BC), aimed to protect landowners from damaging runoffs. As the name indicates, this action was only available if rainwater (*aqua pluvia*) was involved. The requirement was essential, and an extensive interpretation developed over time. For instance, it was possible to instigate the legal action if a mixture between rainwater and other types of water (*aqua mixta*) was concerned.[400] However, the relation with rainwater always had to exist.[401] According to Trebatius, the action was admissible in the case of polluted water from fulleries (*fullonicae*) only if they had collected in a single water conduit because this would in principle ensure that the polluted water blended with rainwater.[402] Likewise, Ulpian denied the applicability of the action to thermal water, this latter certainly not being connected with rainwater.[403] And it is indeed the constant and

[399] This interdict is only valid for perennial waters. Dig. 43.22.1.1 (*Ulpianus 70 ad ed.*) 'Hoc interdictum proponitur ei, qui fontana aqua uti prohibetur: servitutes enim non tantum aquae ducendae esse solent, verum etiam hauriendae, et sicut discretae sunt servitutes ductus aquae et haustus aquae, ita interdicta separatim redduntur' [This interdict is provided for someone who is prevented from using the water of a spring. For servitudes are normally not only for drawing water but also for raising it; and just as servitudes for drawing and raising water are distinct, so the interdicts are granted separately].

[400] Dig. 39.3.1pr (*Ulpianus 53 ad ed.*): 'Si cui aqua pluvia damnum dabit, actione aquae pluviae arcendae avertetur aqua. aquam pluviam dicimus, quae de coelo cadit atque imbre excrescit, sive per se haec aqua coelestis noceat, ut Tubero ait, sive cum alia mixta sit' [If rainwater is going to cause one injury, it can be averted by means of an action to ward off rainwater. We define "rainwater" as water which falls from the sky and is increased in quantity by a rainstorm, whether, as Tubero says, such water from the sky causes damage by itself or in conjunction with some other body of water]. For a practical example of a legal dispute involving *aqua mixta* see Dig. 39.3.23.2 (*Paulus 16, ad Sabinum*).

[401] Lucia Monaco, Sensibilità ambientali nel diritto romano, tra prerogative dei singoli e bisogni della collettività (2012) 1 Teoria e storia del diritto privato 1.

[402] Dig. 39.3.3pr (*Ulpianus 53 ad ed*): 'Apud Trebatium relatum est eum, in cuius fundo aqua oritur, fullonicas circa fontem instituisse et ex his aquam in fundum vicini immittere coepisse: ait ergo non teneri eum aquae pluviae arcendae actione. si tamen aquam conrivat vel si spurcam quis immittat, posse eum impediri plerisque placuit' [It is recorded in Trebatius that someone who had a spring on his land established a fuller's shop at it and began to cause the water there to flow onto his neighbor's property. Trebatius says that he is not liable to an action to ward off rainwater. However, many authorities accept that if he channeled the water into one stream or introduced any dirt into it, he can be restrained].

[403] Dig. 39.3.3.1 (*Ulpianus 53 ad ed.*): 'Idem Trebatius putat eum, cui aquae fluentes calidae noceant, aquae pluviae arcendae cum vicino agere posse: quod verum non est: neque enim aquae calidae aquae pluviae

meticulous attention towards the existence of such relations that distinguishes the Roman approach from today's legal framework. The applicability of this legal remedy had to be centred on a particular type of water, i.e. rainwater. Again, referring to the equivalent of this remedy in the Italian legal system, it is possible to observe that Article 913 of the Italian Civil Code merely refers to water in general terms. This does not mean that the legal provision is applicable to every type of water but here the distinguishing criterion is not any longer on the type of water, but a human intervention.[404] It seems that the modern legislator does not pay significant attention to context-dependent features of water as it was done in Roman law.

In summary, it seems that Roman law takes into account the specific, context-dependent features of water. There was no single legal remedy protecting all water rights; neither were there legal remedies protecting all types of water. Instead, different legal remedies applied to certain types of water. It must have been true, then, that differences between types of water were of considerable regulatory and legal import in ancient Rome.

3.4. Some conclusive considerations regarding the analysis of the Roman legal provisions concerning water

Roman law is often used to identify a regulatory approach with a view to transposition onto a modern legal system.[405] However, this was not the purpose of this analysis. The intention was not to extrapolate general rules from Roman law nor give a complete overview of legal provisions concerning water in ancient Rome.[406] The purpose to achieve here was to demonstrate that Roman regulatory practice could accommodate a fragmented conceptualisation of water. A single legal definition of water was lacking. Likewise, water

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sunt' [The same Trebatius holds that somebody who sustains harm from a flow of hot water can bring an action to ward off rainwater. This is incorrect since hot water is not rainwater].

[404] Article 913(1) reads as follows: 'Il fondo inferiore è soggetto a ricevere le acque che dal fondo più elevato scolano naturalmente, senza che sia intervenuta l'opera dell'uomo'. This Article seems to build on Article 640 of the Napoleonic Code.

[405] Schiavon (n 370) and Fiorentini (n 380), both bringing the example of James L. Wescoat Jr., 'Toward A Modern Map of Roman Water Law' (1997) 18(2) Urban Geography 100.

[406] For a complete, yet dated overview of Roman water law see Eugene Fitch Ware, Roman Water Law (West Publishing Company 1905); Emilio Costa, Le acque nel Diritto romano (Zanichelli 1919). For a recent focus on emperors' water legislation see Bruun (n 367).

fell under several property categories, with different legal remedies for each. Overall, Roman law missed a comprehensive legislation on water.[407]

At this point, it can be argued that water was viewed, and regulated, only in its individuality.[408] Water in a river was regulated as a river, not as water. The same applied to all the various manifestations of water such as lakes, ponds and the like. Because of this, the law focused on contextual factors to regulate water. Most importantly, the law accounted for the existence of various types of water. However, one must concede that these observations are only tentative. This is due to the two types of challenges the study of Roman law presents: the purpose of the analysis and the availability of legal sources. For a better contextualisation of the previously conducted examination, this chapter will present below these challenges.

In any study of Roman law, two antithetical purposes may emerge. One purpose, dear to Savigny and the German Pandectists, is to actualise Roman law.[409] That school's methodology aims at making use of Roman law for present times. Others try to create a historical re-enactment of the Roman legal system.[410] Roman law is treated as a historical phenomenon. In the latter case, the task of the researcher is to provide a detailed overview without pigeonholing Roman laws into modern legal categories. At this point, one may ask which of the two approaches was applied to the current work. The response is far from clear-cut. As Betti notes, it seems unconceivable to embrace one single approach without being influenced by the other.[411] More concretely, we are imbued with our own legal culture and mentality every time we approach the study of Roman law.[412] Thus, it might

[407] A comprehensive legislation was also missing on almost all the legal topics.
[408] Grosso (n 362) 46.
[409] See e.g. Friedrich Carl von Savigny, *Geschichte des römischen Rechts im Mittelalter* 6 (2th edn, JCB Mohr 1850), 472 referred to and translated by Mario Bretone, *Diritto e tempo nella tradizione europea* (3th edn, Laterza 2004) 171.
[410] For example, see e.g. Orestano (n 340) 348-368.
[411] Pietro De Francisci and Emilio Betti (eds) *Questioni di metodo. Diritto romano e dogmatica odierna* (New Press 1997) [= Emilio Betti, 'Diritto romano e dogmatica odierna' (1929) 99 Archivio giuridico Filippo Serafini 129]. Please note that the quoted book is based on an academic debate between the two authors (Betti and De Francisci).
[412] Ibid. 29.

well be that one's own legal culture developed in the 21st century could slightly skew the analysis of a legal system that operated two millennia ago.

The second challenge further exacerbates the tentative nature of the observations developed in this chapter. The study of Roman law is based on those sources that have come down to us, which form only part of what was once available. This means that certain legal sources that are considered local might instead have been applicable across the Roman Empire. For example, although the *lex rivi Hiberiensis* limits its geographical area of application to the Ebro valley, it could well have been inspired by general rules.[413] Likewise, other sources, like the Codex Theodosianus (438 CE) may be limited to very general and broad legal provisions without discussing the more local ones. This hypothesis shall not sound overly unrealistic. Suffice it to say that the Justinian's Code adopted about a century later (534 CE) outlaws local legal provisions and does not allow imperial constitutions not contained in it to be used in court. It seems, in other words, that the regulatory framework in place before Justinian was unduly fragmented.

This consideration on the availability of legal sources may also apply to *time* and *legal fields*. A certain legal provision could only produce effects in the Roman Republic and being repealed in the imperial period.[414] Moreover, the largest part of the *Corpus Iuris Civilis* – the major legal source at our disposal – tends to limit the main discussion to private law. In the specific case of water, the scant references to public law are the Justinian's Codex (11.43 *De aquaeductu*) and few titles in the Digest such as the interdict *Ne quid in flumine publico fiat, quo aliter aqua fluat* (D.43.13). This means that many regulations that concern water in a public-law context are missing. Almost all extant mentions of water in that context, found in literary works (Frontinus) or inscriptions, are limited to reports of legislative text.[415] In other words, there is a lack of commentaries that would contextualise and provide a legal reasoning, which implies that legal scholars are

[413] For a detailed overview of this special water law, see Lloris F. Beltrán, 'An irrigation decree from Roman Spain: The Lex Rivi Hiberiensis' (2006) 96 J Rom Stud 147.

[414] This risk does not however apply to the Corpus Iuris Civilis and the other late antiquity legal texts.

[415] Rodgers (n 333) 63-119. As to the inscriptions, one may consider the Edict of Augustus on the aqueduct at Venafrum (17-11 BC).

in trouble.[416] Last but not least, the interpolation (additions or changes) of ancient manuscripts may have "polluted" their original meaning.

It follows that the incomplete and limited nature of legal sources requires any researcher to adopt theoretical (and practical) assumptions that cannot be fully tested and may ultimately prove incorrect. Taking again as an example the *lex rivi Hiberiensis*, it may be tempting to argue that the discovery of a local law shows that Roman water legislation did not adopt a one-size-fits-all approach.[417] Although this claim could even be convenient to the argument developed in this chapter, the paucity of the sources that reached us forecloses the possibility to make such bold assertions. That being said, it is clear why the previously conducted examination did not purport to provide *the* correct interpretation but drawing only tentative conclusions.

4. The modern understanding of water

The previous sections illustrated the pre-modern view of water in the Graeco-Roman world and its probable impact on the Roman regulatory framework. According to most scholars, the pre-modern understanding of water seems to have dominated for several centuries.[418] However, some contemporaneous events occurred during the 18th and 19th century which contributed to the formation of a different, abstracted, view of water. This process of abstraction meant that individuals began to view water as a homogenous substance that could be reduced to its chemical composition with scant attention to its contextual features. This new conceptualisation, the so-called modern understanding of water, emerged and ultimately replaced the pre-modern view. This section provides an overview of this shift and its consequences.

[416] There have also been attempts to explore the inscriptions from a more legal perspective. See e.g. Lauretta Maganzani, 'L'approvvigionamento idrico degli edifici urbani nei testi della giurisprudenza classica: contributi giuridici alle ricerche sugli acquedotti di Roma antica', in Mariavittoria Antico Gallina (ed), *Acque per l'utilitas, per la salubritas, per l'amoenitas* (ET Edizioni 2004), 185.

[417] Previous literature has indeed argued for the existence of various special laws to the detriment of a harmonised Roman water law. On such claims, see Andrew Wilson, 'Water, power and culture in the Roman and Byzantine worlds: an introduction' (2012) 4 Water History 1, 4.

[418] Hamlin (n 314); Linton (n 161).

Isolating the factors that caused a change in social beliefs is always a tall order. Attribution to one particular set of factors, rather than another, is always impossible. Yet, the analysis may nonetheless yield interesting conclusions. Although the identified factors might not provoke a change of viewpoint if operating in isolation, they most likely explain the social determinants influencing the same change.[419] The literature on water policy investigated the principal causes of the emergence of the modern understanding of water. According to the scholars, three overlapping historical factors triggered a major paradigm shift: the chemical revolution, modern epidemiology and the Industrial Revolution.[420]

The modern understanding of water is based on its chemical composition. At the end of the 18th century, scientists started demonstrating that water resulted from the combustion of hydrogen with oxygen gas. The substance of water could in principle be obtained through chemical synthesis. In this way, water was no longer 'considered a fundamental material from which all things were made',[421] but merely a "standardised" product, like many others. Water was reduced to a specific chemical compound. Its chemical formula (H_20) was found in all types of water. This perspective tended to overlook the various socio-cultural and geographical features of water, focusing instead on uniformity. As a result, scientific reductionism seemed to have filtered out the socio-cultural context of water.[422]

The chemical revolution coincided with developments in epidemiological thought. John Snow's work identified water as the transmission medium for the London cholera outbreak of 1854.[423] The actual detection of contaminated water by Snow overthrew the then prevalent miasma theory, under which diseases were caused by bad air. More importantly to the present ends, a particular feature of water – its purity – came to

[419] Paul Veyne, *Comment on écrit l'histoire. Essai d'épistémologie* (Le Seuil 2013).
[420] Hamlin (n 314); Linton (n 161); Agathe Euzen and Jean-Paul Haghe, 'What kind of water is good enough to drink? The evolution of perceptions about drinking water in Paris from modern to contemporary period' (2012) 4(3) Water History 231; Jean Pierre Goubert, *La conquête de l'eau. L'avènement de la santé à l'âge industriel* (Robert Laffont 1986).
[421] Sydney M. Edelstein, 'Priestley Settles the Water Controversy' (1948) 1 Chymia 123, 124.
[422] Derek Gregory, '(Post)Colonialism and the Production of Nature' in Noel Castree and Bruce Braun (eds) *Social Nature: Theory, Practice and Politics* (Blackwell Publishers 2001) 84.
[423] His endeavours aimed at showing that impure water can induce cholera. See John Snow, *On the Mode of Communication of Cholera* (John Churchill 1855).

predominate all discussions. When it came to classifying water(s), there could only be two categories: pure and impure. This development did not escape the attention of regulators who adopted the 1871 Metropolis Water Act to address the question of water pollution in a very basic form.[424] Likewise, the French Advisory Committee on Public Health started developing a categorisation of waters depending on its quality.[425] In this way, as Hamlin puts it, there was a shift in water conceptualisation where individuals began to overlook 'what was central in premodern European understandings of water by focusing on what was tangential'.[426] To put it differently, the developments of modern epidemiology led individuals to perceive water in a dichotomous fashion (i.e. pure and impure) and to ignore the other, socio-cultural features. The discourse on water was imbued with scientific knowledge at the expense of cultural content.

The last factor that significantly impacted the modern understanding of water was the Industrial Revolution. In this period, a transition from craft production to machines production took place. In this way, the factory system emerged. This process of economic and industrial changes entailed increased demand for water that had to be conveyed from one location to another in accordance with demand.[427] Due to a late use of steam and coal power for industrial purposes, water became (and still is) an essential economic input.[428] Industrialisation, coupled with urbanisation, made it necessary to establish a system for the rapid transportation of water.[429] Water technology successfully addressed these new demands.[430] Since individuals migrated from rural to urban areas, water was no longer gathered from wells or springs but distributed through pipes. These major changes in water distribution affected individual perceptions of water. The availability of tap water

[424] Anne Hardy, 'Water and the Search for Public Health in London in the Eighteenth and Nineteenth Centuries' (1984) 28(3) Medical history 250, 269.
[425] Euzen and Haghe (n 420) 237.
[426] Hamlin (n 314) 315.
[427] Euzen and Haghe (n 420) 235.
[428] G. Nicholas von Tunzelmann, *Steam Power and British Industrialization to 1860* (OUP 1978) 283.
[429] Norman Alfred Fisher Smith, *Man and water: a history of hydro-technology* (Scribner 1975).
[430] Goubert (n 420).

resulted in water's de-territorialisation,[431] causing individuals to lose all empiricist knowledge of water.[432] Water thus started having an even more abstract identity.

All these historical events, in conjunction, seem to have pushed towards a more scientific and essentialist understanding of water in Western society. To prove this point, Linton makes reference to the definition of water provided by today's linguistic references.[433] The modern standard definition of water accounts for the chemical aspect of this resource, which is driven by water's uniform character.[434] This definition of water tends to be blind to contextual factors.

But has this process of abstraction been reflected also in modern European water regulation? Providing a detailed answer is an overly complicated task that comes close to a *probatio diabolica*. It would require minute observation of the evolution of water law in several jurisdictions over the past three centuries. It is commonly thought that the law does not change with scientific advances alone, but that science must first occasion social change before the law responds.[435] For example, although the beginnings of water quality problems can be traced back to the middle of the 19th century, the first major Italian law addressing water pollution was only adopted in 1976, when a notable industrial and social development occurred.[436]

Having said that, a more holistic view on the evolution of the legal treatment of water after the 19th century could still serve to identify some relevant and pertinent trends for the present analysis. Specifically, the following paragraphs show that water regulation in modern legal systems has been subject to a process of legal rationalisation to the detriment

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[431] Bernard Kalaora, 'De l'eau sensible à OH2. L'eau moderne' (2001) Colloque International OH2 'Origines et Histoire de l'Hydrologie', Dijon, 9-11 mai 2001.

[432] Ivan Illich, *Water and the Waters of Forgetfulness* (Marion Boyars Press 1985).

[433] Linton (n 161).

[434] See e.g. the definition of water by the Encyclopaedia Britannica: 'A substance composed of the chemical elements hydrogen and oxygen and existing in gaseous, liquid, and solid states. It is one of the most plentiful and essential of compounds. A tasteless and odourless liquid at room temperature, it has the important ability to dissolve many other substances. (…)'. Available at <https://www.britannica.com/science/water> (accessed 1 May 2020).

[435] Marta Katarzyna Kolacz and Alberto Quintavalla, 'The Conduit between Technological Change and Regulation' (2018) 11 Erasmus L. Rev 143.

[436] Legge 10 maggio 1976, n. 319, *Norme per la tutela delle acque dall'inquinamento*. See Francesco Mantelli and Giorgio Temporelli, *L'acqua nella storia* (Franco Angeli 2007) 158.

of contextual factors. In other words, the heterogenous framework of Roman law progressively faded away in favour of a more generalised protection of water under a single category of public waters.

To trace this evolution, it is necessary to start by describing the legal treatment of waters in the 1804 French civil code, the so-called Napoleonic code. In fact, this civil code impacted many other civilian countries, such as the Netherlands (1838 Dutch civil code), Italy (1865 Italian civil code) and Spain (1889 Spanish civil code).[437] According to Article 538 of the 1804 French civil code, the waters belonging to the national domain were only those navigable or floatable:

> Les chemins, routes et rues à la charge de la nation, les fleuves et rivières navigables ou flottables, les rivages, lais et relais de la mer, les ports, les havres, les rades, et généralement toutes les portions du territoire national qui ne sont pas susceptibles d'une propriété privée, sont considérés comme des dépendances du domaine public

All other waters located below, along or on privately owned land were instead under private property. For example, Articles 552 and 641 of the code indicates that the landowner can make full use of, respectively, groundwater and springs rising on her land.[438] It follows that apart from navigable rivers, water was regarded as a resource which individuals could freely use within the limits provided for the law. The approach towards

[437] The French system of water law also influenced its colonies beyond the Ocean and possibly some countries in Latin America who became independent from Spain in the course of the 19th century. See e.g. Caponera D.A., *Principles of Water Law and Administration* (Balkema 1992).

[438] Article 552 of the 1804 French Civil Code states 'La propriété du sol emporte la propriété du dessus et du dessous. Le propriétaire peut faire au-dessus toutes les plantations et constructions qu'il juge à propos, sauf les exceptions établies au titre *des Servitudes ou Services fonciers*. Il peut faire au-dessous toutes les constructions et fouilles qu'il jugera à propos, et tirer de ces fouilles tous les produits qu'elles peuvent fournir, sauf les modifications résultant des lois et règlements relatifs aux mines, et des lois et règlements de police'. Article 641 of the 1804 French Civil Code states 'Celui qui a une source dans son fonds, peut en user à sa volonté, sauf le droit que le propriétaire du fonds inférieur pourrait avoir acquis par titre ou par prescription'.

water in terms of property categories was thus schematic and the distinction clear-cut: water was either public (i.e. navigable rivers) or private (all other waters).[439]

However, one must note that the category of public waters has not remained constant since then. It has expanded over the years. This tendency not only entailed a larger role of the state in the management of water resources, but also suggested that water should be viewed as a *single* resource to be protected regardless of its specific manifestation nor the particular nature of the places. Although this evolution had a different degree of strength depending on the specific legal system considered,[440] it can be traced in many jurisdictions of civil law. For example, while France has adopted a more nuanced approach, Italy and Spain fully embraced the subsumption of all (if not all) waters under a single category of public property.

It is appropriate now to briefly sketch this evolution in these countries starting with the more nuanced approach taken in France. As previously mentioned, the Napoleonic code qualified only navigable rivers as public waters. An annex to the ordinance of July 10, 1835 expressly listed all these public streams.[441] This enumeration could be contested and ultimately changed due to the lack of a precise definition of navigability and floatability prior to the law of 8 April 1910.[442] Article 128(3) of that law makes the reclassification of rivers impossible, except through legislative amendment: '[l]es cours d'eau, portions de cours d'eau et canaux ainsi définis ne pourront être distraits du domaine public qu'en vertu d'une loi'.[443] In addition, this same law marked the beginning of an expansion of the category of public waters by allowing the state to acquire other waters for the purpose of public works

[439] A simplified approach can also be identified in the English common law system. This system decided to adopt the category *res communis omnium* of Roman law for all waters. In other words, no ownership of water is possible. The only water that could be privately owned is the one which accumulates or falls on somebody's land.

[440] This may be caused by a certain path-dependency in the evolution of rights and remedies in every single jurisdiction. See on this point Joseph Dellapenna and Joyeeta Gupta, 'Toward Global Law on Water' (2008) 14(4) Global Governance 437, 438.

[441] This ordinance was the implementation of the law of April 15, 1829.

[442] See e.g. Ludwik A. Teclaff, 'Private Water Rights in France and in the Eastern United States' (1962) 11(4) The American Journal of Comparative Law 560, 562 and Piotr Szwedo, *Cross-border water trade: legal and interdisciplinary perspectives* (Brill 2018) 54-55.

[443] Loi de finances du 8 avril 1910, Journal Officiel, 10 avril 1910. Art. 128.

Half a century later, the Law No. 1245 of 16 December 1964 further extended public ownership to waters necessary for domestic, agricultural and industrial supply based on a request by the Minister concerned and upon declaration by the Council of State.[444] While this law allowed for a consideration of the public use of a watercourse, this was done at a more central level and with the consideration of general interests. This law also made no use of the term private ownership, using instead the more neutral term non-state owned (*non-domaniaux*).[445] Finally, the Ordonnance 2006-460[446] rationalised the fragmented regulatory framework existing at that time by establishing the general code of property belonging to public persons and providing a simpler definition of public waters in Articles L2111-7 and L2111-10.[447]

As anticipated earlier, certain legal systems showed an even clearer trajectory towards a more uniform view of water. These are, for instance, Italy and Spain. With regard to Italy, the 1865 Italian civil code limited the public character of waters to all rivers – perennial and torrential. This regulatory framework was further complemented by some special laws that qualified lakes and all the other minor watercourses as public.[448] Subsequently, the 1933 royal decree no. 1775 broadened the public domain by including water springs that could be of public interest – not being needed the actual public use.[449] This condition has then been overcome by the combined provisions of Article 822 of the 1942 Italian Civil Code, Article 1(1) of the law No. 36 of 1994[450] and D.P.R. n. 238/1999[451]. According to those regulatory provisions, all waters are publicly owned

[444] Art. 29. Loi n° 64-1245 du 16 décembre 1964 relative au régime et à la répartition des eaux et à la lutte contre leur pollution, JORF, 18 décembre 1964, p. 11258.
[445] See e.g. Section 1 of the first Chapter of Title II.
[446] Ordonnance n° 2006-460 relative à la partie législative du code général de la propriété des personnes publiques du 21 avril 2006.
[447] Julie Laussat, *Code général de la propriété des personnes publiques et identification du patrimoine des collectivités territoriales* (PhD diss. Pau 2015) 265.
[448] See e.g. Regio Decreto 9 Ottobre 1919, n. 2161.
[449] Art. 1. Regio Decreto 11 Dicembre 1933, n. 1775, Testo Unico delle disposizioni di legge sulle acque e impianti elettrici. G.U. 8 gennaio 1934, n. 5.
[450] Legge 5 gennaio 1994, n. 36, Disposizioni in materia di risorse idriche. G.U. 19 gennaio 1994, n.14 - Suppl. Ordinario n. 11.
[451] D.P.R. 18 febbraio 1999, n. 238. Regolamento recante norme per l'attuazione di talune disposizioni della L. 5 gennaio 1994, n. 36, in materia di risorse idriche. G.U. 26 luglio 1999, n. 173.

regardless of a general interest – and as recently confirmed by a judgment from the Court of Cassation.[452]

The Spanish experience is not so dissimilar from the Italian one. Articles 407 and 408 of the 1889 Spanish civil code followed the same distinction between public and private waters established by the Napoleonic code.[453] However, the Spanish civil code started including additional types of water under the category of public property already in 1889. For example, there is no longer any reference to the navigability criterion; all watercourses, be they navigable or non-navigable rivers or streams, are part of public waters. Yet, a uniform view of water had not been realised yet. For that, it was necessary to wait the Law 29/1985 that vested ownership of almost all waters in the state.[454] The preamble of this law is very explicit in this regard: '*…para el recurso, de una sola calificación jurídica, como bien de dominio público estatal, a fin de garantizar en todo caso su tratamiento unitario, cualquiera que sea su origen inmediato, superficial o subterráneo…*'. A unitary treatment of water requires that all waters should fall under a single property category and, namely, the public property.

To sum up, the modern understanding of water tends to view water as a unitary resource. Water has undergone a process of abstraction and the focus of individuals is on water as such. This approach seems to reverberate in the contemporary regulatory frameworks. Although there may be different types of water, legislators attempted to focus on a more generalised protection of water. To facilitate this policy endeavour, civil jurisdictions tends to subsume most of the waters under a single category of public property. By extending the public nature to most (if not all) waters, modern regulation tends to pay less attention to the contextual factors.

[452] Cassazione civile, Sez. Unite, sentenza n. 18215 del 17 settembre 2015.

[453] Laura Movilla Pateiro, *El derecho internacional del agua: los acuíferos transfronterizos* (JM Bosch 2014) 168.

[454] Ley 29/1985, de 2 de agosto, de Aguas. Ref. BOE-A-1985-16661. This law has been subsequently amended several times. Interestingly, the law 1/2001 expressly includes the waters from sea desalination as public property, too. See e.g. Real Decreto Legislativo 1/2001, de 20 de julio, por el que se aprueba el texto refundido de la Ley de Aguas. Ref. BOE-A-2001-14276.

5. The reality on the ground

This chapter showed that individuals in the modern era think of water as a uniform substance which requires a unitary regulatory treatment. Having considered both the pre-modern and modern understanding of water, one may be tempted to argue that this shift in conceptualisation was necessary in light of the developments in human thought, that the scientific progress justified the adoption of an essentialist conception. Thinking about many waters would be outdated. Water is H_2O and its chemical composition cannot be contested. In line with this view, a modern regulation attempting to address water-related issues should not focus on distinguishing between different types of water, but rather recognise the unity of the water cycle. In other words, water should be treated uniformly.

At first glance, this conclusion might seem reasonable. However, would this conceptualisation of water and, accordingly, its consequent regulatory consequences reflect reality? One may doubt it. Water has several concrete manifestations. This is a rule of nature that it is not possible to change. Besides, the previous chapter showed that these multiple manifestations greatly influence the understanding of water. They also account for specific policy preferences. Individuals have diverse views on how to manage water, depending on its specific, context-dependent features. Viewing water as, say, a religious good may yield a different policy approach from perceiving it as a marketable commodity. Water is a complex resource that is highly interconnected with society. It escapes easy definitions and it encompasses multifaceted conceptualisations in science and society.

Under these circumstances, one has to admit that the modern, unitary view may not fully correspond to reality. A modern conceptualisation risks not to easily capture the various manifestations of water. This approach would tend to overlook the various contextual factors given by the sociocultural perceptions of water. Current trends in scholarship and policymaking corroborate this interpretation.

The academic, socio-cultural analysis of water management has begun to gain traction.[455] For example, the concept of hydrosocial cycle has acquired particular prominence in geography and environmental studies. It was original proposed by

[455] Jamie Linton, 'Modern water and its discontents: a history of hydrosocial renewal' (2014) 1(1) Wiley Interdiscipl. Rev.: Water 111, 118.

Swyngedouw, who built the theory on the well-known hydrological cycle.[456] While the hydrological cycle describes the *natural* continuous movement of water in the Earth-atmosphere system, the hydrosocial cycle stresses the relationship between water and social processes.[457] In other words, it criticises the artificial division between society and nature.[458] Socio-cultural contexts and water management *internally* shape each other.[459] Water as we know it is the result of an interaction between society and the natural features of water.[460] Overlooking this hybrid aspect would mean neglecting the true nature of water. A modern view of water, which focuses on the scientifically defined aspects of water to the exclusion of all other factors, is unfit for purpose.

From a policy perspective, the paradigm of integrated water resource management, which will be described in detail in the following chapter, builds on the fact that water is a cross-cutting issue that should be regulated holistically.[461] In other words, this water management paradigm acknowledges that water is not a single unitary substance devoid of context, but a resource that assumes different meanings and uses depending on context. The sustainability concept, which is embedded in various policy instruments, reaches a similar conclusion regarding the non-economic values attached to water as an essential element of policymaking.[462]

Against this background, Feitelson suggested a more flexible approach.[463] In his view, we should break down water into various types, each corresponding to a different regulatory approach.[464] Other authors, including natural scientists, have emphasised the relevance of the context-dependent features. For example, Chang advances 'scientific realism' whereby societal factors pertaining to reality complement science.[465] The

[456] Erik Swyngedouw, 'The city as a hybrid: on nature, society and cyborg urbanization' (1996) 7(2) Capitalism Nature Socialism 65.
[457] Jessica Budds, Jamie Linton and Rachael McDonnell, 'The hydrosocial cycle' (2014) 57 Geoforum 167.
[458] Jeremy J. Schmidt, 'Historicising the hydrosocial cycle' (2014) 7(1) Water Alternatives 221.
[459] Jessica Barnes, 'Mixing waters: the reuse of agricultural drainage water in Egypt' (2014) 57 Geoforum 181.
[460] Linton and Budds (n 29) 173.
[461] One can also argue that the same applies for the more recent paradigm of adaptive water management.
[462] UNGA 66/288 (n 158) paras 119-124.
[463] Feitelson (n 16); Feitelson (n 127).
[464] Ibid.
[465] Hasok Chang, *Is Water H20? Evidence, Realism and Pluralism* (Springer 2012) 219.

resultant conceptualisation of water will accommodate approaches other than chemistry and other natural science disciplines.

All this would induce us to favour an understanding of water that come closer to the pre-modern one. Importantly, this chapter showed that another model of water regulation is possible. Viewing water as a heterogeneous entity would allow us to differentiate between different kinds of water for regulatory purposes. The distinguishing features will not necessarily be the same as the ones discussed in antiquity, nor will its regulatory treatment. Actually, there is no need to distinguish water according to its effects on the human body or to distinguish among several categories of public property. However, acknowledging the existence of contextual factors that may require differential regulatory treatment would not only do justice to the nature of water but might also improve its management.

In summary, there are signs of a return to a pre-modern conception of water. Confining the definition of water to a single "container" gives rise to making its management more difficult task than first imagined. In fact, doing so may exclude some relevant features of water. Because of that, a fragmented conception that seeks to take into account water's heterogeneity seems better suited to the nature of water.

6. Concluding remarks

This chapter discussed how water regulation can be tailored to historical contexts. Specifically, it shows that the view of water has not remained constant over time. The modern understanding of water, that is a unitary essentialist conception, prevailed over the fragmented empiricist view of pre-modern times. This chapter also revealed that the regulatory framework tends to reflect a particular understanding of water that the society has at that specific moment. Viewing water as a fragmented resource has regulatory implications for its management. Roman law illustrates that. The lack of a single legal definition, the existence of several property categories and multiple interdicts limited to specific types of water corroborates this view.

Therefore, this chapter could be read on two levels. The text may be interpreted as a historical overview of how the Graeco-Roman experience with water differed from today's or as an effort to avail ourselves of the past experiences in water management. This dichotomy is very similar to the purposes of the analysis of Roman law (i.e. actualisation of Roman law or historical re-enactment) discussed above. While the current work took no side in the previous trade-off, here the latter option would be preferred. These findings in fact show not only that the historical context matters, but also that a different approach to water regulation is possible. This latter reflection becomes particularly salient in today's world, especially in light of recent trends in the scientific literature and policymaking that push for a fragmented conceptualisation of water and a holistic management thereof. This chapter, however, did not discuss this topic in detail, leaving a more in-depth and detailed analysis of integrated and fragmented regulation of water to the following chapters. For the moment, it is sufficient to highlight that the understanding of water has changed over time and this may have affected the regulatory framework. In other words, the historical context discussed in this chapter shows that societal views of water change over time and may shape its regulatory treatment. Taken together with the two earlier chapters, this finding implies that water is a context-dependent resource and so is its management.

CHAPTER V

THE PARADIGMATIC SHIFT TO INTEGRATION APPRAISED

1. Introduction

Water is a resource that is difficult to conceptualise. As shown by the previous chapter, its conceptualisation has varied over time. The pre-modern understanding of water was non-unitary, while the modern one tended to treat water as a unitary resource. The different conceptualisations of water have reverberated in water management. Attempts to devise a more standardised regulatory framework replaced a pre-modern, fragmented approach towards water resources. It emerges that humans have struggled to conceptualise and manage water since humanity's origin.

Recently, most academics and water professionals seem to agree that the conceptualisation of water is fragmented, but its management should be holistic. These two assertions build on the same rationale: water is a cross-cutting issue dependent on contextual factors. While the existence of multiple meanings and uses pushes us to see water as a heterogenous entity, we should strive to adopt an integrated approach to water regulation so that conflicts among different conceptualisations of water would be minimised.

The previous chapters have extensively discussed the veracity of the first assertion by focusing on how physical and sociocultural complexities affect the understanding of water both over time and extant. Specifically, they show that these complexities yield multifaceted conceptualisations of water in science and society, ultimately reinforcing a fragmented conceptualisation. It is then time to analyse the second assertion: whether integration is the proper response to manage water resources effectively. In response to that, this chapter aims to appraise the paradigmatic shift to integration which has taken place at the EU level.

The idea of adopting an integrated approach to water regulation stems from the currently dominant paradigm of Integrated Water Resource Management (hereafter

'IWRM'). The most commonly advanced argument for IWRM is that a comprehensive view of water resources would reduce conflicts between the different objectives of water policy as well as increasing coordination between different interrelated policies. At the European level, the implementation of an integrated approach took shape with the adoption of the Water Framework Directive.[466]

However, this chapter shows that a few questions have remained unanswered. The bulk of those questions revolve around the implementation phase of integration. What does integration mean in the EU context? Does integration work in its application? The literature on these questions is somewhat patchy. While the concept of integration has multiple elements, most scholars have focused solely on some very specific aspects thereof.[467] Interestingly, there have not been many holistic attempts to assess the effectiveness of integration as a whole.[468] Despite its limited breadth, previous research has undoubtedly provided interesting findings by offering well-grounded observations on particular facets of integration. Thus, this chapter collects all these efforts and treats them as pieces of a puzzle. It will then try to put the pieces together and eventually show that the results of integration at the EU level are mixed, at best. The shift to integration has manifested itself only at rhetorical level.

The remainder of the chapter focuses on the following topics. Section 2 discusses the concept of IWRM. It outlines how it became the new mantra of international water management and the reasons for its allure. Section 3 describes the development of EU water regulation. The entry into force of the Water Framework Directive heralded an integrated approach to water management, replacing – at least partially – the existing sectoral approach. Section 4 assesses the effectiveness of integration in its application. It collects existing literature and it systematises it according to the different components of integration. Section 5 concludes by identifying integration's failings and their underlying causes.

[466] Directive 2000/60/EC (n 13).
[467] See e.g. Howarth (n 18).
[468] Nikolaos Voulvoulis, Karl Dominic Arpon and Theodoros Giakoumis, 'The EU Water Framework Directive: From great expectations to problems with implementation' (2017) 575 Science of the Total Environment 358.

2. Integrated Water Resource Management

2.1. Introductory remarks

IWRM is unlike any other concept in water management at the moment, it has characterised the debate on water management in the last three decades and it will very likely continue to do so in the near future. This relatively recent paradigm of water management, however, seems very difficult to pin down. Some authors have already attempted to review its rich literature.[469] Others have identified various principles of water management and discussed their relationship with the IWRM concept.[470] This section does not intend to do either of these things. Rather, it aims at providing a historical overview of IWRM and a succinct discussion of its normative content. This investigation will turn out to be a useful tool for two reasons. Firstly, it contextualises the EU Water Framework Directive, which will be discussed in the following section, showing that an international push towards integration has spilled into the European policymaking. Secondly, it lays the ground for the subsequent analysis of the meaning of integration in the Water Framework Directive.

2.2. Integrated Water Resource Management: from simple suggestion to mantra

In the past, water management developed in a sectoral way.[471] Regulators tended to treat various water-related problems in isolation, with scant attention paid to their integration. There was no holistic view of the matter. For example, the issues of water quality and quantity covered different discourses in the policy and legal framework. Discussions on water quality mostly revolved around the realisation of individuals' basic needs and the protection of ecosystems. The purpose of establishing minimum water quality standards

[469] Sarah Hendry, 'Integrated water resource management and river basin planning' in Hendry n (31) 11; Mark Lubell and Carolina Balazs, 'Integrated Water Resources Management' in Ken Conca and Erika Weinthal (eds), *The Oxford Handbook of Water Politics and Policy* (OUP 2018), 569.

[470] Neil S. Grigg, *Water Resource Management: Principles, Regulations, and Cases* (McGraw-Hill 1996); Asit K. Biswas, *Water Resources: Environmental Planning, Management and Development* (McGraw-Hill 1997).

[471] Elli Louka, *Water law & policy: governance without frontiers* (OUP 2008) 23.

was to safeguard the human right to drinking water and sanitation. Also, it ensured that the environment would not be exposed to irreparable harm. The issue of water scarcity, on the other hand, became particularly salient in the industrial and agricultural sectors.

Regulations approached water-related problems separately. The various issues in water policy seemed entirely severed. A gradual shift away from this paradigm began in the mid-1970s.[472] Experts started acknowledging the intertwinement of water-related problems and began to advocate a more comprehensive approach to the management of water resources.[473] According to them, the traditional sectoral approach failed because it neglected the transversal aspects of water. Water management policy, as it was structured then, could not absorb the latest insights from the literature. To this end, international commentators started haltingly advancing the concept of IWRM. Specifically, the need for co-ordination within the water sector emerged at the United Nations International Conference on Water held in Mar del Plata in 1977.[474] There, the Mar del Plata Action Plan expressly states that '[i]ncreased attention should be paid to the integrated planning of water management'.[475]

This recommendation, however, did not spark further discussions on integration, nor did it yield any operational concepts. The time was not ripe, yet. The neglect of water-related problems at the international level characterised the following fifteen years.[476] While the need for coordination was no longer unknown to water professionals, it was still not topical in policy circles.[477] In short, the initial rise of co-ordination in academia did not coincide with an effective international endorsement of IWRM. An integrated

[472] Some authors pointed out that there were already instances where the idea of integrated management found expression. This was the case of the Tennessee Valley Authority in the US in the 1940s. See e.g. Gilbert F. White, 'Reflections on the 50-year international search for integrated water management' (1998) 1(1) Water policy 21.

[473] The very cross-cutting nature of water leads Biswas to argue that having a holistic approach is a tall order. See Asit K. Biswas, 'Water policies in the developing world' (2001) 17(4) International Journal of Water Resources Development 489.

[474] United Nations, 'Report of the United Nations Water Conference' (Mar del Plata, 14-25 March 1977) E/CONF.70/29.

[475] Ibid. para. 41.

[476] Muhammad Mizanur Rahaman and Olli Varis, 'Integrated water resources management: evolution, prospects and future challenges' (2005) 1(1) Sustainability: science, practice and policy 15.

[477] Ken Conca, *Governing water: contentious transnational politics and global institution building* (MIT Press 2006), 138.

approach represented only one of the modes of water management and not the dominant paradigm. For that, it was necessary to wait until 1992.

The Dublin International Conference on Water and the Environment was the first international forum to push for the use of IWRM in water management.[478] As per the conference report,

> '[t]he Conference was the first major meeting of world experts to focus on the holistic management of water in its proper context, that is, in the integrated spectrum of human and environmental uses and needs, as opposed to particular sectoral needs'.[479]

The resulting Dublin Statement identified the advantages of the holistic approach over the sectoral one. Furthermore, it elaborated certain principles that should guide IWRM, which are now called the Dublin Principles. The protection of the natural ecosystem and the need to acknowledge the economic value of water resources form part of these principles, among others. Table 4 quotes the enunciated principles. Yet, the impetus for promoting IWRM did not correspond to any substantial progress achieved by experts in spelling out the concept in a clear and unambiguous manner.

[478] This conference was not an intergovernmental conference, but a forum for water management experts. This particular setting led to accusations that developing countries had not been considered. Nevertheless, one cannot deny that its final recommendations have considerably shaped water policy in the following years.

[479] The Dublin Statement and Report Conference, International Conference on Water and the Environment: Development Issues for the 21st Century (Dublin, 26-31 January 1992), para. 1.8.

1	Freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment
2	Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels
3	Women play a central part in the provision, management, and safeguarding of water
4	Water has an economic value in all its competing uses, and should be recognised as an economic good

Table 4 - Quoting the four Dublin Principles

Six months later, the 1992 United Nations Conference on Environment and Development (the Rio "Earth Summit") marked the second milestone in the advancement of IWRM.[480] The aim of this intergovernmental conference was to reconcile the various priorities that the management of water resources had in different parts of the globe. IWRM served as a means of integrating environmental protection with socio-economic development.[481] In other words, the concept of IWRM, according to the Rio Earth Summit, was to be instrumental to the realisation of sustainable development. Chapter 18 of Agenda 21 reflects this approach. The promotion of an integrated approach as well as the attempts of experts to spell out the IWRM concept are readily observable in various parts of the text. For example, paragraph 18.3 contains a very concrete vision of integrated water management:

[480] United Nations, 'Report of the United Nations Conference on Environment and Development' (Rio de Janeiro, 3-14 June 1992) UN Doc. A/CONF.151/26/Rev. 1.

[481] Hubert HG Savenije and Pieter Van der Zaag, 'Integrated water resources management: Concepts and issues' (2008) 33(5) Physics and Chemistry of the Earth, Parts A/B/C 290, 293.

> The widespread scarcity, gradual destruction and aggravated pollution of freshwater resources in many world regions, along with the progressive encroachment of incompatible activities, demand integrated water resources planning and management. Such integration must cover all types of interrelated freshwater bodies, including both surface water and groundwater, and duly consider water quantity and quality aspects. The multisectoral nature of water resources development in the context of socio-economic development must be recognized, as well as the multi-interest utilization of water resources for water supply and sanitation, agriculture, industry, urban development, hydropower generation, inland fisheries, transportation, recreation, low and flat lands management and other activities.

Despite the wordiness of the foregoing provision, a precise definition of IWRM was (and remains) lacking.[482]

Nevertheless, these two conferences (i.e. Dublin International Conference and the Rio Earth Summit) of water management put IWRM under the spotlight and paved the way for a push towards integration at the international level. The implementation of the IWRM concept should, so the argument runs, complement its scientific endorsement and regulatory acceptance. In 1996, the establishment of the World Water Council (hereafter 'WWC') and the Global Water Partnership (hereafter 'GWP') aimed to implement IWRM at political and operational level, respectively.[483] The need for such institutions arose out of the failure to designate an international entity to deal with water holistically.[484] Prior to that, a laundry list of international bodies (WHO, WMO, FAO, UNESCO, UNDP, UNEP, UNICEF) dealt with different aspects of water individually. Furthermore, the WWC has prompted the establishment of various World Water Fora, where support for IWRM was part of the recommendations. For example, at the 2000 World Water Forum held in The Hague, water professionals pointed to the existence of a water crisis that could be solved through the implementation of the Dublin principles, including 'holistic' management.[485]

[482] Howarth (n 18) 301.
[483] Savenije and Van der Zaag (n 481) 293.
[484] Ibid.
[485] This Forum is also well-known due to the promotion of 'full cost pricing'. This idea proved divisive, with some fearing the hijacking of the forum by corporations. See Woodhouse and Muller (n 27).

At last, the second millennium saw the "full recognition" of IWRM in water policy. Since then, the integrated approach has attained unrivalled dominance. The international legal instruments adopted in that period reveal a shift in the actual approach to IWRM. The 2001 Bonn International Conference on Freshwater reviewed all the various principles in water management, suggesting IWRM as the most effective.[486] The 2002 World Summit on Sustainable Development in Johannesburg drew the same conclusions.[487] The Johannesburg Plan of Implementation urged the development of integrated water resources management and efficiency plans by 2005.[488] As Giordano and Shah put it, 'the [IWRM as a] means has become the end'.[489] The promotion of IWRM became a self-standing policy objective, superseding any other discussion on water policy. This led to the promotion of the IWRM concept as a sort of mantra. For instance, the first recommendation of the UN-Water survey stressed the need to recur to IWRM. It stated that 'countries, particularly those that are lagging behind, need to prioritise the development of IWRM and water efficiency measures, with the help of supporting agencies'.[490]

Building on previous research, this historical overview shows how IWRM came to serve as a new paradigm for water management. The last decades have seen a significant surge in the advancement of IWRM.[491] Policymakers, academics and water professionals promoted the adoption of a holistic and comprehensive approach towards water resources everywhere and always.[492] Starting from the mid-1990s, the hitherto esoteric concept of IWRM gained international prominence. Figure 5 graphically shows this trend: a substantial increase in the use of the term 'integrated water resource management' in

[486] International Conference on Freshwater, *Report Bonn Freshwater Conference 3-7 December, 2001 for DGIS*, 1.
[487] United Nations, 'Report of the World Summit on Sustainable Development' (Johannesburg, 26 August-4 September 2002) A/CONF.199/20.
[488] See especially paragraph 26.
[489] Mark Giordano and Tushaar Shah, 'From IWRM back to integrated water resources management' (2014) 30(3) International Journal of Water Resources Development 364, 366.
[490] UN Water, *Status Report on Integrated Water Resources Management and Water Efficiency Plans for CSD16* (2008).
[491] Rahaman and Varis (n 476) 15.
[492] Biswas (n 37).

textual sources occurred in that period. Both the normative content and the structural causes of the ascendancy of IWRM will be discussed in the next subsection.

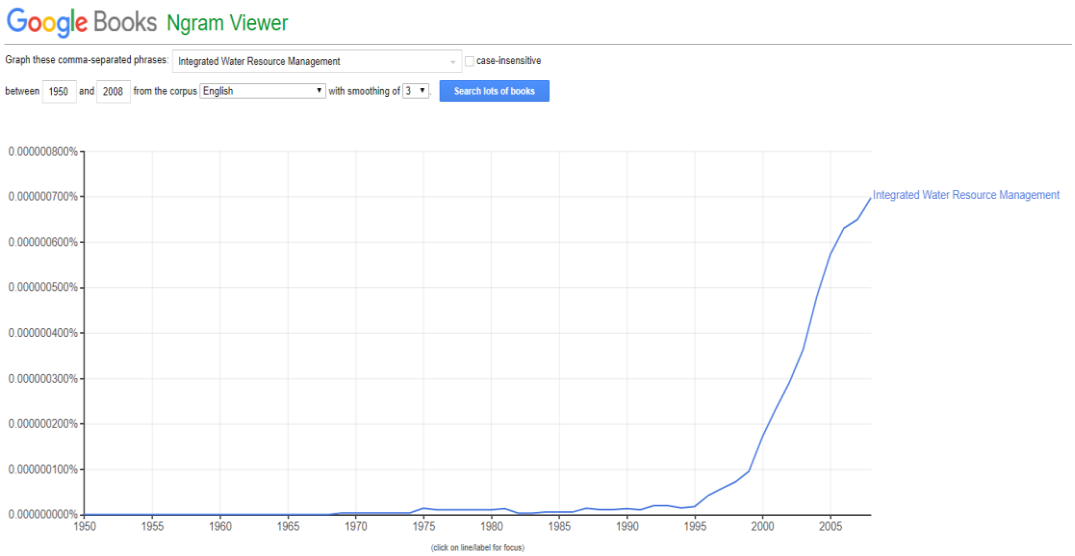

Figure 5 - NGram Viewer for the word 'Integrated Water Resource Management'

2.3. The attractiveness of Integrated Water Resource Management

The process that led to the advancement of IWRM is more varied than one would imagine. While IWRM has become increasingly popular, its content is underdetermined. Its definition has proven very fluid. At this point, one may wonder what IWRM means, exactly. Unfortunately, different actors have shaped the operationalisation of IWRM, leading to a nebulous concept that has ultimately become difficult to pin down and implement.[493] No single, unambiguous definition exists. The most cited definition of IWRM in the literature is the one put forward by the GWP. According to the Partnership, IWRM is 'a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social

[493] Annika Kramer and Claudia Pahl-Wostl, 'The global policy network behind integrated water resources management: is it an effective norm diffusor?' (2014) 19(4) Ecology & Society 10.

welfare in an equitable manner without compromising the sustainability of vital ecosystem'.[494]

This study takes the above definition of the GWP as a point of reference, in line with previous literature.[495] One can make a few observations about the alleged advantages of this definition to water professionals. Firstly, the meaning of IWRM is malleable and vague. It encompasses a wide array of issues, ranging from socio-economic needs to ecosystem preservation and thus protection of biodiversity.[496] The reason lies in the 'process dimension' of IWRM: its conceptualisation is in constant motion.[497] Its dynamic nature becomes apparent when considered in the context of the evolution of IWRM described in the previous subsection. While the underlying rationale was the need for co-ordination among the various values attached to water, subsequent interpretations started encompassing many additional meanings.[498] Indeed, the definition provided above is not limited to ensuring co-ordination. Instead, it seeks to embrace various competing objectives – (social) equity, efficiency, and ecological integrity. This specific definition of IWRM has expanded from its "original" meaning, though it has remained silent on the extent of the integration required. Thus, the flexibility of the integration concept – together with the complete absence of specific operational requirements – ensures broad acceptance among experts in water policy.[499]

Secondly, and relatedly, IWRM provides decision-makers with a *generic* roadmap on how to manage water resources without a standardised formula. This is handy when it is

[494] Global Water Partnership, *Integrated Water Resources Management. Technical Advisory Committee Background Paper no. 4* (2000) 22.
[495] See e.g. Torkil Jønch-Clausen and Jens Fugl, 'Firming up the conceptual basis of integrated water resources management' (2001) 17(4) International Journal of Water Resources Development 501; Rahaman and Varis (n 476); Paul Jeffrey and Mary Gearey, 'Integrated water resources management: lost on the road from ambition to realisation?' (2006) 53(1) Water science and technology 1; Wietske Medema, Brian McIntosh and Paul Jeffrey, 'From premise to practice: a critical assessment of integrated water resources management and adaptive management approaches in the water sector' (2008) 13(2) Ecology and Society 29.
[496] Lubell and Balazs (n 469).
[497] Molle (n 280) 132.
[498] Stephen Brichieri-Colombi, *The world water crisis: The failures of resource management. Vol. 14* (IB Tauris 2008) 12.
[499] Conca (n 477).

necessary to integrate all the various dimensions and values.[500] In fact, the management of water resources often entails trade-offs and priority setting. Although IWRM purports to integrate various and different priorities while maximising the various benefits, full integration is not always possible in practice.[501] The political negotiations under the IWRM framework are intended to achieve a balance between different goals.[502] From a practical perspective, certain principles that arise from IWRM offer some guidance. For example, full-cost pricing forces a recognition of water as an economic good, while the need for equitable allocation realises social welfare. However, the lack of common implementation rules limits the IWRM's potential as a catalyst in solving potential conflicts since the final choice is ultimately left to policymaker.[503] This latter feature seems particularly advantageous for policymakers since the interpretation of IWRM could vary with the entity responsible for its implementation. This is an extremely convenient aspect in water management, since each policymaker tends to perceive water differently and to influence policymaking from her own perspective.[504] Thus, appealing to the IWRM concept would allow policymakers to focus on the elements deemed most useful, while being backed by a legitimised process of water policy.[505]

IWRM also has drawn much criticism.[506] Commentators have questioned the practical scope of IWRM. Given the very diverse meaning attached to IWRM over the years, a common understanding that serves as a basis for a successful implementation

[500] For example, Savenije and Van der Zaag argue that the management of water resources must encompass four dimensions: the water resources – including water quality and quantity issues, the water users who raise discussions on the human dimension and the emerging economic interests, the spatial scales where water is managed, and the temporal scale. See Savenije and Van der Zaag (n 481) 292.

[501] Jønch-Clausen and Fugl (n 495) 503.

[502] Howarth (n 18) 301.

[503] V. S. Saravanan, Geoffrey T. McDonald and Peter P. Mollinga, 'Critical review of integrated water resources management: moving beyond polarised discourse' (2009) 33(1) Natural Resources Forum 76.

[504] This occurs also at the governmental level. For example, the Minister of Agriculture will have different policy preferences compared to the Minister of Transport or the Minister of Industry.

[505] John Anthony Allan, 'Integrated water resources management is more a political than a technical challenge' (2003) 50 Developments in Water Science 9.

[506] The most vocal or, at least, the most cited has been Biswas. See Biswas (n 37); Asit K. Biswas, 'Integrated Water Resources Management: Is It Working?' (2008) 24(1) International Journal of Water Resources Development 5.

seems unattainable.[507] It follows that there is a lacuna between theory and practice, with the result that many practical aspects of water management are neglected. Thus, Molle defines IWRM as a 'nirvana concept', that is a concept embodying 'an ideal image of what the world should tend to'.[508] Moreover, the various claims about water management stemming from IWRM can and do contradict each other. For example, the constant reference to local conditions makes it impossible to devise strategies of universal application.[509]

The risk that IWRM has become a floating signifier is real to many commentators. Others still argue that these critiques, though understandable, are not fully justified. The time for assessing the operative value of IWRM is not ripe yet and there is still a need to wait and see how IWRM will evolve.[510] This may have been true a decade ago. However, almost thirty years have passed since the 1992 Dublin Statement. It does not seem unreasonable to assess IWRM, even if that assessment is preliminary. To assess IWRM – or better, its underlying rationale (i.e. integration), this chapter takes the Water Framework Directive as an example.[511] According to Louka, the European directive is 'the first instrument that attempts to establish integrated water management in a consistent fashion on an international scale'.[512] The section that follows provides a description of the EU regulatory framework and its relationship with the concept of IWRM.

3. EU water law

3.1. Introductory remarks

Water has never escaped the attention of European lawmakers.[513] Over time, a large set of EU legal acts have regulated water in various domains. In this vast regulatory

[507] Lewis Jonker, 'Integrated water resources management: theory, practice, cases' (2002) 27 Physics and Chemistry of the Earth 719, 719.
[508] Molle (n 280) 132.
[509] Jeffrey and Gearey (n 495).
[510] John Butterworth, J. F. Warner, Patrick Moriarty, Stef Smits and Ch Batchelor, 'Finding practical approaches to integrated water resources management' (2010) 3(1) Water Alternatives 68, 70; Louka (n 471).
[511] Please consider that there will also soon be a check on the Water Framework Directive itself by the EU.
[512] Louka (n 471) 37.
[513] Ludwig Krämer, *EC environmental law* (Sweet & Maxwell 2000).

landscape, the Water Framework Directive (hereafter 'WFD') occupies centre stage. The WFD is an extensive piece of legislation whose main aim is to establish a basis for a comprehensive and coherent EU water policy.[514] To do so, it adopts a holistic approach, focused on the complex functioning of ecosystems. Furthermore, the preamble of this directive alludes to an integrated approach in the implementation of the WFD's provisions.[515]

It would seem, then, that the international push towards integration has also affected the policy discussions that led to the adoption and entry into force of the WFD.[516] Indeed, the WFD reflected a considerable shift in water legislation. Before 2000, EU legislation was sector-specific and had developed on a piecemeal basis. As the following subsection will show, the adoption of the WFD marked a turning point in the EU water legislative framework due to its integrated approach to water-related problems.[517]

However, this chapter will concur with other scholars' findings by showing that this shift has mostly been realised at a rhetorical level.[518] That is to say, there has been a mismatch between rhetoric and the letter of the law. But before delving into that, it is necessary to investigate how the concept of integration enshrined in the EU WFD emerged and what is its meaning in the EU regulatory framework. The following subsections focus on these two elements. First, subsection 3.2 sketches the historical development of EU water law and its (rhetorical) shift in approaching water resources through integration. Thereafter, subsection 3.3 provides a short discussion on the relationship between IWRM and WFD.

[514] Consider that the WFD – without including the documents pertaining to the CIS – is seventy-two pages long with eleven annexes. See Louka (n 471) 49.
[515] See e.g. Recital n. 9 of the WFD (n 13).
[516] Louka (n 471) 49.
[517] Kallis and Butler (n 33) 126.
[518] Howarth (n 18) 304; Philippe A. Ker Rault and P. J. Jeffrey, 'Deconstructing public participation in the Water Framework Directive: implementation and compliance with the letter or with the spirit of the law?' (2008) 22(4) Water and Environment Journal 241.

3.2. An evolution from a sectoral to an integrated approach

The first EU legislative proposals for water management date back to almost half a century ago. Throughout this period, European regulators did not approach the management of water resources uniformly. While early legislation tended to treat water-related problems in isolation through goal-based regulation, the WFD sought integration. Commentators divide the development of EU water policy by distinguishing three waves, the last one beginning with the adoption of the WFD itself.[519]

The first wave of EU water law began in the mid-1970s and, at that time, legislators' attention mostly focused on particular aspects of water resources. Specifically, the protection of public health was the primary reason to regulate.[520] To this end, the EU institutions adopted multiple directives aimed at improving the environmental quality standards of water for *particular* uses.[521] The measures mostly set mandatory and/or recommended quality standards that each member state had to respect. The 1975 Surface Water Directive,[522] the 1976 Bathing Water Directive[523] and the 1980 Drinking Water Directive[524] represent the most important legal instruments of this first wave.[525] Furthermore, the directives tackling particular pollutants' emissions to water

[519] See e.g. Giorgios Kallis and Peter Nijkamp, 'Evolution of EU water policy: a critical assessment and a hopeful perspective' (1999) Research Memorandum No. 27; Maria Kaika, 'The Water Framework Directive: a new directive for a changing social, political and economic European framework' (2003) 11(3) European Planning Studies 299; Helmut Blöch, 'European water policy and the Water Framework Directive: an overview' (2004) 3(1) J. Eur. Environ. Plann. Law 170.

[520] Kallis and Nijkamp (n 519) 1.

[521] Please note that the legal basis for the directives was either Article 100 and/or Article 235 Treaty of Rome. Both Articles allowed for a harmonisation of member states' laws in the interest of common market and other objectives, respectively.

[522] Council Directive 75/440/EEC of 16 June 1975 concerning the quality required of surface water intended for the abstraction of drinking water in the Member States, [1975] OJ L 194/26.

[523] Council Directive 76/160/EEC of 8 December 1975 concerning the quality of bathing water, [1976] OJ L 31/1.

[524] Council Directive 80/778/EEC of 15 July 1980 relating to the quality of water intended for human consumption, [1980] OJ L 229/11.

[525] Kallis and Nijkamp (n 519).

complemented the original legislative framework.[526] Public health aims thus characterised this first wave of legislation.

The late 1980s saw the start of the second phase of European legislation. This wave saw the regulator turn its full attention to the "environmental value" of water and, in particular, to pollution control and management. The ultimate objective was to address the most polluting sources. In addition, the establishment of a formal legal basis for environmental policy in the treaties favoured regulatory intervention by the EU.[527] In this way, the EU set specific emission levels – the so-called emission limit values – for different pollutants, as a means of achieving water quality standards. Single directives addressed pollution from specific types of water. The subject of EU legal instruments ranged from sewage treatment in urban wastewater to chemical pollutants in agricultural runoff. This period included the adoption of the 1991 Urban Waste Water Treatment Directive[528] and the Nitrates Directive.[529] In the same period, the 1996 Directive for Integrated Pollution and Prevention Control[530] aimed at preventing or reducing emissions to water, air and soil caused by large industries in a more concerted way.

Although one may consider this latter directive a first attempt at integration,[531] a sectoral approach still characterised the second wave of EU water legislation. In addition, the fragmentation that had occurred at the regulatory level was subsequently reflected at the implementation level.[532] While the member states implemented certain directives on time (e.g. drinking water), they faced substantive delays in translating other directives into national legislation.[533] This was the case for the directive on nitrate emissions, which did

[526] These directives aimed to provide a common basis for emissions standards across all member states. See e.g. Council Directive 76/464/EEC of 4 May 1976 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community OJ L 129/29 and its daughter directives.
[527] The first treaty to include the title "Environment" was indeed the Single European Act (Title VII) whereas Maastricht Treaty converted it into a "European Policy".
[528] Council Directive 91/271/EEC (n 140).
[529] Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources, [1991] OJ L 375/1.
[530] Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control, [1996] OJ L 257/26.
[531] Page and Kaika (n 278) 331.
[532] Kallis and Nijkamp (n 519) 7.
[533] Ibid.

not reach a satisfactory level of implementation.[534] The resulting framework did not satisfy European regulators. Despite undeniable progress in the EU water policy,[535] the high degree of heterogeneity in implementation stressed the need to protect water resources holistically.[536] This required an overhaul of existing legislation. The idea was to integrate separate but related directives and, at the same time, to update them to the latest advancements in science. These changes would, so the argument ran, ultimately lead to better compliance.

Against this background, the 1995 annual report of the European Environment Agency called for the adoption of a more integrated approach to water management.[537] This report went in the same direction as policy recommendations resulting from past ministerial seminars and international conferences promoting the advancement of IWRM described in the previous section.[538] A call for action to protect waters in all its various aspects (e.g. quantity and quality) led to the third wave of water legislation in Europe. As already indicated, the adoption of the WFD signalled the intention of embracing an integrated approach to water management.[539] The WFD aimed at combining the various interests protected in previous years with new, emergent needs. On the one hand, it repealed a number of older EU legal instruments by absorbing the operative provisions of six previously adopted sectoral directives and one Council decision.[540] On the other hand,

[534] Ibid.

[535] William Howarth, 'New strategies for water directives' (1992) 1 Eur. Envtl. L. Rev. 117.

[536] Theodoros Giakoumis and Nikolaos Voulvoulis, 'The Transition of EU water policy towards the water framework directive's integrated river basin management paradigm' (2018) 62(5) Environmental Management 819, 821.

[537] European Environment Agency, *Environment in the European Union – 1995: Report for the Review of the Fifth Environmental Action Programme* (EEA 1995)

[538] The reference is here to the Community Water Policy Ministerial Seminar in Frankfurt in 1988 and the Ministerial Seminar on groundwater held at The Hague in 1991. The latter urged to achieve sustainability 'through an integrated approach, which means that groundwater and surface water should be managed as a whole paying equal attention to both quantity and quality aspects; that all interactions with soil and atmosphere should be duly taken into account; and that water management policies should be integrated within the wider environmental framework as well as with other policies dealing with human activities such as agriculture, industry, energy, transport and tourism'.

[539] The adoption of the WFD was based on Article 174 that now corresponds to Article 192(1) TFEU and stays in the realm of environmental policy.

[540] These are the Surface Water Directive 75/440/EEC and its Daughter Directive on Sampling and Analysis 79/869/EEC, the Dangerous Substances Directive 76/464/EEC, the Decision on Exchange of Information on Surface Waters 77/795/EEC, the Fish Water Directive 78/659/EEC, the Shellfish Water Directive

it expanded the European legislation on water resources, providing a common framework for water management and protection across the EU.[541] Its overall goal reflected this dual purpose: achieving 'good' ecological and chemical quality status for all waters through an integrated approach to water management based on river basins, and combining emission controls with environmental quality standards.

However, the WFD has not established a comprehensive EU water legislation code. Despite forming the bulk of water regulation in the EU, the WFD is not the only applicable directive in the EU regulatory landscape on water. The WFD is embedded in a larger regulatory framework for water where other important water directives coexist. Considering the central role of the WFD, these other water-related directives are usually categorised in two main groups depending on their relation to the WFD. The first one consists of those directives that include the provisions and measures that are required into the so-called programme of measures which all states must establish for each river basin district as set out in Article 11 of the WFD. Examples of this type of directives, which are listed in Annex VI of the WFD, are the Bathing Water Directive 2006/7/EC,[542] the Drinking Water Directive 98/83/EC,[543] the Urban Waste-water Treatment Directive 91/271/EEC,[544] and the Nitrates Directive 91/676/EEC.[545] The second group, on the other hand, refers to those directives whose adoption has been triggered by the WFD. These directives, which are also known as "daughter directives", are the Groundwater Directive 2006/118/EC,[546] the Priority Substances Directive 2008/105/EC[547] and the Flood Risk

79/923/EEC, the Groundwater Directive 80/68/EEC. The first two Directives and Council Decision had to be repealed by 2007 while all the others by 2013. See Art. 22 of the WFD (n 13).

[541] Kallis and Butler (n 517).

[542] Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 concerning the management of bathing water quality and repealing Directive 76/160/EEC, [2006] OJ L 64/37.

[543] Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption, [1998] OJ L 330/32.

[544] Council Directive 91/271/EEC (n 140).

[545] Council Directive 91/676/EEC (n 528).

[546] Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration, [2006] OJ L 372/19.

[547] Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council, [2008] OJ L 348/84.

Directive 2007/60/EC[548]. The first two directives set specific quality standards for groundwater and surface water respectively while the Flood Risk Directive supplements the WFD in terms of flooding risk reduction.[549]

From this brief description of the EU water legislation, it becomes apparent that the WFD initiated a new regulatory phase aimed at more integration, but has not managed to integrate all water-related legislation within a single comprehensive legal text.[550] The European regulatory landscape on water is still relatively heterogeneous after the WFD. But, even setting aside the achievement of a single European legal framework on water, one must observe that the WFD is the central node of the EU water legislation.[551] In other words, the WFD provides the common framework of EU water policy and it is supported by other EU directives in the achievement of the set objectives. A good example is the abovementioned Groundwater Directive setting water quality standards and establishing measures to prevent or limit pollution in groundwater. The EU adopted this directive to address Article 17 of the WFD which requires the adoption of strategies to prevent and control pollution of groundwater. Therefore, the centrality of the WFD in the EU regulatory framework cannot be questioned. As Langlet and Mahmoudi define it, the WFD became – and currently is – 'the centrepiece of EU water law'.[552]

3.3. The relationship between IWRM and WFD

The previous subsection showed that the EU water policy evolved from a sectoral to an integrated approach. The WFD has been heralded as the first and most important step of the European policymakers towards integration. Surprisingly, however, the WFD does not explicitly endorse the concept of IWRM. The directive lacks any direct reference to

[548] Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks, [2007] OJ L 288/27.
[549] See e.g. Recital n. 4 of the Flood Risk Directive (n 548).
[550] Please consider that there are also some other directives that touch upon water-related aspects but whose main aim is not water itself. This is the case for Directive 2005/35/EC on Ship-source Pollution, Directive 2013/30/EU on Offshore Oil and Gas operations and Directive 2014/89/EU on Marine Spatial Planning.
[551] Monika Ambrus, Herman Kasper Gilissen and Jasper JH Van Kampen, 'Public values in water law: A case of substantive fragmentation' (2014) 10 Utrecht Law Review 8, 18.
[552] David Langlet and Said Mahmoudi, *EU environmental law and policy* (OUP 2016) 223.

'integrated water resource management'. What is then the relationship between IWRM and WFD? Some scholars have attempted to address this very relationship.[553] This chapter, though, cannot shy away from this endeavour. Indeed, answering this question would eventually allow us to identify what are the single integration elements that the EU wished to achieve with the adoption of the WFD.

At first glance, one might argue that the approaches put forward by IWRM and WFD are divergent. On the one hand, the discourse on IWRM is more holistic, since it seeks to provide a comprehensive response to the various multifaceted issues arising from the international water crisis. On the other hand, the WFD mainly aims to ensure environmental protection by laying down common principles: achieving a good ecological status for all water bodies while striking a balance with socio-economic interests seems to be its core objective.[554] It follows that the primary objectives of the European WFD are contingent upon local, context-dependent factors. The WFD's bond with a given geographically diverse area means that local circumstances, to a certain extent, preordain the particular type of integration required. Some authors corroborate this point.[555] For example, Rahaman et al show that the pursuit of narrow objectives by the WFD has led it to overlook some aspects that are essential to the implementation of IWRM such as the integration between different sectors.[556]

One should note, however, that the WFD and IWRM are not entirely separate, either. Integration is a core element of the WFD.[557] The important role played by integration in the WFD is perceptible, from both a teleological and a literal perspective. The 1998 report

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[553] Muhammad Mizanur Rahaman, Olli Varis and Tommi Kajander, 'EU water framework directive vs. integrated water resources management: The seven mismatches' (2004) 20(4) International Journal of Water Resources Development 565; Ross Beveridge and Jan Monsees, 'Bridging parallel discourses of Integrated Water Resources Management (IWRM): institutional and political challenges in developing and developed countries' (2012) 37(7) Water International 727; Insa Theesfeld and Christian Schleyer, 'Germany's light version of integrated water resources management' (2013) 23(2) Environmental Policy and Governance 130.

[554] Global Water Partnership (n 494).

[555] Butterworth et al (n 510) 70; Rahaman et al (n 553) 569-573.

[556] The other six 'mismatches' between IWRM and WFD are as follows: gender awareness, decentralisation, participation of stakeholders, focus on poverty, human-oriented management, and the development of responsibilities at lowest level.

[557] David Grimeaud, 'The EC Water Framework Directive – An Instrument for Integrating Water Policy' (2004) 13(1) Review of European Community & International Environmental Law 27, 29.

of the European Environment Agency is explicit in describing the role of integration: the WFD consists of 'an integrated approach covering all aspects of water management (including groundwater) under one framework document'.[558] The provisions of the directive were drafted to accord with this approach. The establishment of cost-recovery principle and polluter-pays principle, the drawing up of river basin management plans, the realisation of public participation, the precautionary principle and the principle of transparency all reflect essential elements linked to the IWRM concept.[559] For example, the term "integration" is repeated frequently in the directive. This is particularly apparent in its preamble.[560] Analogously, IWRM is not a foreign concept in the various guidance documents aimed at facilitating the implementation of the directive, the so-called Common Implementation Strategy (hereafter 'CIS'). One may simply refer to the WFD CIS Guidance Document No. 1 where integration is not only defined as 'key concept underlying the Water Framework Directive' but it is also partitioned in different elements such as the integration of all water resources and the integration of quality and quantity environmental objectives.[561]

Accordingly, it is possible to argue that the concept of integration operates at multiple levels in the WFD.[562] The EU adopted a single piece of legislation that purports to ensure the integration of competing objectives (conservation, economic, and equity) while regulating different types of water resources (surface waters, transitional waters, coastal waters and groundwater) in all their aspects (quality and quantity).[563] Because of this, WFD resembles a concrete subtype of IWRM. In line with this view, most scholars tend to treat the WFD as a regional effort towards integration and a possible blueprint for

[558] European Environmental Agency, *Environment in the European Union at the turn of the century* (EEA 1999) 177.
[559] Ker Rault and Jeffrey (n 518).
[560] See e.g. para. (7) and (9): 'action programme for *integrated* protection and management of groundwater' and 'It is necessary to develop an integrated Community policy on water' [emphasis added], respectively.
[561] European Commission, *Common Implementation Strategy for the Water Framework Directive (2000/60/EC) Guidance document No. 1* (European Communities 2003) 5.
[562] Ingela Andersson, Mona Petersson and Jerker Jarsjö, 'Impact of the European water framework directive on local-level water management: case study Oxunda catchment, Sweden' (2012) 29(1) Land Use Policy 73, 74.
[563] Blöch (n 519).

IWRM.[564] It is no coincidence that some have used the appellative of "IWRM of the North" to refer to the WFD.[565] In this way, the type of integration put forward by the WFD is a lighter version of the one provided for in IWRM.[566] As Heldt et al put it, the WFD is 'a more specific (framework) guideline for certain aspects of water management' compared to the 'broad general framework' of IWRM.[567] In a nutshell, although various factors contribute to the emergence of the WFD as a regulatory tool aimed at integration, IWRM and WFD are two parallel, yet distinct, approaches to integration.[568]

4. The application of the EU Water Framework Directive

4.1. Introductory remarks

The previous section discussed the influence of integration in the WFD. Now it is possible to investigate whether the EU institutions managed to achieve integration in its application and, if not, what are the underlying causes. The literature has attempted to address this question by focusing on particular elements of integration. Presently, it seems that no scientific work has evaluated the effectiveness of integration in its entirety. The analysis of the entire regulatory framework requires considerable effort. It will then only be possible to rely on studies that analyse the level of integration achieved in single elements of the WFD. By using them as a proxy for the overall success of the integration paradigm, the following subsections focus on the three main elements evaluated by previous literature. These are the integration of competing objectives, the integration between qualitative and quantitative aspects, and the so-called external dimension of integration.

[564] Andy Gouldson, Elena Lopez-Gunn, Jamie Van Alstine, Yvonne Rees, Miles Davies and Vijay Krishnarayan, 'New alternative and complementary environmental policy instruments and the implementation of the Water Framework Directive' (2008) 18(6) European Environment 359; David Benson, Andrew Jordan and Dave Huitema, 'Involving the public in catchment management: an analysis of the scope for learning lessons from abroad' (2012) 22(1) Environmental Policy and Governance 42.

[565] Global Water Partnership, 'Integrated water resources management in Central and Eastern Europe: IWRM vs EU Water Framework Directive' (2015) Technical Focus Paper, 22.

[566] Theesfeld and Schleyer (n 553) 132.

[567] Heldt et al (n 34) 28-29.

[568] Beveridge and Monsees (n 553).

4.2. The integration of competing objectives

The WFD reflected a paradigm shift in EU water policy. This was triggered by the acknowledgment of the complexity of water resource management, which faces the challenges of the co-existence of multiple actors with conflicting incentives and objectives. Increasing concerns about environmental sustainability highlighted the transnational and cross-sectoral dimension of water-related problems. All these considerations led commentators to question the ability of states to manage water effectively. The broader concept of "governance"[569] started replacing the traditional notion of "government" of water resources where states were the sole responsible for water-related issues. This shift required a new policy response. The integration paradigm is that response.

The EU committed to this aspect of integration at the beginning of the negotiation process for the WFD. Discarding command-and-control regulation while promoting public participation became part of the rationale of the directive.[570] The inclusion of all stakeholders was the key to map the various (possibly competing) interests and to their integration in the final legislative proposal. That was the intent of the European legislator.[571] Reality turned out somewhat different. Although the Commission opened up policymaking to various interested parties, an actual 'dissymmetry' was observed.[572] This

[569] The term "governance" can be defined as the process in which 'an organization or a society steers itself, and the dynamics of communication and control are central to the process'. See Steven A. Rosell, *Governing in an information society* (Institute for Research on Public Policy 1992), 21. This definition entails a plurality of actors (government, environmental and social NGOs, QUANGOs such as Environment Agencies, etc.) using various activities (laws, lobbying, etc.) at different levels (international, EU, national, local, etc.).

[570] David Woods, 'Stakeholder involvement and public participation: a critique of Water Framework Directive arrangements in the United Kingdom' (2008) 22(4) Water and Environment Journal 258, 259. Besides, one may note that the very concept of IWRM requires the realisation of public participation in decision-making. See Louka (n 471) 34.

[571] Ralf Boscheck, 'The EU Water Framework Directive: meeting the global call for regulatory guidance?' (2006) 41(5) Intereconomics 268, 268.

[572] Kaika (n 519) 304.

was mostly due to the institutional architecture of EU policymaking[573] and the leading role of DG Environment in the drafting of the WFD.[574]

Environmental NGOs were thus extremely important players in the negotiation process, diverting attention from other actors and promoting ecological ambitions within the directive.[575] The outcome was not surprising: most controversial discussions among actors concerned – and were limited to – environmental protection. In concrete terms, the WFD became a piece of legislation mostly oriented towards conserving environmental water quality in order to protect the environment.[576] This attention towards environmental objectives can be exemplified through the introduction of water pricing and public participation. As Kaika and Page put it,

> '[water pricing and public participation] initially appear to be beyond the conservation remit of the directive; however, the Commission portrayed them as necessary precursors to achieving the ecological goals. It was hoped that through pricing and participation water would be used more rationally and valued more highly'[577]

However, this does not mean that there were no internal struggles on how to achieve environmental objectives. Stakeholders, lobbying groups and institutional actors all

[573] Although the Treaty of Amsterdam became operational at the very end of the Directive's passage, the European Parliament – sympathetic to the environmentalists – sought and achieved a more strategic role in the whole negotiation process. See Kallis and Nijkamp (n 519).

[574] Maria Kaika and Ben Page, 'The EU Water Framework Directive: Part 1. European policy-making and the changing topography of lobbying' (2003) 13(6) European Environment 314. The point of greening the treaties is made in general terms in Sebastian Stetter, 'Maastricht, Amsterdam and Nice: the environmental lobby and greening the treaties' (2001) 10(5) European Energy and Environmental Law Review 151.

[575] Ibid. Regarding the powerfulness of environmental NGOs in general see Daphne Biliouri, 'Environmental NGOs in Brussels: how powerful are their lobbying activities?' (1999) 8(2) Environmental Politics 173.

[576] Howarth (n 18) 300.

[577] Kaika and Page (n 574) 317.

attempted to skew the process.[578] The frequent use of exemptions and derogations to the environmental objectives is testament to the troubled history of the proposals.[579]

The WFD appeared to be a political compromise rather than a legislative text aimed at integration.[580] Narrow interests superseded reaching an actual integrated agreement. The negotiation process was not as all-encompassing as the European legislator had wanted. Environmental objectives outweighed societal and economic ones. Despite good intentions, integration of competing objectives had mixed results in the negotiations. Still, it may well be that the implementation of the directive succeeded in integrating the conflicting objectives. However, there is evidence that this was not the case, either. Firstly, the directive lacks any strong reference to the human right to water or aspects thereof. Secondly, the WFD incorporates the economic dimension of water rather weakly. This section now turns to these issues.

Little is said of human rights and equity considerations in the WFD. Although Van Rijswick and Kessen portray the WFD as a European legislation combining IWRM and a human rights approach,[581] few provisions push in that direction. It is true that an increased protection of water quality – as targeted by the WFD – would secure drinking water supply.[582] However, it is also true that the efforts by the EU legislators to integrate human rights concerns into the WFD seem meagre. Two main reasons support this claim. Firstly, there is no legal right to realise the human right to water or to hold member states accountable if they fail to realise that right. As Van Rijswick and Kessen themselves conceded, individuals cannot seek legal redress from courts under the WFD directive.[583] Human rights protection usually arises from international and regional treaties, the EU

[578] Beveridge and Monsees (n 553) 738.
[579] Blandine Boeuf, Oliver Fritsch and Julia Martin-Ortega, 'Undermining European environmental policy goals? The EU Water Framework Directive and the politics of exemptions' (2016) 8(9) Water 388.
[580] Colin Green and Amalia Fernández-Bilbao, 'Implementing the Water Framework Directive: How to define a "competent authority"' (2006) 135(1) Journal of contemporary water research & education 65; Kallis and Butler (n 517); Klaus Lanz and Stephan Scheuer, *EEB Handbook on EU Water Policy under the Water Framework Directive* (EEB 2001) 49.
[581] Marleen Van Rijswick and Andrea Keessen, 'Legal protection of the right to water in the European Union' in Sultana and Loftus (n 210) 123.
[582] See e.g. Recital n. 24 and Article 1 of the WFD (n 13).
[583] Van Rijswick and Keessen (n 581) 127.

Charter of Human Rights[584] and, (constitutional) domestic laws. Secondly, and possibly most importantly, the WFD pays insufficient consideration to the various aspects (e.g. availability, safety, affordability) that are instrumental to the realisation of the right to water. A good example is water affordability. Article 9(1) of the WFD urge member states to 'have regard to the social, environmental and economic effects' when realising cost recovery and incentive pricing. At first glance, one may assume that the WFD does ensure the respect of equity objectives – thus integrating them in the regulatory framework. However, as Howarth stresses, the likelihood that individuals could enjoy protection from this specific provision is rather low.[585] It is sufficient to read the concurrent Commission's Communication on pricing policies to understand that the abovementioned provision will find limited applicability:

> 'The provision of water at artificially low prices to account for social and affordability objectives is a crude instrument for pursuing equity objectives. This form of subsidy encourages inefficient use and pollution. Thus, in situation of unsustainable water use, social concerns should not be the main objective of water pricing policies, although they need to be taken into account while designing new pricing policies. And social concerns are better dealt with through accompanying social measures'[586]

Therefore, it seems that the WFD does not fully address the issue of economic accessibility to water but prefers dodging it by adopting open-ended provisions whose scope of application remains to be tested. Another example where the directive does not really integrate equity considerations is the obligation to provide safe drinking water. Article 7(2) of the WFD is limited to state that water used for human consumption must meet additional requirements set out by the Drinking Water Directive. It follows that

[584] The EU Charter of Fundamental Rights has the same binding legal status of the Treaties after the entry into force of the Lisbon Treaty.
[585] William Howarth, 'Cost recovery for water services and the polluter pays principle' (2009) 10(4) ERA Forum 565, 570 and 573.
[586] European Commission, Communication on Pricing Policies for Enhancing the Sustainability of Water Resources COM(2000) 477, 16-17.

specific drinking water quality standards for administrative authorities and water companies that individuals can use in courts are within the remit of a different directive.[587] In this way, the WFD does not directly address elements of the right to water, but leaves their discipline to another pre-existing directive. All in all, the WFD contains sporadic references to equity considerations and, even on those occasions, on a secondary level (i.e. in a bid to secure environmental protection and *not* as a right to be granted to individuals).[588]

The second issue revolves around the "thorny issue"[589] of the integration of economic tools in water management. In line with some international conferences, the development of economic instruments has been intended as complementary to the pursuit of a good ecological status for water resources.[590] In particular, disproportionality of costs and cost-benefit analyses (Article 4), economic analysis of water uses (Article 5), cost recovery principle (Article 9), and cost-effectiveness analysis for water measures (Article 11) all express economic concepts and instruments in water regulation. However, the use of economic policy tools is mostly subordinated to the conservation outcome. For example, water pricing serves to incorporate the negative environmental externalities produced by water abstraction and pollution.[591] The idea is that the cost of water should include not only the financial costs of water provision *but also* environmental costs and service costs, the latter being the opportunity costs of water uses. Water pricing serves both as a way of rectifying environmental harm and as an incentive to limit water consumption.[592]

[587] Council Directive 98/83/EC (n 543).

[588] Joyeeta Gupta, Rhodante Ahlers and Lawal Ahmed, 'The human right to water: moving towards consensus in a fragmented world' (2010) 19(3) Review of European Community & International Environmental Law 294, 295.

[589] The cost recovery principle – as well as the use of other economic principles – in the water sector is a highly controversial issue. It does not come as a surprise that many exemptions were permitted. For example, Ireland provides domestic water free of charge and recovers the cost through taxation.

[590] See e.g. 1992 Rio Principle 16.

[591] See e.g. European Commission (n 586). For academic literature, see e.g. Dominic Moran and Sabrina Dann, 'The economic value of water use: Implications for implementing the Water Framework Directive in Scotland' (2008) 87(3) Journal of Environmental Management 484, 484.

[592] Please note, however, that there is no explicit provision for the compulsory allocation of water services costs in the WFD.

Against this background, it is possible to argue that the attempt to effectively integrate economic and environmental objectives failed. Specifically, previous research indicates that there is a mismatch between economics and the other dimensions of the WFD.[593] The poor incorporation of economic considerations permeates various directive provisions. Some authors show that the economic tools deployed (e.g. cost-benefit analysis and disproportionality) do not accommodate environmental and social objectives adequately.[594] Other authors point to the substantial challenges to the application of economic methods, owing to interactional complexity and lackadaisical harmonisation.[595] Cost-effectiveness analysis, as deployed in the directive, is a pertinent example of this latter finding.[596]

Another relevant problem identified by the scientific literature refers to the lack of clear and binding guidance, which ultimately yields several problems of interpretation and implementation.[597] For example, the wording used in Article 9 (replacing 'shall ensure' with 'shall take account of') weakens the water service cost recovery obligation and creates an ample margin of discretion.[598] As Howarth argues, cost recovery does not

[593] Julio Berbel and Alfonso Expósito, 'Economic challenges for the EU Water Framework Directive reform and implementation' (2018) 26(1) European Planning Studies 20; Julia Martin-Ortega, 'Economic prescriptions and policy applications in the implementation of the European Water Framework Directive' (2012) 24 Environmental Science & Policy 83; Patrick Steyaert and Guillaume Ollivier, 'The European Water Framework Directive: how ecological assumptions frame technical and social change' (2007) 12(1) Ecology and Society 1, 4.

[594] Martin-Ortega (n 593) 88; Blandine Boeuf and Oliver Fritsch, 'Studying the implementation of the Water Framework Directive in Europe: a meta-analysis of 89 journal articles' (2016) 21(2) Ecology and Society 14.

[595] Daniel Hering, Angel Borja, Jacob Carstensen, Laurence Carvalho, Mike Elliott, Christian K. Feld, Anna-Stiina Heiskanen et al., 'The European Water Framework Directive at the age of 10: a critical review of the achievements with recommendations for the future' (2010) 408(19) Science of the total Environment 4007.

[596] Bedru Babulo Balana, Andy Vinten and Bill Slee, 'A review on cost-effectiveness analysis of agri-environmental measures related to the EU WFD: Key issues, methods, and applications' (2011) 70(6) Ecological Economics 1021; Julio Berbel, Julia Martin-Ortega and Pascual Mesa, 'A cost-effectiveness analysis of water-saving measures for the water framework directive: the case of the Guadalquivir River Basin in Southern Spain' (2011) 25(2) Water Resources Management 623.

[597] Brian Moss, 'The Water Framework Directive: total environment or political compromise?' (2008) 400(1-3) Science of the total environment 32; Moran and Dann (n 591).

[598] Herwig Unnerstall, 'The principle of full cost recovery in the EU-water framework directive – genesis and content' (2007) 19(1) Journal of Environmental Law 29, 31.

appear to be required always under the current framework.[599] Firstly, it only applies to 'water services'. Secondly, within 'water services', states still decide how application should work in practice (i.e. they are allowed to have regard to 'social, environmental and economic effects' and particular geographical circumstances).[600] The advent of further *non-binding* guidance such as the CIS[601] did not improve the situation considerably.[602]

These issues have become a major impediment to the successful integration of the economic dimension into the WFD. In 2019, the European Commission acknowledged the so far inadequate use of economic analysis in water policy.[603] The underlying causes identified by the EU institutions themselves match those highlighted in academic studies: lack of knowledge capital in water economics, as well as the lack of common, harmonised methodologies and rules among member states.[604]

In summary, the environmental side of the directive is more developed than its social and economic dimensions. Building on the existing research, this subsection showed that attempts to realise integration between the three objectives were not particularly successful both at the negotiation and implementation phases. The integration of competing objectives in the WFD has been meagre. The next subsections will investigate if this is also the case for the other elements of integration.

[599] Howarth (n 585) 570.
[600] See e.g. Case C-525/12, *European Commission v Federal Republic of Germany* (2014) 11 September 2014 E.C.R. 1-2202.
[601] In the specific case of cost recovery and economic analysis the relevant working group was WATECO led by France and the European Commission whose final document was *Economics and the Costs*.
[602] Howarth (n 585) 574; Rodrigo Maia, 'The WFD implementation in the European member states' (2017) 31(10) Water Resources Management 3043; Erik Gawel, 'Article 9 of the EU Water Framework Directive: Do We Really Need to Calculate Environmental and Resource Costs?' (2014) 11(3) Journal for European Environmental & Planning Law 249. For an opposing view, see Turrini (n 38) 94.
[603] European Commission, 'Report from the Commission to the European Parliament and the Council on the implementation of the Water Framework Directive (2000/60/EC) Second River Basin management plans' COM(2019) 95 final, 5.
[604] European Commission, 'European Overview – River Basin Management Plans' SWD(2019) 30 final, 17.

4.3. The integration of qualitative and quantitative aspects

The WFD does more than integrate competing objectives. The concept of integration should operate at multiple levels. It encompasses the adoption of a holistic approach in the management of different types of water resources in their qualitative and quantitative aspects. This task, however, is a particularly complicated endeavour. Integration was not the underlying rationale of past water policies where multiple sectoral directives characterised the first and second phase of European legislation. Thus, the WFD had to integrate all these previously adopted directives within a single legal text for integration to be achieved. Admittedly, this attempt was only partially successful. As shown in the previous subsection, the European regulatory landscape is still relatively heterogeneous. Many pre-existing directives are still in force and others have been adopted thereafter. But, even setting aside the achievement of a comprehensive European legal framework on water, the integration of different types of water resources in their qualitative and quantitative aspects has resulted to be problematic. The WFD did not meet the expectations of its preamble or the academic community.[605] The reasons identified by the literature are twofold: firstly, the legal basis of the WFD is deficient and, secondly, there is a lack of integration in the very content of the legal provisions.

The imbalance between qualitative and quantitative aspects in the WFD to a considerable extent originates from the EU's own statutory constraints. Specifically, this is due to the reading of Article 175 as amended by the Amsterdam Treaty, which provided the legal basis for the adoption of the WFD.[606] According to paragraph 1, the adoption of a law characterised by environmental objectives – such as the WFD – requires a qualified majority within the Council of Ministers. A number of derogations, however, restrict the application of this ordinary legislative procedure. In specific cases, paragraph 2 of Article

[605] With regard to scholars see e.g. Erik Mostert, 'The European water framework directive and water management research' (2003) Physics and Chemistry of the Earth, Parts A/B/C 28 523, 525. With regard to the preamble, see e.g. Recitals n. 7, 19, 23, and 25 of the WFD (n 13).

[606] In this regard, it is necessary to recall that the WFD was adopted in 2000 with the introduction of co-decision by the Treaty of Amsterdam. Thus, Article 175 in the Treaty of Amsterdam was previously numbered Article 130s of the Treaty establishing the European Community (Maastricht Treaty) and currently Article 192 of the Treaty on the Functioning of the European Union (Lisbon Treaty).

175 requires unanimity, thus granting a veto power to every single member state. The 'management of water resources' was one of these explicit exceptions.

However, the dividing line between the first and second paragraph is ambiguous. The phrasing (i.e. 'management of water resources') used by the Treaty might indeed give rise to varying interpretations. More concretely, would the 'management of water resources' include any regulatory measure impacting on water use? A clarifying response, yet not a definitive one, came from a judgment of the European Court of Justice.[607] There, the Court stated that Article 175(1) is applicable as long as the quantitative issues of water are secondary to the qualitative ones.[608] Thereafter, the Nice Treaty – and lately the Lisbon Treaty – has indirectly confirmed this interpretation. The current Article 175(2) reads as follows: 'quantitative management of water resources or affecting, directly or indirectly, the availability of those resources'.[609] In addition, it is also possible to note that the ECJ indirectly touched the issue once again in a relatively recent judgment by stating that the WFD 'is primarily concerned with the quality of the waters concerned' and that '[c]ontrol of quantity is an ancillary element in securing good water quality'.[610]

Against this background, the European legislator decided to limit the legal basis of the WFD to Article 175(1). Using the ordinary legislative procedure increased the likelihood in finding a consensus among member states. The negotiations leading to the adoption of the WFD were tough, being characterised by a tug-of-war between multiple competing interests.[611] However, given the choice to apply the less demanding procedure, a comprehensive framework encompassing qualitative *and* quantitative aspects could not be realised.[612]

That "original sin" is reflected in the content of the legal provisions of the WFD, too. Regulatory constraints geared the attention of the European regulator to water quality. It

[607] Case C-36/98, *Kingdom of Spain v Council of the European Union* (2001) 30 January 2001 E.C.R. 1-810.
[608] Ibid. Para 52.
[609] The reference to the quantitative aspects of water in Article 175 has not been subject to changes in the Treaty of Lisbon.
[610] Case C-525/12 (n 600).
[611] Kaika and Paige accurately and thoroughly describe the negotiations between the various institutions and member states. See Page and Kaika (n 278) and Kaika and Page (n 574).
[612] Howarth (n 18) 305.

is sufficient to read the purposes set out in the WFD to notice an emphasis on the qualitative aspects. As Article 1 states:

> 'The purpose of this Directive is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater which:
> (a) prevents further deterioration and protects and enhances the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands directly depending on the aquatic ecosystems;
>
> (b) promotes sustainable water use based on a long-term protection of available water resources;
>
> (c) aims at enhanced protection and improvement of the aquatic environment, inter alia, through specific measures for the progressive reduction of discharges, emissions and losses of priority substances and the cessation or phasing-out of discharges, emissions and losses of the priority hazardous substances;
>
> (d) ensures the progressive reduction of pollution of groundwater and prevents its further pollution, and (e) contributes to mitigating the effects of floods and droughts'

The text of the Article is crystal clear in this regard. Water quality protection takes centre stage, while water quantity assumes a complementary role, if it assumes any role at all. Concerns about water quality dominate four out of the five sub-paragraphs of Article 1. Yet, the lack of integration between qualitative and quantitative aspects does not emerge only from the analysis of the purposes set out by the directive.

The normative content of the WFD does the rest. As Howarth shows, the WFD treats the attainment of any quantitative requirements for water flows in surface waters as a secondary issue[613] – 'good water status' requires 'the achievement of the values specified (…) for the biological quality elements' without any reference to quantitative matters.[614]

[613] Howarth (n 18) 306.
[614] Annex V, Table 1.2, WFD (n 13).

In other words, the quantitative requirements have legal importance only where the qualitative status of surface waters impedes the achievement of good water status.[615] This means that if the member states are able to meet the qualitative objectives, water quantity has no longer significance.

These provisions, however, are not applied to every particular type of water. For example, the WFD provides an explicit quantitative requirement for good status in groundwater. As set out in the Annex V, the groundwater level should be set so that 'the available groundwater resource is not exceeded by the long-term annual average rate of abstraction'.[616] This quantitative requirement does not apply to other types of water. In this way, the regulatory framework lacks integration not only between qualitative and quantitative aspects but also among different types of water due to different hydrological and morphological conditions of surface water and groundwater.

In summary, the integration of this the integration of qualitative and quantitative aspects seems not to have been too successful. That conclusion is shared by the EU institutions. The European Environment Agency called for more integration of the quantitative aspects in one of its reports.[617] Likewise, the European Commission called for a 'more solid foundation' for quantitative water management.[618] These demands were heeded. The establishment of CIS guidance documents served as an attempt to address the issue of integration. In more detail, WFD CIS Guidance Document No. 31 purports to provide a shared understanding of 'ecological flows' – a key term for the achievement of good water status - that should be relevant to all water types and that should include water quantity aspects.[619] Moreover, the same CIS Guidance Document No. 31 calls for the establishment of monitoring programmes that should be inclusive of quantitative aspects

[615] Howarth (n 18) 306. Thereafter, the author also mentions an increased attention to quantitative matters in the case of high status surface waters as well as possible exception to the attainment of good water status in the case of artificial water bodies or heavily modified water bodies.
[616] Annex V, 2.1.2, WFD (n 13).
[617] European Environment Agency, *Europe's Water Resources: Current Status and Future Challenges. Report No. 9/2012* (EEA 2012).
[618] European Commission, A Blueprint to Safeguard Europe's Water Resources, COM(2012) 673 final, 6.
[619] European Commission, *Common Implementation Strategy for the Water Framework Directive (2000/60/EC) Guidance document No. 31* (European Communities 2015), 24.

as set out in CIS guidance documents No. 7 and No. 15.[620] Whether this initiative will succeed remains an open question. Guidance Documents are not legally binding, but they depend on the political will of each member state. As the Strategic document on the CIS highlights at its very beginning, the responsibility for implementation is 'fully within the competence of the individual member state'.[621] There could be the risk that narrow interests would supersede European ones.[622]

4.4. The external dimension of integration

The last two subsections showed that there is little integration in the WFD between competing objectives as well as between qualitative and quantitative aspects. By doing so, they discussed aspects related to the *internal* dimension of integration, that is the integration to be realised within the WFD itself. Yet, the concept of integration in the WFD extends beyond its internal dimension. As the WFD CIS Guidance Document No. 1 clarifies, the concept of integration has an *external* dimension as well.[623] This dimension refers to the integration of the WFD with other policy sectors. This subsection thus turns to assess the level of integration achieved by the EU in the external dimension and shows that such level has, so far, been meager.

One of the biggest challenges in the management of water resources is the issue of spatial (mis)fit. This type of problems arises when institutions do not manage to determine optimal units of governance for the management of water resources.[624] In other words, this situation materialises as soon as there is no congruence between the natural unit and the management area of an institution. The achievement of an optimal spatial fit, however,

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[620] Ibid. 44.

[621] Common Implementation Strategy for the Water Framework Directive (2000/60/EC) Strategic Document (2 May 2001), 1. Available at <https://circabc.europa.eu/sd/a/eb42e3b2-fb80-45dd-8e46-58880940f041/CIS%20-%20Strategic%20Document%20-%20May%202001.pdf> (accessed 1 June 2020).

[622] It is sufficient to recall the (opposing) behaviour of the Spanish government when it came to adopt a Directive regulating water quantity issues. See again Page and Kaika (n 278) 333.

[623] European Commission (n 561) 5.

[624] Oran R. Young and Les Gasser, *The institutional dimensions of environmental change: fit, interplay, and scale* (MIT press 2002) 55.

is far from easy because identifying the most appropriate institutional boundaries will mostly depend on contextual factors.[625]

Against this background, IWRM tends to promote a river basin management approach.[626] The clearly defined boundaries of river basins will provide – so the argument runs – a holistic and integrated approach to the solution of water-related problems.[627] In line with this view, the WFD institutionalised the river basin management approach. Articles 3 and 13 aim to address problems of spatial fit by promoting river basins as the optimal unit of the water management system. This push is particularly evident when the EU legislator urges member states to also assign groundwater that do not follow a particular river basin as well as coastal waters to 'the nearest or most appropriate river basin district'.[628] River basin districts have to include all types of water.

This revolutionary approach of establishing river basins as institutionalised natural units in EU water law is then complemented by the inclusion of a legal provision aimed at integrating stakeholders and the civil society in decision-making. Specifically, Article 14(1) of the WFD calls for 'the active involvement of all interested parties in the implementation of this Directive, in particular in the production, review and updating of the river basin management plans'. The river basin management approach should then realise a multi-scalar setting ranging from the EU to the local level.

However, a closer review of the legal practice reveals that the creation of this multi-scalar setting is fraught with difficulty. To start with, one should note that the WFD did not devote sufficient time to address the possible emerging conflicts between different scales. In fact, the EU legislator decides to simply argue that it is member states' task to develop 'appropriate administrative arrangements, including the identification of the appropriate competent authority'.[629] This regulatory choice has led to the emergence of

[625] Allan K. Fitzsimmons, *Defending illusions: federal protection of ecosystems* (Rowman & Littlefield 1999).
[626] See e.g. Chapter 18.9 of the Agenda 21 document which states 'integrated water resources management, including the integration of land- and water-related aspects, should be carried out at the level of the catchment basin or sub-basin'.
[627] Timothy Moss, 'The governance of land use in river basins: prospects for overcoming problems of institutional interplay with the EU Water Framework Directive' (2004) 21(1) Land use policy 85.
[628] Art. 3(1) of the WFD (n 13).
[629] Art. 3(2) of the WFD (n 13).

several incompatibilities between the newly established natural units and the pre-existing national and sub-national institutions of water management.[630] A well-known case in the literature is Germany, where a problem of spatial misfit between the river basin districts and the Länder occurred.[631] Furthermore, the open-ended provision on public participation have provided little guidance to member states and, accordingly, made the legal provisions hard to implement.[632] The situation did not improve either after the adoption of the WFD CIS on public participation due to their non-binding nature.[633]

In addition, and most importantly for the present chapter, commentators stress that the institutionalisation of the river basin management seemed not to have favoured the integration of the WFD with other interconnected policy sectors. This is particularly noteworthy given that the EU legislator requires the integration between these various policies to increase the effectiveness of water management.[634] Indeed, other policy sectors play a determinant role in water management due to their critical impact on water resources.

Thus, the attempt of the WFD to address problems of spatial fit has given rise to another type of spatial problem.[635] The establishment of natural units to deal with water resources has caused a mismatch with other organisations having political-administrative boundaries that deal with other policy sectors.[636] The scientific literature points at this issue by referring to the lack of integration between land-use planning and water.[637] In this specific case, it is possible to identify several underlying causes.

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[630] Timothy Moss, 'Solving problems of 'fit' at the expense of problems of 'interplay'? The spatial reorganisation of water management following the EU Water Framework Directive' in Heiko Breit, Anita Engels, Timothy Moss and Markus Troja (eds) *How institutions change: perspectives on social learning in global and local environmental contexts* (Springer 2003) 85, 85.

[631] Timothy Moss, 'Spatial fit, from panacea to practice: implementing the EU Water Framework Directive' (2012) 17(3) Ecology and Society.

[632] Maria Lee, 'Law and Governance of Water Protection Policy' in Joanne Scott (ed), *EU Environmental Governance* (Oxford University Press, 2009) 27.

[633] Howarth (n 18)

[634] European Commission, *Common Implementation Strategy for the Water Framework Directive (2000/60/EC) Guidance document No. 11* (European Communities 2003) 15.

[635] Moss (n 630).

[636] Moss (n 631).

[637] Malcolm Newson, *Land, water and development: sustainable and adaptive management of rivers* (2nd edn, Routledge 1997) 343.

A first one refers to the lack of effective coordination in the institutional and technical framework. Carter stresses that the activities carried out by political authorities high and low rarely fit each other in space and time.[638] Specifically, the preparation of spatial plans and the drawing up of river basin management plans occur at two different points in time, and also in different institutional and technical contexts, thus multiplying transaction costs.[639] The EU acknowledged this problem in advance, too.[640] Secondly, conceptual confusion plays a role. There is little guidance in relation to the actual meaning of integration itself.[641] To solve this problem, an effective implementation of more integrated approaches must involve clearer coordination structures.[642] Moore, accordingly, stresses the necessity of a common understanding of the most complex challenges as the base for a successful integration. Thirdly, the need for institutional adaptation due to a mismatch between the new EU demands and the existing domestic institutional framework weakens the effectiveness of the new policies.[643] Considerable margin of discretion left to member states by the WFD and lack of political will can exacerbate this problem.[644] Consequently, the positive results achieved in specific areas (e.g. England) are not caused by the entry into force of the WFD itself but by longer traditions in addressing environmental issues through integration.[645]

One may conclude by stating that the level of integration achieved by the EU does not live up with the original expectations. These last three subsections showed that there is little integration in both the internal and external dimensions. In addition, these

[638] Jeremy G. Carter, 'Spatial planning, water and the Water Framework Directive: insights from theory and practice' (2007) 173(4) Geographical Journal 330.
[639] Moss (n 631) 9.
[640] European Communities (n 634) 13.
[641] Theesfeld and Schleyer (n 553).
[642] Boschet Christophe and Rambonilaza Tina, 'Integrating water resource management and land-use planning at the rural – urban interface: Insights from a political economy approach' (2015) 9 Water Resources and Economics 45, 46.
[643] Timothy Moss and Jens Newig, 'Multilevel water governance and problems of scale: Setting the stage for a broader debate' (2010) 46(1) Environmental Management 1; Moss (n 631).
[644] Mark Wiering and Irene Immink, 'When water management meets spatial planning: a policy-arrangements perspective' (2006) 24(3) Environment and planning C: Government and policy 423; Duncan Liefferink, Mark Wiering and Yukina Uitenboogaart, 'The EU Water Framework Directive: A multi-dimensional analysis of implementation and domestic impact' (2011) 28(4) Land Use Policy 712, 714.
[645] Carter (n 638) 339.

subsections highlighted the underlying causes of the WFD's failings. This is necessary to preface the broader discussion on the benefits of integration – examined more thoroughly in the next chapter.

5. Concluding remarks

This chapter discussed integration of water management in the EU. To summarise, IWRM is the new mantra. This paradigm of water management was developed at international level and was then transposed to the regional, European level. The WFD introduced a paradigm shift in water regulation. Before 2000, the EU's water policy was highly fragmented. This was a characteristic of a discipline-specific management practice. The WFD instead embraced a holistic approach, aimed at integrating water-related problems in a single legislative framework. Integration became the core purpose of the new Directive.

Yet, the WFD is relatively silent on the concrete path to integration. The new regulatory framework leaves ample margins of discretion to member states.[646] Implementation issues have therefore become key to assessing the WFD's success.[647] In this regard, it is possible to imagine two different ways to evaluate integration. Most experts would argue that only full integration between all actions and actors would mean that the directive has been implemented successfully. Others would claim that simply setting rules to solve coordination problems in water policy is sufficient to realise an integrated approach.[648] The analysis advanced here shows that results are mixed, at best. The EU achieved a low level of integration in the single elements formerly analysed. The implementation reports by the EU Commission confirm that the WFD requires further integration to be effective.[649] Howarth maintains that integration has been materialised

[646] Liefferink et al (n 644).
[647] In this regard we can borrow the words of Giakoumis and Voulvoulis (n 536) 826: 'Assessing the effectiveness of the WFD as a policy tool might be more complex and challenging than one might expect. It is not about evaluating the Directive's success based on the water quality improvements it delivered (or did not) but assessing if the Directive has delivered what it really aimed to achieve'.
[648] Butterworth et al (n 510) 73.
[649] European Commission (n 603).

only at a rhetorical level.[650] There is no doubt that neither "strong" nor did "soft" integration has taken place.

This chapter mapped the underlying causes of the WFD's failings in terms of integration discussed by the literature that may exist simultaneously or separately. Also, their relative weight may depend on several circumstances. Although the list here is neither exhaustive nor hierarchical, their identification drives the analysis in the next chapter. The first underlying cause of the failure of integration is that the negotiation and implementation processes are highly political. When the WFD was drafted, various actors aimed to balance competing claims. This led to the adoption of a political compromise where every single party could steer the implementation toward their own interests. The lack of clear implementation arrangements bolstered margins of discretion.[651] In this way, the integration sought after by the WFD faces the same critiques as the concept of IWRM: it is a relatively weak and ambiguous concept leaving ample room for manoeuvre.

Secondly, the form of integration put forward requires the adoption of a comprehensive analysis of ecosystem functioning, including a myriad interlinkage,[652] leading to the need of member states to acquire and consolidate a vast volume of information. At the moment, there is conceptual confusion on the precise means necessary to realise integration. This leads to pervasive ambiguity,[653] ultimately reinforcing the failings of the WFD.

Thirdly, coordination costs in water management are fairly high. Given the lack of clear and binding guidance, there is little effective coordination in the institutional framework. In other words, not solving the conflicts in the negotiation phase simply shifts them to the implementation stage. This entails the same coordination issues and costs as sectoral legislation, the very system that the WFD sought to reform.

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[650] Howarth (n 18) 300.

[651] Giakoumis and Voulvoulis (n 536) 826.

[652] Martyn Kelly, 'Data rich, information poor? Phytobenthos assessment and the Water Framework Directive' (2013) 48(4) European Journal of Phycology 437.

[653] Henrik Josefsson and Lasse Baaner, 'The Water Framework Directive – a directive for the twenty-first century?' (2011) 23(3) Journal of Environmental Law 463.

The disregard of the historical trajectory is the last cause of the WFD's failure. The progress on the implementation of the WFD is very slow due to actors' failure to conform to the integrated approach. The adaptation to a new way of thinking is labour-intense, and administrative agencies tend to be stuck in their ways.[654] Weak enforcement mechanisms do not provide any incentive to adapt.[655]

In defense of the WFD, it may be possible to use the same sentence Medema et al used to refer to IWRM: 'we must not, however, fall into the trap of thinking that a lack of extensive evidence for success is, of itself, indicative of failure'.[656] It is hard to disagree with that proposition. Yet, it is difficult to identify this as likely to happen, as the majority of the literature is consistent in calling for more integration.[657]

Nowadays, integration dominates water management discourse. As Giordano and Shah put it, 'it has caused us to forget that there are many paths to improving water outcomes, many of which are unrelated to IWRM as commonly conceived'.[658] This should cause us to examine whether other ways to manage water resources might be more effective. That problem forms the subject matter of the next chapter.

[654] Voulvoulis et al (n 468).
[655] Corey Johnson, 'Toward Post-Sovereign Environmental Governance? Politics, Scale, and EU Water Framework Directive' (2012) 5(1) Water Alternatives 83, 90.
[656] Medema et al (n 495) 2008.
[657] Molle (n 280).
[658] Giordano and Shah (n 489) 369.

CHAPTER VI

INTEGRATION VS. SECTORALISM

1. Introduction

A few years ago, a debate started attracting the attention of water academics and experts. This debate presented a rather straightforward question. Should we promote integration or sectoralism in the management of water resources?[659] The previous chapter already described the historical evolution of that debate and its regulatory consequences at the EU level. Indeed, it seems fairly settled now. A paradigm shift took place in water legislation and an integrated approach prevailed over sectoralism. With few exceptions,[660] the proposition that integration leads to more effective water-resource management became axiomatic.

This chapter will deal with that axiom. It will discuss whether choosing integration is always the best regulatory pathway. This problem is not moot. Although most scholars believe that an integrated approach is the most effective way to manage water resources, a series of institutional arrangements aimed at realising integration did not yield the expected results. The literature has consistently identified several reasons for this failure. However, the approach in itself has rarely been questioned. This chapter departs from this tendency and reassesses the "integrationist axiom". Specifically, it will question whether integration is always the preferred regulatory pathway.

This analysis has various benefits, irrespective of its outcome. If integration transpires to be the optimal regulatory pathway, then the contribution of this chapter would be twofold. Firstly, it could confirm once again that applying integration is a

[659] The literature may also have used synonyms for sectoralism over the years. For example, issue-by-issue regulation or fragmented regulation denote a sectoral approach. This chapter, however, uses only the term "sectoralism". This is for two reasons. Firstly, fragmentation seems a rather pejorative term with an underlying criticism, while the use of "issue-by-issue regulation" is relatively uncommon. Secondly, it is better not to confuse the reader with the use of multiple terms to denote the same concept. See e.g. Howarth (n 18).

[660] Biswas (n 37).

necessary precondition for the successful management of water resources. Secondly, and relatedly, it would follow that further research should be steered towards advancing integrated regulation. Yet, there remains a chance that integration is not always the best solution. In this latter case, this contribution would be even more important. First of all, it would be possible to argue that integration *per se* is not a panacea in water management. This finding would also align with what some scholars have contended, viz. water problems cannot have a single solution.[661] The need to adapt the solution to context-dependent factors could show that integration can only be effective in certain circumstances. Secondly, and relatedly, this chapter could identify the conditions under which integration is not desirable. Thirdly, it could open the possibility that the policy narrative of promoting integration may have squandered scholars' energies on issues that are not central to water resource management.

Section 2 makes a theoretical distinction between integration and sectoralism. In doing so, it will be possible to identify the characteristic features of each policy approach and to infer their relative desirability. Section 3 complements the theoretical framework with the practical aspects of water resource management at the EU level. It stresses that the main distinction between the two policy approaches grows more nuanced as soon as it is contextualised. Section 4 compares the two policy approaches – enriched by the practical aspects – in terms of legal costs and regulatory implications. It eventually provides a definitive answer as to whether integration is always the preferred regulatory pathway. Section 5 concludes by stressing that the choice between integration and sectoralism in terms of implementation of water resource management is not overly salient as both approaches seem to produce *de facto* similar regulatory implications.

[661] Meinzen-Dick (n 11) 15205.

2. The pure types of integration and sectoralism[662]

2.1. Introduction

Integration and sectoralism are two policy approaches in the management and regulation of water resources. They are different. Many scholars attempted to define them, lending their support to one or the other. The debates surrounding these policy approaches usually focus on the degree of integration required in the regulation of water management. While integration aims at adopting a unified system of administration in water-related issues, sectoralism presumes that it is more effective to treat water-related issues separately. This is certainly the traditional way to look at the distinction. The current chapter intends to adopt a distinct, yet related, viewpoint: it focuses on the different way integration and sectoralism address the emerging conflicts in water management. While integration tends to address them in the promulgation phase, sectoralism leaves their resolution to the implementation phase. To this end, subsection 2.2 will detail the main difference between the two approaches. Specifically, it identifies the regulatory impacts of integration and sectoralism and it projects their legal costs – meaning all those costs to be borne in the adoption and implementation of the laws. Building on that, subsection 2.3 will discuss their relative desirability. In this way, this section develops a basic theoretical model that will then be refined in the following section.

2.2. The two pure types explained

A substantial amount of the literature has focused on the extent to which integration has to govern water resource management. By discussing this point at greater length, the previous chapter showed that integration has become the new mantra in policy and academic circles. Specifically, most water professionals argue in favour of embracing integrated water resource management (hereafter 'IWRM'). Conversely, only a limited number of individuals argue against IWRM.[663] The current EU regulatory framework is a

[662] The theoretical scheme of this section is inspired by the economic analysis of rules versus standards by Professor Kaplow. Moreover, the following section will employ this analysis to make an important point about water policy. See Louis Kaplow, 'Rules versus standards: An economic analysis' (1992) 42 Duke Law Journal 557.

[663] Biswas (n 37).

product of this thinking. By replacing sectoral regulation, the adoption of the Water Framework Directive (hereafter 'WFD') marked the beginning of an integrated approach at the EU level.[664]

This recent policy development highlighted that the EU legislator made a specific choice when devising water regulation. She favoured integration over sectoralism. Integration and sectoralism are two very different approaches to water resource management. This view has never been contested. Indeed, Howarth is bolder in the language he uses when arguing that the debate on integration and sectoralism is 'a clash of cultures in the strategic management and regulation of water resources'.[665]

Integration and sectoralism possess distinctive features which entail different regulatory consequences. It therefore seems appropriate to expend some space on restating their respective definitions. An integrated approach arises from the IWRM concept. It aims at bringing together the various aspects of water management and regulation. To do that, the holistic approach has to reconcile the conflicting provisions of various legal norms in a unified system. A sectoral approach to regulation, on the other hand, implies that the legislator approaches water issues separately. There are separate legislative regimes to address various water-related problems. For example, the regulation on water-related environmental standards should not necessarily be embedded within a broader regulatory framework that also covers other aspects of water policy.

Although these two definitions are likely to be clear and exhaustive, they cannot capture the actual consequences of the choice between integration and sectoralism. In other words, they focus on various properties of the two models without identifying their essential regulatory effects. From a theoretical viewpoint, the dividing line between integration and sectoralism is one of timing: when does the legislator decide to solve possible conflicts between different pieces of water-related legislation? While integration aims at solving conflicts *ex ante*, sectoralism solves those issues *ex post*. This means, in practical terms, that integration determines what interest must prevail over others before the actual emergence of conflicts. A legal provision from an integrated approach would

[664] Directive 2000/60/EC (n 13).
[665] Howarth (n 18) 299.

look as follows: ‘water pricing shall *always* reflect the environmental and resource cost of water’. Such a rule would not be open-ended, but it would set out the best course of action from the outset. In this way, the ecological objective would prevail over *any* consideration, be it equitable or economic. The need to include ‘environmental and resource costs’ in water pricing would take precedence over all other competing interests.

Sectoralism, instead, pursues different objectives separately; it does not seek to address their compatibility *ex ante*. The following statements would be consistent with the sectoral approach: ‘water pricing shall reflect the polluter pays principle’ and ‘member states shall ensure water access for all individuals’. It is competent authorities, and in last resort courts, that need to address the compatibility of the two provisions. They have to determine the implications of the two provisions on a case-by-case basis. No *ex ante* guidance is available. Therefore, relevant authorities and courts would have to determine the circumstances under which water pricing takes precedence over water access.[666]

This distinction seems very clear-cut from a *theoretical* perspective. The difference between integration and sectoralism is one of timing. Integration seeks to address conflicts before they arise, whereas sectoralism addresses them after the fact. One must concede, however, that despite being clear, this distinction is too sharp. Integration and sectoralism can certainly be pure types, but they can also display various nuances. As Figure 6 shows, it is possible to depict the *pure* types of integration and sectoralism as the endpoints of a continuum. While this section deals with the pure types, the following section will discuss the more nuanced forms of these pure types.

[666] The literature has advanced different possibilities on how to settle clashes between laws. See, for example, Ronald M. Dworkin, ‘The model of rules’ (1967) 35(1) The University of Chicago Law Review 14; Hans Kelsen, *General theory of law and state* (Routledge 2017); Herbert Lionel Adolphus Hart, *The concept of law* (OUP 2012).

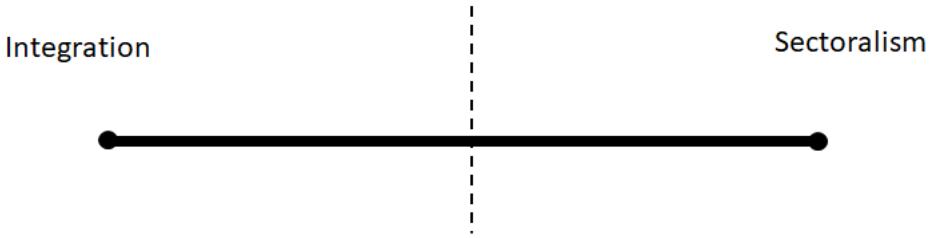

Figure 6 - The endpoints of the continuum

This part has so far discussed integration and sectoralism in terms of the different timing of intervention in the resolution of possible conflicts. Yet, there is also another relevant aspect associated with integration and sectoralism. There is a difference in the temporal distribution of legal costs under each approach. While the design of both policy approaches entails some legal costs, they are incurred at different points in time.

To increase the clarity of the explanation, it is possible to differentiate between the promulgation and the implementation phases and spell out the different activities required in each phase. The promulgation phase corresponds to the moment in which the legislator adopts a certain regulatory framework. In this specific moment, the legislator has to decide whether to adopt an integrated approach or a sectoral one. If the former is preferred, then the legislator, before adopting the law, will map and subsequently solve most of the conflicts that may arise in the management of water resources. If a sectoral approach is preferred, then the legislator will leave the settlement of the conflicts to the relevant authorities – member states, courts and a variety of other competent authorities who are responsible for implementing the regulatory provisions such as the national river basin authorities. In this way, there is no need to map and solve the conflicts prior to the promulgation of the law. The two policy approaches thus entail different activities at different points in time.

The different timing of activities in integration and sectoralism has, however, a further consequence. The distribution of legal costs changes depending on whether the

legislator opts for integration or sectoralism. In fact, the legal costs may arise in either the promulgation or the implementation phases. It is possible to begin by describing the legal costs associated with integration. An integrated approach requires that clashes between rules are settled beforehand. The mapping and the resolution of conflicts *ex ante* causes high information costs to be incurred at the promulgation phase. The legislator must set up adequate mechanisms to identify all the various perspectives on water. She must then identify all possible types of conflicts that may arise in the future. Having done that, the legislator must then find a satisfactory solution to each type of problem. All these activities are costly for the legislator. The role of the competent authorities, on the other hand, is limited to the application of the law, without any need to determine the correct interpretation of the law in a given situation.[667] Since all types of conflicts have already been settled at the promulgation phase, the cost of implementation and enforcement is relatively low.

It follows that in integration legal costs are high to the legislator, but low to the implementation and enforcement authorities. A sectoral approach follows the opposite cost schedule. The *ex post* resolution of conflicts will shift most of the regulatory burden from the legislator to the implementation and enforcement authorities. The latter will have to address the compatibility of conflicting provisions in a specific situation with little guidance from the existing regulatory framework. In sectoralism, costs are low for the legislator and high for the implementation and enforcement authorities.

The use of a simple illustration can help the understanding of the differential temporal distribution of legal costs in integration and sectoralism. Suppose that a legislator wants to implement the polluter-pay principle. Prior to enacting the law, an integrationist legislator must establish a deliberative process, identify relevant perspectives, and integrate them. Any implementing legislation would have to be compatible with other regulatory provisions (human right to water, technical regulations, administrative law),

[667] The remaining part of this chapter will always recur to the term "law" to describe what other authors have defined as either "legal command" (Kaplow) or "legal norm" (Kelsen and Schäfer). See Kaplow (n 662); Hans Kelsen, *General theory of norms* (OUP 1990); Hans-Bernd Schäfer, 'Legal rules and standards' in Charles K. Rowley and Friedrich Schneider (eds) *The Encyclopedia of Public Choice* (Springer 2004), 671.

with the attendant legal costs. Assorted experts on the law would have to be retained to give opinions and various draftsmen would essay drafts which the legislature would debate. All these costly activities before the promulgation of the law do not take place in a pure type of sectoralism since the compatibility of any regulatory provision will be assessed *ex post*. The will of the legislator, which would presumably reflect the majority of parliament, would suffice.

Thus, this section provided a clear definition of integration and sectoralism. It focused on a single difference between the two, the resolution of conflicts *ex ante* and *ex post*. Furthermore, it shows that the adoption of a given policy approach has specific consequences in the timing of costs generation. Integration will require the legislator to invest a great deal in information to acquire an extensive knowledge of existing conflicts. Sectoralism, instead, will be characterised by smaller investments due to a dearth of knowledge about various conflicts and the consequent impossibility of solving them before they have arisen.

2.3. The desirability of one system over another

The conceptual scheme developed so far was only expository, insofar as it spelled out the legal costs associated with each policy approach. The intention was not to raise any normative consideration or to ascertain the desirability of one system or another. The concern referred solely to the distribution of costs over time. This section, instead, identifies the concrete conditions that might impel the legislator to favour one scheme or another. Once again, the discussion will adopt a purely theoretical perspective. The refinements of this stylised model will only be introduced in the following section.

When devising regulation on water policy, the legislator must choose between integration and sectoralism. This choice should not be arbitrary. It should be based on a rational choice. In other words, the legislator should identify what policy approach is more

likely to minimise waste, in welfare terms.[668] A couple of factors helps determine the desirability of an integrated or a sectoral approach.

The first one is the incidence of conflicts between water-related legislations. If it is anticipated that those conflicts will be frequent, then it seems reasonable to address them before they arise. Integration would be preferable over sectoralism. Conversely, more limited conflicts would tend to favour sectoralism. It would be wasteful of public money to invest in information to map all the various possible conflicts and subsequently to solve them if only a handful of conflicts are going to arise. A low rate of actual conflicts will not justify the high legal expenses incurred at the promulgation phase.

Frequency of actual conflicts is therefore a central element in decisions on whether to invest in information costs to solve conflicts between regulatory provisions *ex ante* or *ex post*. Predicting whether clashes between laws will be frequent is not an arbitrary exercise. There are certain considerations that help the legislator to make this decision. For example, the political nature of the subject of regulation is a determinant of the frequency of disputes. If the good regulated usually gives rise to contested relationships, then legal conflicts are more likely to arise. Likewise, should the regulated cases recur at a high frequency (e.g. traffic laws), then it is reasonable to expect a higher volume of litigation.[669]

There is also a second factor that may tilt the balance towards one policy approach over another. This concerns vested interests. If the legislator deems that the legal persons to whom the law is addressed will seek to misuse a pliable regulatory framework, then integration is preferable. This consideration stems from the different degree to which member states and competent authorities would be informed about the content of regulation in integration and sectoralism. Member states and competent authorities would be better informed if the EU adopts an integrated approach.[670] The EU laws would either

[668] According to economists, it is possible to refer to the waste of potential welfare in terms of deadweight loss, which is generally the cost borne by society due to an inefficient allocation of resources.
[669] Kaplow (n 662) 563-4.
[670] On the original discussion of rules versus standards, the fact that an *ex ante* approach would necessarily lead to better information is not uncontested. For example, Baldwin claimed that an *ex ante* approach may provide little guidance due to inaccurate and to a certain extent unenforceable legal provisions. This point

prevent conflicts or provide detailed instructions on how to manage them. The integrated regulatory framework would then be sufficiently detailed, so that the member states and competent authorities would know how to address possible conflicts. A sectoral approach would not be as clear as integration. The applicable regulatory framework would leave the resolution of conflicts to member states and competent authorities. Given the absence of *ex ante* rules, the applicable regulatory framework would be to a large degree silent on how to manage possible conflicts.

These last considerations make it possible to draw two important observations. Firstly, there is a trade-off between information costs and legal uncertainty. More information costs will provide the legislator with greater knowledge of all the possible conflicts in water policy. The mapping and the subsequent resolution of those conflicts will eventually allow for the creation of a clearer regulatory framework. Lower information investments will lead to less coordination between conflicting provisions due to the incomplete mapping of various perspectives around water. This will eventually bolster legal uncertainty, since the law would be indeterminate, and its content will be dependent on the member states and competent authorities.

Secondly, and relatedly, legal certainty will ensure that violations of laws will be easier to detect. If a member state or a competent authority will know in greater detail how to settle conflicts due to integration, then it is counterintuitive to think that the member states and authorities who violate such laws will not be held accountable. Conversely, the lack of precise knowledge on how to solve conflicting provisions *ex ante* grants member states and competent authorities greater legal leeway to pursue their particular interests. Accordingly, the risk of a pliable settlement of conflicts would be more likely to materialise.

A situation where legal certainty is reduced is not desirable under any circumstance. However, a situation of this kind is to a certain extent tolerable if the member states and competent authorities do not include vested interests. It may well be that in those cases, member states and competent authorities might be risk-averse and would tend to seek

will be discussed in the following section. See Robert Baldwin, *Rules and Government* (Clarendon Press 1995).

legal advice so that they overcomply with the existing regulatory framework in order to ensure they never breach the law.[671] However, this is not the case if particular interests materialise because member states and competent authorities will have an intrinsic motivation to adapt the open-ended regulatory framework to their own interests. Hence, a vested-interest situation would call for integration. A clearer regulatory framework solving conflicts *ex ante* would avoid a pliable settlement of conflicts *ex post*.[672] Member states and competent authorities will have fewer opportunities to steer the law towards their particular interests. This conclusion builds on a rather extensive literature according to which administrative agencies and governmental bodies should have little discretion if the legislator wishes to better protect rights and liberties.[673] Indeed, a clearer regulatory framework would ensure that violation of laws will be easier to detect.

It is now possible to complete the development of the provisional theoretical scheme introduced earlier. Integration is more costly to realise from an EU regulatory perspective. It entails high information costs to map the various perspectives surrounding water and to solve the possibly emerging conflicts in a satisfactory manner. The existence of high information costs will however lead to an increase in legal certainty. Sectoralism, on the other hand, is less costly for the EU legislator. It will be the enforcement authorities that will be required to determine whether the settlement of conflicts arisen in practice respect the current regulatory framework. Legal uncertainty will therefore characterise a sectoral approach.

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[671] This consideration builds on Korobkin. See Russell Korobkin, 'Behavioral Analysis and Legal Form: Rules vs. Standards Revisited' (2000) 79 Oregon Law Review 23.

[672] See C.R. Sunstein, 'Problems with Rules' (1995) 83 California Law Review 1023. This point is also restated to a certain extent in the "void for vagueness" doctrine. On the other hand, some argue that recurring to an *ex ante* approach may be detrimental if there are powerful interest groups involved in the passage of the legislation. Indeed, interest groups may hijack the drafting of a complete regulatory framework. Thus, it would be more convenient to leave the decision to enforcement authorities *ex post*. However, one may rightly point out that interest groups will anyway influence the legislator regardless of integration and sectoralism. See Schäfer (n 667).

[673] This point builds on the fact that '[i]nstruments that have large financial interests at stake and that grant a large scope of discretion to corrupt civil servants should of course be avoided. Preference should be given to clear and precise rules in legislation'. See Michael Faure, 'Environmental rules versus standards for developing countries; learning from Schäfer' in Thomas Eger, Claus Ott, Jochen Bigus and Georg Von Wangenheim (eds) *Internationalisierung des Rechts und seine ökonomische Analyse* (Springer 2008) 735, 742.

Furthermore, integration and sectoralism tend to localise public power at two different levels of governance. While integration would vest the EU with the power to resolve all conflicts between laws, sectoralism would leave more margin of discretion to member states, who would have the final say on conflicts. This point has been indirectly confirmed by Dellapenna and Gupta when they note that 'efforts at harmonization are making member states nervous about their own rights to make decisions regarding water'.[674]

From these considerations, it is thus possible to argue that no policy approach enjoys absolute advantage over the other. Their relative desirability depends on two main factors. First, a high incidence of conflicts will make integration more desirable. The EU legislator will face high information costs, but those costs will not be borne later in the implementation phase. Second, an integrated approach will ensure that member states and competent authorities will not steer the law towards their particular interests. This situation, which would shift public power in the hands of the EU, is certainly desirable if a vested-interest situation arises.

3. Refinements

3.1. Introduction

The preceding section provided the reader with a provisional scheme concerning the desirability of one policy approach over the other. Admittedly, this scheme was just a simplified model. This section makes some refinements. It seeks to put this theoretical framework into context by discussing its relevance to EU water policy. To do so, subsection 3.2 outlines the limitations of considering only pure types of policy approaches. Specifically, it highlights that nuances may exist within a single policy approach. There is not a single (pure) type of integration. There are many. The different types also entail different legal costs and regulatory implications. Discussing integration as a unique "prototype" of policy approach would not do justice to reality. Subsection 3.3 gets even more concrete. It attempts to connect existing EU water law with the basic

[674] Dellapenna and Gupta (n 440) 444.

model developed thus far. In line with chapter V, it argues that the EU's regulation of water resources cannot be described as a pure type of integration. A more nuanced form of integration – what this study will call as "integration through standards" – would best fit the description of the EU regulation on water resources, or, at least, its underlying rationale. As will be shown *infra*, this is also understandable from a more normative perspective. There are certain concrete reasons that justify a decision not to adopt a pure type of integration.

3.2. The limitations of pure types: the existence of more nuanced forms

So far, this chapter developed a basic model. It is now time to discuss its applicability to EU water law. To do that, it is necessary to recall the two elements that make an *ex ante* approach preferable: a high frequency of conflicts and vested interests. Against this background, one should wonder what policy approach is advisable to employ in the regulation and management of EU water resources.

Would integration or sectoralism be better for EU water policy? Answering this question does not seem difficult at first glance. Any reasonable person would opt for an integrated approach. A high frequency of conflicts and vested interests tends to characterise *all* water policy. Firstly, water is a resource at the intersection of diverse interconnected domains.[675] Water is, as some scholars contend, a 'total social fact'.[676] Individuals hold different perceptions of water. These different perceptions lead to various conflicting views. Chapter III illustrated this point. Furthermore, the fact that water is a scarce resource with multiple needs, values and uses makes it apparent that conflicts will tend to be frequent. Secondly, and relatedly, the water sector represents a vested-interest situation. Multiple conflicting values and interests revolve around the management of water resources. For example, it is sufficient to think of the conflicting interests revolving around the introduction of full-cost pricing in the WFD. As a generalisation, while southern countries tended to oppose that measure because it represented an economic

[675] de Lourdes et al (n 166); Barnes and Alatout (n 166); Strang (n 166) 5.
[676] Orlove and Caton (n 14). The term 'total social fact' refers to Mauss (n 168) 3.

threat to their powerful farming industry, northern countries favoured it because their main concern was with quality issues.[677]

These considerations would push us to support integration as the way of managing and regulating water resources. Hardly anybody would argue against this view. However, the prescriptions from this basic model are applicable only if *pure types* of policy approaches are considered. Unfortunately, this does not reflect water policy in practice. As anticipated in the previous section, integration and sectoralism can certainly be pure types but they can also display various nuances. As graphically identified in Figure 7, the two pure types of integration and sectoralism only represent the endpoints of a continuum. Reality dictates that there is also the need to take into consideration the area that stands in between the endpoints, i.e. the more nuanced forms of the two policy approaches.

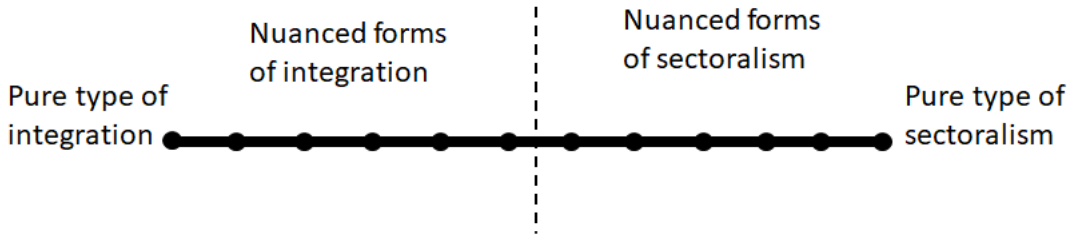

Figure 7 - More nuanced forms of integration and sectoralism

Thus, integration and sectoralism can have various nuances in their application. For example, it could well be that integration will simply provide some guidance on how to settle disputes without giving specific and precise rules to follow. In other words, integration and sectoralism are not single policy approaches in practice. A single policy approach may present itself in different nuances. In this way, each policy approach could be further partitioned into – at least – two additional types. The economic analysis of legal

[677] Kaika and Page (n 573) 318.

approaches could be helpful in identifying these types.[678] Making use of the wording stemming from that scholarship, each approach could be realised through either rules or standards.[679] For instance, the policymaker can choose to opt for integration through rules or integration through standards.[680]

Integration through rules is what was discussed as the pure type of integration. Rules indeed are more specific than standards since they entail 'an advance determination of what conduct is permissible, leaving only factual issues for the adjudicator'.[681] Integration through rules would therefore cover all the possible types of conflicts, providing the rules' addressees with perfect information. Integration through standards would be a hybrid form. There, the EU policymaker *does consider* possible conflicts, as opposed to sectoralism, but only provides general guidance on how to solve them. In other words, the use of standards would leave the specific determination of legal provisions to the member states and competent authorities.[682] Integration through standards would then coincide with the various nuanced approaches of integration (non-pure type of integration). Figure 8 shows this distinction graphically.

[678] Colin S. Diver, 'The optimal precision of administrative rules' (1983) 93 Yale Law Journal 65; Isaac Ehrlich and Richard A. Posner, 'An economic analysis of legal rulemaking' (1974) 3(1) The Journal of Legal Studies 257; Kaplow (n 662).

[679] One may certainly disagree that the nuances of integration and sectoralism can eventually be divisible only into two "pure" types as rules and standards. However, the reasoning put forward here would not change if the door is open to the existence of multiple types that are distinct from the pure type of integration (i.e. integration through rules). Indeed, this reasoning holds as long as it is possible to contrast the pure type of integration against all the other various nuances. Therefore, this chapter will attempt to simplify an already complicated theoretical framework and stay with only two ("pure") types. On a different note, this chapter will continue to use the nomenclature by Kaplow (rules and standards) for this dichotomy. See Kaplow (n 662).

[680] Since the EU regulatory framework has recently embraced integration, this chapter will now only focus on integration. This choice will also enhance the clarity and consistency of arguments.

[681] Kaplow (n 662) 560.

[682] This description of integration through standards resembles to a certain extent a sectoral approach. The following section will discuss this point.

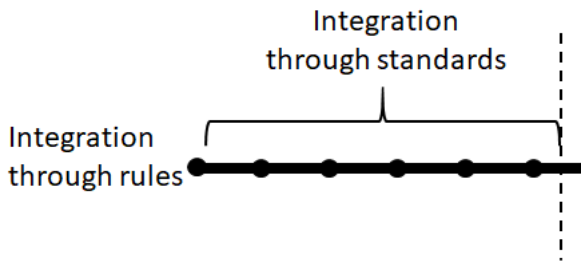

Figure 8 - Integration through rules and integration through standards

Dividing integration into a pure type (through rules) and a more nuanced form (through standards) has repercussions for legal costs. The legal costs arising from the two types follow different patterns. Rules require high information costs at the promulgation phase whereas standards shift these costs to the implementation phase.[683] While the application of rules will occur almost mechanically, applying a standard will require further and more in-depth investigation by the competent authorities.[684] In doing so, standards would shift costs from the EU itself to the competent authorities responsible for the implementation.[685]

The different temporal distribution of legal costs is not the only element that vary with the choice of approach. There are further elements. One is legal uncertainty. While rules give content to the law at the promulgation phase, standards will shift the resolution of conflicts to the implementation phase. Standards are indeed adopted as general prescriptions that leave ample margin of discretion to the competent authorities. They are circumstantial in that their exact determination is context-sensitive. This tendency will eventually lead to an increase in legal uncertainty. The law's addressees cannot be certain about what specific behaviour will conform to the law.

[683] This section does not purport to discuss in greater detail the findings by Professor Kaplow but only to refer to them as long as they are useful for the present analysis. For the original, please see Kaplow (n 662).
[684] Hans-Bernd Schäfer, 'Rules versus standards in rich and poor countries: Precise legal norms as substitutes for human capital in low-income countries' (2006) 14 Sup. Ct. Econ. Rev. 14 113, 114.
[685] This statement is an adaptation of the original argument to the EU water policy in practice. Indeed, the original argument is that standards shift costs from the state, which is in charge of writing laws, to the private sector, which funds (most) litigation.

Yet, one might claim the specificity of standards can change over time. The literature tends to stress that competent authorities may transform vague provisions (say, standards) into more specific ones (say, rules) over time.[686] Specifically, it is usually possible to build up a body of precedent deriving from standards, so that the exact content of the regulatory provisions becomes clearer over time. For example, if the EU legislator decides to adopt a standard, its exact meaning will be converted into a rule over time due to the clarification that domestic competent authorities and, in the last resort, national courts will provide. In other words, the standards set by the legislator will be converted into rules over time.

Despite being valid for single national jurisdictions, this consideration seems of limited applicability within the EU regulatory framework or, at least, in EU water policy. Being the case law established by disparate national authorities in the EU regulatory setting, standards will have to be adapted to national case-specific circumstances and will not make the standards more rule-like from an EU perspective. The European Union Court of Justice (hereafter 'ECJ') would not transform standards into rules, either. The ECJ's task is limited to assessing whether member states comply with the legal obligations established by EU law (Article 258 TFEU) or to interpreting specific points of EU law authoritatively through preliminary rulings (Article 267(1)(b)). Thus, as long as the EU regulatory provisions are open-ended leaving an ample dose of discretion to member states, the ECJ will have a hard-time converting standards into EU-wide rules.

A recent judgment from the ECJ confirms the limited applicability of what the literature advanced for the conversion of standards into rules. In *European Commission v Federal Republic of Germany*,[687] the ECJ had to decide on the obligation of cost recovery for certain water services that Germany excluded, adducing that they did not fall under the term 'water services'. To do that, the ECJ had to clarify the meaning of the term 'water services' according to Article 2(38) of the WFD. In fact, Germany – as well as other member states – adopted a relatively narrow interpretation of the term, so that the obligation of cost recovery would only apply to urban piped waters. The ECJ stated that the term 'water services' has a broad definition; but it also ruled that states would still

[686] Kaplow (n 662) 577-9.

[687] Case C-525/12, *European Commission v Federal Republic of Germany* (2014) 11 September 2014 E.C.R. 1-2202.

enjoy significant discretion on how to apply cost recovery for any particular service.[688] The Court held a similar approach when deciding on a request from a preliminary ruling raised by Croatia.[689] There, the ECJ stresses that the member state enjoys large discretionary power in fulfilling the environmental objective of the directive.[690] These judgments therefore show that the margin of discretion to states has been left intact[691] and, accordingly, that EU standards have not been converted into rules.

Thus, the EU legislator shoulders different costs and faces different regulatory problems depending on whether integration is through standards or through rules. The EU could have a strong incentive to adopt integration through standards for a couple of reasons. Firstly, it will not bear the costs of an integrated legislation, which would be higher compared to the costs of an integration through standards. Secondly, under that system, the EU would provide member states and competent authorities with guidance on how to address the various conflicts. The EU would thus retain a certain amount of public power. As will be shown *infra*, this specific feature may turn out to be essential in the choice between integration and sectoralism.

To conclude, the provisional scheme developed in the last section did not take into consideration the various nuances within a single policy approach. The pure type of integration is only one way of implementing an integrated approach at the EU level. Acknowledging that more nuanced forms exist introduces a refinement to the stylised model. Also, the existence of two types of integration – rule- or standard-based – makes it necessary to determine which one the EU adopts at present. This would allow the following section to make a more precise comparison when assessing the choice of the EU legislator to embrace integration over sectoralism.

[688] See particularly paras. 47-59 of Case C-525/12 (n 687).
[689] Case C-686/15, *Vodoopskrba i odvodnja d.o.o. v. Zeljka Klafuric* (2016) 7 December 2016 E.C.R. 1-927.
[690] See particularly para. 24 of Case C-686/15 (n 689).
[691] Sarah Hendry, 'The EU water framework directive–challenges, gaps and potential for the future' (2017) 14 Journal for European Environmental & Planning Law 249, 260.

3.3. EU water policy in practice

The EU adopted the WFD in 2000. This particular moment represented a paradigm shift from sectoralism to integration in European water policy. The main aim of the WFD was to establish a basis for a comprehensive and coherent EU water policy.[692] Some commentators argue that the IWRM became – to a certain extent – the underlying rationale of the European regulatory approach.[693] The previous chapter discussed this issue, as well as the actual level of integration achieved by the EU. Therefore, this part will take stock of the findings of the previous chapter to determine how best to characterise EU water law, in line with the hitherto developed theoretical framework. In other words, it provides an explanation of why EU water law should not be considered as a pure type of integration, but as a more nuanced one.

The preceding chapter concluded by arguing that the WFD is not a regulatory framework that realises full integration. In line with many other scholars, the analysis found little evidence of integration.[694] For instance, Newig et al argue that '[i]n implementing the directive, the competent authorities regularly have to make decisions', implicitly admitting that conflicts are addressed *ex post*.[695] Besides, the EU Commission itself shares this view, having conceded that the WFD is a mere step on the road to full integration.[696] These considerations would be sufficient to define the EU policy approach as a more nuanced form of integration, at least in terms of actual achievements.

There is another finding from the previous chapter that allows us to consider that the EU approach cannot be defined as a pure type of integration. The WFD largely contains general legal provisions.[697] The member states and competent authorities enjoy ample margins of discretion.[698] Implementation arrangements are unclear, and each member state

[692] Kallis and Butler (n 517) 126.
[693] Howarth (n 18) 303; Louka (n 471) 49.
[694] See e.g. Giakoumis and Voulvoulis (n 536).
[695] Jens Newig, Claudia Pahl-Wostl and Katja Sigel, 'The role of public participation in managing uncertainty in the implementation of the Water Framework Directive' (2005) 15(6) European Environment 333, 333.
[696] European Commission, Report on the progress in implementation of the Water Framework Directive Programmes of Measures SWD(2015) 50 final.
[697] Josefsson and Baaner (n 653).
[698] Liefferink et al (n 644).

and competent authority is free to pursue its own interests.[699] This situation typifies standards. Accordingly, the WFD is not an example of a pure type of integration. Both its modest achievements in terms of integration and the open-ended nature of its regulatory provisions characterise the WFD as integration through standards.

This characterisation of the WFD could reflect a temporary state of affairs, rather than being permanent. Some may argue that integration through standards is just a transition to integration through rules. This possibility cannot be excluded. From a regulatory perspective, it may be difficult to directly switch from the traditional approach (i.e. sectoralism) to full integration. This could entail prohibitive costs. The desire to avoid a cumbersome paradigm shift (i.e. from sectoralism to integration through rules) may account for the more nuanced form of integration through standards that it is observed today. This view is not so illogical. Some water experts and the EU institutions themselves have indirectly lent support to this view by arguing that the achievement of actual integration requires more time.[700]

However, a pure type of integration is unlikely to replace a more nuanced form. The current EU legal system hinders that possibility in two ways. Firstly, a sudden shift towards full integration is unlikely. In fact, the European laws still require unanimity with regard to water quantity issues.[701] Reaching consensus among all member states in a bid to adopt an integrated approach covering all the various types of conflicts would be very demanding. Secondly, as shown *supra*, the open-ended standards will not progressively become rules even after some time. Specifically, the system of precedents cannot turn the open-ended standards into specific rules due to the fragmented European legal system described above. There is no guarantee that the precedent built up in Spain will be the same as the precedent that accumulates in the Netherlands. All this shows that there are factual limitations for progressing towards a pure type of integration.

[699] Giakoumis and Voulvoulis (n 536) 826.
[700] Louka (n 471); European Environmental Assessment, European waters – assessment of status and pressures. EEA Report No. 8 (EEA 2012), 100.
[701] Gábor Baranyai, 'The Resilience of Transboundary Water Governance Within the European Union: A Legal and Institutional Analysis' in Gábor Baranyai (ed) *European Water Law and Hydropolitics* (Springer 2020), 119, 125.

Furthermore, there are also more normative considerations that push one to argue that a transition to rule-based integration will not take place. This conclusion builds on what was discussed in the three first chapters of this study where it was shown that water management is highly dependent on contextual factors. In particular, one of the main findings of chapter III highlighted that the specific arrangements for the regulation of water resources vary across space depending on local preferences. This is highly relevant to explain why it is not advisable nor likely that the EU regulatory framework will embrace a pure type of integration. Since water is "glocal", water policy needs to reflect both supranational and local factors.[702] Accordingly, devising a single homogenous regulatory framework on water resources in order to solve all possible types of conflicts would be unreasonable. It would not allow capturing the local factors, which are elements innate to a vast and diverse geographical area like the EU.

It is unimaginable that all European citizens may have the same policy preferences when it comes to managing water resources. As previous research acknowledged, it is not unusual that the EU member states have opposing views in managing water resources, ultimately leading to substantial frictions in devising a common European policy.[703] For example, the ultimate objective of Dutch water regulation (i.e. "keeping the feet dry") is markedly different from the other EU states.[704] Likewise, southern European countries tend to place more regulatory focus on water quantity issues whereas northern European countries are mostly concerned with water quality.[705] It follows that a European water policy that provides member states and competent authorities with common standardised solutions that do not take context into account would be highly undesirable. After all, it is

[702] Joyeeta Gupta, Claudia Pahl-Wostl and Ruben Zondervan, '"Glocal" water governance: a multi-level challenge in the anthropocene' (2013) 5(6) Current Opinion in Environmental Sustainability 573.
[703] R. Andreas Kraemer, 'Public and private water management in Europe' in Francisco Nunes Correia (ed) *Selected Issues in Water Resources Management in Europe* (AA Balkema 1998) 319; Jeremy Richardson, 'EU water policy: uncertain agendas, shifting networks and complex coalitions' (1994) 3(4) Environmental Politics 139.
[704] Wim Ravesteijn and Otto Kroesen, 'Tensions in water management: Dutch tradition and European policy' (2007) 56(4) Water Science and Technology 105, 109.
[705] Page and Kaika (n 278) 333-4.

the role of standards – and not rules – to demand that the implementation authorities assess facts in the light of societal values.[706]

The preceding considerations show that integration through rules in the EU policy setting is not only difficult, but also undesirable. Once we acknowledge the existence of context-dependent factors, we close the door on a pure type of integration (through rules). Based on this assessment, the EU legislator should leave the determination of the regulatory provisions to the member states competent authorities.[707] This conclusion, which has been endorsed in the text of the WFD itself,[708] is particularly important. In fact, this theoretical model began by arguing that a pure type of integration should be preferable due to the high frequency of conflicts and the existence of vested interests. However, the fact that water is highly context-dependent triggers the need to refine the theoretical model. Full integration is not desirable. The legislator should instead opt for a more nuanced form, i.e. integration through standards. However, as the next section will show, there are some elements that may skew this provisional framework and suggest the adoption of a sectoral approach.

4. Integration through standards and sectoralism

Focusing on the choice between integration and sectoralism has been helpful because it enabled a discussion of the characteristic features of each system, as well as their relative desirability. Eventually, it yielded certain policy prescriptions: if the legislator has to govern water resources in a vast and diverse geographical area, then she should adopt a nuanced form of integration. Open-ended legal provisions will ensure respect of the context-depend factors that characterise water policy.

The previous sections, however, mostly dealt with integration and sectoralism separately. The comparison made between the two policy approaches served only to

[706] Duncan Kennedy, 'Form and substance in private law adjudication' (1975) 89 Harvard Law Review 1685, 1688.
[707] In a different context, a similar point is raised by Kaplow when arguing that if the central authority lacks information, then the administration of laws will be given to the enforcement authorities which will give shape to standards through court decisions.
[708] Recital n. 13 of the WFD (n 13).

identify the actual features of each system and their distinct consequences. The chapter did not discuss the actual choice that the EU legislator has to face in practice, i.e. embracing integration (through standards) or sectoralism. For most of the literature on water management, this choice is particularly important: adopting integration over sectoralism improves the management of water resources.[709] It is this specific statement that the current section challenges. By comparing the costs and regulatory implications associated with these two policy approaches, this section shows that integration through standards and sectoralism are fairly similar in practice. In addition, it shows that embracing an integrated approach might imply some extra costs that are only justifiable on political grounds.

Earlier in this chapter, the temporal distribution of legal costs in a sectoral approach were outlined. In sectoralism, the legislator will incur low costs while member states and competent authorities will incur high costs. In other words, information costs will only materialise at the implementation phase when member states and competent authorities have to address the possible conflicts in water policy. Other relevant observations were that legal uncertainty is higher and public power is localised at the member states' level. Subsequently, the previous section described the costs associated with two types of integration, i.e. the pure type of integration and its more nuanced form, that is integration through standards. The latter entails low information costs at the promulgation phase. Higher costs arise *ex post*. In line with the model developed by Kaplow, in integration through standards, legal uncertainty will be higher than it would be under integration through rules.[710] This hypothesis finds empirical support in the works of Newig et al, who point at the high costs associated with the WFD.[711]

An example might be helpful. Let us take the two legal provisions that would be applicable in a sectoral approach: 'water pricing shall reflect the polluter pays principle' and 'member states shall ensure water access to all individuals'. The consequences of polluter-pays principle and the obligation to ensure water access are not spelled out. Competent authorities responsible for the implementation would have to figure out what

[709] European Environment Agency (n 537).
[710] Kaplow (n 662).
[711] Newig et al (n 695) 334.

those provisions mean in practice. Uncertainty would increase. Now, it would be wise to confront those provisions with a legal provision stemming from integration through standards and not from a pure type of integration ('water pricing shall always reflect the environmental and resource cost of water'). A legal provision reflecting integration through standards would provide 'water pricing shall reflect the polluter pays principle, but each individual shall have access to water'. Again, this legal provision still seems open-ended and needs implementation authorities to be rendered operative. Uncertainty would remain high.

This comparison highlights a rather interesting point. It seems that the legal costs of both sectoralism and integration through standards follow the same pattern: low costs *ex ante* and high costs *ex post*. Some might say that this view is only apparent. While integration and sectoralism seem identical in terms of costs at a conceptual level, they may be different in practice. In the attempt to dispel this doubt, it is important to recall the discussion of legal costs in the preceding chapter. Building on existing research, chapter V argued that the integrated approach promoted by the WFD was a nuanced form of integration that had mixed results at best. This claim was supported by mapping some of the underlying causes. Recalling some of them would be particularly advantageous because because it could be possible to infer when the legal costs associated with integration through standards occur, i.e. *ex ante* or *ex post*. One finding was that the WFD left member states an ample margin of discretion due to vague and ambiguous legal provisions.[712] Another was that the information required for the WFD to be operationalised was not available at the time of its promulgation.[713] In this way, information costs mostly arise *ex post,* despite the attempt of the WFD to reduce them *ex ante*. Information costs will *in concreto* be borne after the promulgation phase by the member states and competent authorities. This has two results. First, the settlement of conflicting provisions is postponed to the implementation phase. Second, the WFD maintained a level of legal uncertainty similar to the one under the old sectoral regulation. The present situation reflects the previous *status quo* – the WFD has not produced any relevant change in this regard. These observations thus show an actual similarity of

[712] Giakoumis and Voulvoulis (n 536) 826.
[713] Lee (n 632).

sectoralism and integration through standards. By no means does this chapter imply that that the two approaches are the same. The point this chapter would like to make is different, namely that it seems that sectoralism and integration through standards are similar *in their costs and the regulatory effects* they produce.

However, one may note that this comparison neglects the fact that not all policies are drafted from scratch. There are many cases when the legislator "inherits" a policy. The costs related to changing regulatory approach (i.e. switching costs) are relevant. Moving away from the traditional policy approach will certainly entail extra costs for implementation authorities. The existence of these switching costs is readily confirmed by the European experience. A weak adaptation of administrative agencies to the new regulatory framework has characterised the adoption of the WFD.[714] In hindsight, it seems that embracing integration at the EU level entailed further costs for member states without significantly impacting the former state of the art.

Against this background, a move from a sectoral approach to a more nuanced form of integration does not seem justifiable in terms of costs or regulatory implications. First, the adoption of a more nuanced form of integration entails additional switching costs. Second, the regulatory implications stemming from these two policy approaches are also very similar: it will mostly fall on member states and competent authorities to address the possible conflicts *ex post*. Thus, it is likely that the EU legislator decided to adopt integration mostly for political reasons. An integrated approach through standards would allow the EU to have legislative power and retain a certain amount of power related to its implementation and enforcement. A sectoral approach, not allowing the EU to provide even minimum guidance to member states, would consequently prove less favourable for the EU.

In a nutshell, a more nuanced form of integration is not so dissimilar from sectoralism. The choice between two policy approaches does not seem so salient, even though regulatory rubrics that have a historical tradition of sectoralism find themselves disincentivised to change due to the switching costs. In these cases, sectoralism should prevail because the positive change brought by integration through standards is negligible,

[714] Voulvoulis et al (n 468).

but its costs are higher. This point may, however, be deliberately overlooked by those legal systems that want to shift public power from one level of governance to another.

5. Concluding remarks

Scholars in water policy have focused on the IWRM concept for the last thirty years. According to them, the adoption of a unified system of administration in water-related issues is the key to effective water resource management. Thus, the EU legislator must abandon sectoral regulation and embrace an integrated approach. In doing so, the assumption is that an effective water resource management will eventually be realised.

This chapter sought to qualify these propositions. It advanced three findings. Firstly, integration through standards and sectoralism have similar costs. Secondly, integration is not always the preferred regulatory pathway. It can generate unnecessary switching costs. If this is the case, sectoralism is to be preferred. Thirdly, attempts to acquire more public power may account for the shift from sectoralism to integration. All these findings, in conjunction, uncover a fourth finding: the choice between integration and sectoralism is not the most salient issue in water management. What should frame the debate on water management are other, more central issues that the following chapter will discuss in more detail. For the moment, it is possible to argue that the literature's emphasis on integration is misplaced. Its cause celebre, IWRM, is tangential to the central problems of water management. It is now time to shift the attention away from integration toward other, more pressing issues in water management.

Yet, these last words should not give the wrong impression. It was not the purpose of this chapter to criticise the work of authors who focus on integration, but rather to debunk misconceptions. The integration of water-related problems is not *the* answer to the problems of water management. IWRM is not required to manage water resources more effectively, but simply to shift public power from one level of governance to another. Moreover, one must acknowledge that the "hype" over integration had a silver lining. It stressed the variety of perspectives that must be considered within a single piece of legislation. While water laws can be drafted in different ways, be they sectoral or integrated, the incorporation of multiple perspectives is always essential to their success.

CHAPTER VII

TO INTEGRATE OR NOT TO INTEGRATE, THAT IS *NOT* THE QUESTION

1. Introduction

The starting point of this study was an alleged aporia: the conceptualisation of water is fragmented but its management should be holistic. This seemingly incompatible thesis served as a spark to further investigate the matter. Throughout this research journey, this study reached several relevant findings that, put together, help answer the following question: if we conceptualise water as fragmented, should we regulate water resources holistically? The response is that we can, but we should not. The first chapter already anticipated this main finding. However, it is now possible in the following pages to enrich this original proposition with more in-depth explanations, as well as to sketch out some policy recommendations.

The previous sentences argued that the aporia was the spark to initiate this research journey. This statement is accurate, yet it requires a further clarification. The aporia consisted of two assertions. The first is that there is usually a tendency to conceptualise water as fragmented. The second is that water resources should be managed with an integrated approach. Whilst discussing the two, it was the second proposition that came to represent the core of this academic inquiry. The aim of this study was indeed to reflect on integrated water resource management (IWRM).

IWRM is the current dominant paradigm among water experts. Any effective water regulation must – so the argument runs – embrace an integrated approach. The veracity of that claim and the particularities of its regulatory implications have received little attention in legal studies. With a few notable exceptions,[715] legal scholars have tended to overlook the topic. Many water lawyers have embraced the integration paradigm in their

[715] Howarth (n 18).

work without considering what its actual significance and consequences are. In this regard, one can comfortably claim that the IWRM has pervaded the legal world too.

By filling this gap in the literature, the preceding chapters reached an important general finding: the literature's emphasis on integration is misplaced. There are many reasons supporting this finding. Perhaps the most important is that water regulation depends on perceptions that vary across space and over time. A monopolising discourse that devises a unique set of specific economic and legal arrangements *a priori* would not do justice to the multiple social constructions of water. Likewise, the drafting of open-ended provisions in a bid to implement integration would not change the *status quo*. The constant need to adapt those broad arrangements with contextual factors would pre-empt efforts towards integration. These are the study's conclusions in brief.

Section 2 describes the arguments stemming from the preceding substantive chapters in more detail and outlines the main findings of this study. Since one of these findings is that integration cannot be considered an essential aspect of water regulation, Section 3 pinpoint what issues water management should focus on. Having reflected on these major issues, Section 4 delineates a policy suggestion that could help tackle these issues without necessarily resorting to an integrated approach in the EU regulatory landscape. Section 5 concludes.

2. Building blocks

The previous section introduced the main finding of this study. It reads as follows: if we conceptualise water as fragmented, we *can* regulate water resources holistically. However, it is not imperative to embrace integration, especially in polities with entrenched traditions of sectoralism, such as the EU and its regulatory experience. This finding is certainly relevant, but it is only the "ceiling" of this research. From a structural perspective, a ceiling can be safe only if its building blocks are well grounded. Therefore, this section will now lay these out, hoping that the general argument is sound enough.

In order to reach this general finding, this study embraced two research approaches. Firstly, it discussed the context-dependence of water in the first three chapters. Secondly,

it analysed what the IWRM concept is and what its effects at the regulatory level are in chapters V and VI. These two research routes, in conjunction, provided the reader with new lenses through which to look at the paradigm of IWRM in the legal realm.

The first research route began by analysing water management from an economic perspective. This refers to the discussion on whether it is possible to treat water as a "pure" private good. Chapter II highlighted that the economic toolbox is not apt for dealing with the many complexities that water possesses. Or, better put, the economic toolbox provided an explanation of why we humans struggle to find the key to manage water resources. The underlying motivation is that water is a context-dependent resource that cannot be easily categorised under any particular type of (economic) good, being dependent on physical and social preferences. The following chapters therefore turned to analyse the "context-dependent factor" further.

Specifically, the focus shifted to the fact that individuals tend to perceive water differently. A thirsty Bedouin before an oasis will not have the same perception of water as a Dutch farmer on a polder. One might say that this example is too extreme. The same reasoning would still hold with a more nuanced illustration that may be relevant to modern society: bottled water is usually perceived differently than tap water.[716] Individuals have multiple perceptions towards water and chapter III attempted to map them. While doing so, this chapter stressed that each and any of those perceptions promotes its own policy preferences in terms of equity, efficiency and ecological conservation – the main objectives of any water policy. Furthermore, chapter III graphically showed that it is difficult to integrate all these different policy preferences. In the drafting of a water regulation, only some preferences will prevail, and which ones will prevail will mostly depend on the contextual factors. A corollary of this finding is that there may be a risk that certain policy preferences will lead to non-optimal policy choices.

Water is therefore a context-dependent resource across space. Chapter IV complemented this claim by showing that contextual factors play a role in water regulation also vary over time. The way individuals have related to water has varied over centuries

[716] Martha Kaplan, 'Lonely drinking fountains and comforting coolers: paradoxes of water value and ironies of water use' (2011) 26(4) Cultural Anthropology 514.

and, in this way, historical context has affected the drafting of contemporary water regulations. The exegesis of the Roman regulatory system vis-à-vis modern regulation corroborates this finding. To return to the previous statement, water is context-dependent *both* across space and over time. This is the main finding of the first research route, on which the second builds.

The first route paved the way for a deeper analysis of IWRM. The paradigm of integration has come to the fore as a response to the way individuals started viewing water. Since many disciplines have discussed the different conceptualisations, perceptions and values of water,[717] water professionals have been exhorted to treat water as a heterogeneous resource. Admittedly, this view laid the ground for IWRM: given the co-existence of various perspectives revolving around water, it seemed reasonable to devise a single regulatory framework that would capture all aspects of water and minimise potential conflicts. A single integrated regulation would – so the argument runs – avoid neglecting every single feature of water.

In line with what was just said, chapter V began by describing how IWRM has monopolised the discourse on water management since the 1970s. That trend also triggered the adoption of various policies aimed at integration, including the Water Framework Directive (WFD) in the EU. The WFD therefore became the main subject of the remaining part of the chapter and led to an assessment of integration in the various elements of the WFD. Consistently with other scholars, chapter V shows that integration has achieved mixed results, at best. While doing that, it also pinpointed some root underlying causes of this failure.

Finally, chapter VI discussed the differences between integration and sectoralism. In doing so, it made use of the aforementioned root causes. This chapter provided a better understanding of the policy choices that regulators must make when it comes to water management. In particular, it assessed whether the adoption of integrated regulation brings positive changes as originally conceived by the promotors of IWRM. The finding is clear-cut: the efficiency gains of integration over sectoralism seem to be negligible in

[717] Gupta et al (n 702) 573.

case there is a historical tradition of sectoralism. The choice for integration is only justifiable on political grounds.

While a considerable amount of academic work pointed to the possible weaknesses of IWRM in terms of its practical implementation, this study pushed this criticism further by assessing the regulatory consequences of the IWRM paradigm from a theoretical perspective. From all the preceding arguments, it follows that interventions in water management should not focus on integration *per se*. The issue of integration is tangential to the actual problems of water management. It is then advisable that water regulation is devised in a manner that would pay more attention to other issues. This is discussed more thoroughly in the next sections, which advance a policy suggestion based on broader reflections on water management.

3. Some reflections on water management: should integration vs. sectoralism be the real focus?

3.1. Introductory remarks

The previous section reviewed the main building blocks of this study. They served to yield four main findings. Firstly, choosing between integration through standards and sectoralism in the EU does not entail a significant difference in terms of legal costs and regulatory implications. This finding is particularly relevant in the current water management discussions, where most scholars tend to perceive these two management arrangements as diametric opposites.[718] Secondly, prior arrangements play a role and may favour the adoption of one system over another. Policymakers should not automatically embrace integration without considering historical context. For this reason, integration should not be the automatic preferred regulatory approach. Thirdly, it is likely that public power is accountable for the shift from sectoralism to integration. Fourthly, the choice between integration and sectoralism is not overly salient in practice. This consideration lessens the relevance of the various academic and policy discussions on integration.

[718] Howarth (n 18).

This last finding raises the question what issues water management should focus on. If the choice between integration and sectoralism is not so salient, then what should the legislator focus on? Answering this question will help provide this study with a better grip on the material world. Admittedly, the previous findings were rather abstract and related to a relatively narrow topic, i.e. IWRM. It is now time to spend some words on the broader implications of these findings. This exercise allows us to have a better understanding of what is the actual contribution of this study to the broader field of water management beyond the issue of integration.

By adopting a helicopter view, the following subsections develop a reflection on water management discussing some of its major issues: the quest for cooperation, the existence of a pluralistic legal framework that triggers the need for coordination and the fact that uncertainty pervades the regulatory framework, calling for the establishment of public participation to acquire localised knowledge. Although these reflections are not very original *per se*, their relevance is indisputable in any discourse on water management. The policy consequence stemming from this study is therefore to let the legislators focus on addressing these issues rather than attempting to achieve integration. In addition, the following discussion – which remains at theoretical level – will then be complemented by a more practical policy suggestion on the establishment of a European agency on water. Such a proposal would eventually show that the theoretical analysis developed so far may well have a practical application.

3.2. The quest for cooperation

In the introduction of this study, it was argued that the water crisis many scholars refer to is a 'crisis of governance'.[719] The subsequent chapters confirmed this view. The fact that water is scarce and cannot satisfy all the various human and ecological demands is due not only to geophysical reasons but also to human inability to manage water effectively. Since social factors are a complementary part of technical water management, water management is a political process where technocratic solutions alone are inadequate to

[719] United Nations (n 5).

solve the water allocation problem.[720] Water is a highly politicised issue.[721] If legislators want to improve water management, they should focus on addressing normatively problems that are social and inherently political.

These very same problems tend to be context-dependent. It is societies that determine and shape problems in water management. For example, the difficulty of finding a compromise in the EU laws regulating qualitative and quantitative issues originates from the fact that the EU decision-making process involves both Northern and Southern European countries, which have different objectives.[722] If the EU consisted of Northern European countries only, it would be easier to find a compromise. Analogously, it was the social disapproval towards a sharp increase in water bills following privatisation in 2004 that led Berliners to create the *Berliner Wassertisch* (Berlin Water Table) and to demand the remunicipalisation of their water provider through a referendum.[723] It is very likely that such demands would not have materialised if this situation had unfolded in Chile, where a privatised system of water supply is the norm.[724]

Although contextual factors shape social problems, it is possible to identify some common features. The existence of different, sometimes conflicting policy preferences – together with power relations – is usually the root underlying cause of these problems. While not being negative *per se*, this aspect can lead to polarisation and tensions in society. This is readily apparent in the endless debate about privatisation/commodification vs. nationalisation/renationalisation or in its underlying conflict between productive uses/water as an economic good vs. drinking uses/water as a human right.

The existence of these latent and less latent disagreements has thus pushed scholars to find ways to deal with different policy preferences. One commonly proposed solution was the promotion of cooperation. Lawyers, economists and political scientists have all

[720] Conca (n 477).
[721] Marco Schouten and Klaas Schwartz, 'Water as a political good: implications for investments' (2006) 6(4) International Environmental Agreements: Politics, Law and Economics 407.
[722] Kaika and Page (n 574); Page and Kaika (n 278).
[723] Ross Beveridge and Matthias Naumann, 'Global norms, local contestation: Privatisation and de/politicisation in Berlin' (2014) 42(4) Policy & Politics 275.
[724] Madeline Baer, 'Private water, public good: water privatization and state capacity in Chile' (2014) 49(2) Studies in Comparative International Development 141, 142 ss.

researched cooperative solutions. International lawyers advanced the concepts of equitable utilisation and common management against the more state-centred principles of transboundary water allocation (i.e. absolute territorial sovereignty and absolute territorial integrity).[725] Ostrom demonstrated that cooperation in the management of natural resources is possible, reaching valuable findings within the theory of common-pool resources.[726] Likewise, previous studies in international relations have shown that cooperation is the key to avoiding violent conflicts within and between states.[727]

Thus, the realisation of cooperation between actors (individuals, communities, states, international organisations) appears to be a natural response to the need to tackle the social problems that water management is confronted with.[728] Although this claim is undisputed in the literature, the ways to reach cooperative solutions may vary. Disagreements exist not only at interdisciplinary level but also within the same discipline. It is not only political scientists that have a different opinion compared to their fellow economists, but also within law conflicting opinions exist. Given the focus of this study, the legal field is taken as an example.

During the last years, scholars discussed the possibility to draft a "global" water law.[729] The need mostly arose from the emergence of many transnational issues that required and still require concerted action: climate change, increasing standards of living and the behaviour of multinational corporations affected water resources in terms of both quality and quantity. A global water law would – so the argument runs – ensure further cooperation between actors and tackle those problems more effectively. In more economic terms, it would internalise the negative externalities.

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[725] Patricia W. Birnie, Alan E. Boyle and Catherine Redgwell, *International Law and the Environment* (3rd edn, 2009) 540-6; Owen McIntyre, 'Water' in Elisa Morgera and Kati Kulovesi (eds), *Research Handbook on International Law and Natural Resources* (Edward Elgar 2019) 305, 308 ss.

[726] Ostrom (n 82); Elinor Ostrom, Roy Gardner, James Walker, James M. Walker and Jimmy Walker, *Rules, games, and common-pool resources* (University of Michigan Press 1994).

[727] Shlomi Dinar, 'Water, security, conflict, and cooperation' (2002) 22(2) Sais Review 229.

[728] See in this regard recital n. 14 of the WFD (n 13).

[729] Dellapenna and Gupta (n 440); Philippe Cullet, 'Water law in a globalised world: the need for a new conceptual framework' (2011) 23(2) Journal of Environmental Law 233; Arjen Y. Hoekstra, 'The global dimension of water governance: Why the river basin approach is no longer sufficient and why cooperative action at global level is needed' (2011) 3(1) Water 21.

That idea of cooperation has been substantiated by an analysis of the legal evolution of water law. Over the last century, water law has progressed at a startling rate, covering many more water-related aspects and going beyond its local dimension.[730] The thrust towards IWRM around the world described in this study was only one example. Many other developments – mostly stemming from international water law – have helped the materialisation of a more global discourse. The recognition of a human right to water with regulatory consequences within each single state,[731] the extension to different water uses of a 'common legal right' to be exercised by different riparians in international water law,[732] some timid attempts to regulate states' environmental duties towards individuals and groups located in other states,[733] the drafting of the non-binding Berlin Rules[734] are all heading towards a water law that is made up of the same main principles.

On closer inspection, however, the lofty idea of a global water law is too ambitious and cannot exhaust the challenge of managing water resources cooperatively. As Dellapenna and Gupta put it, '[a]lthough *prima facie* water law may appear to be very similar across the world, in fact historical transfers of legal mechanisms from one part of the world to another have generated pluralistic, confused, and in many cases ineffective water law'.[735] This statement was – at least to a certain extent – exemplified by the IWRM experience. As the previous chapters showed, integration has not necessarily led to an improvement of the *status quo*, but to confusion and uncertainty. Judging from the foregoing, it appears that while cooperative solutions are always welcome, the road towards a common water law is fraught with danger. The point here is not that efforts to identify some common principles between different legal traditions should be avoided.

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[730] Joseph W. Dellapenna and Joyeeta Gupta, 'The evolution of global water law' in Joseph W. Dellapenna and Joyeeta Gupta (eds) *The evolution of the law and politics of water* (Springer 2009) 3.

[731] UNGA 64/292 (n 206); United Nations Human Rights Council Res. 15/9 (n 207).

[732] *Case Concerning the Territorial Jurisdiction of the International Commission of the River Oder*, Judgment No. 16, PCIJ (1929) Ser. A No. 23, p. 27 and *Case Concerning the Gabcikovo-Nagymaros Project* (1997) ICJ Reports 7, para. 85.

[733] *Environment and Human Rights*, Advisory Opinion OC-23/17, Inter-American Court of Human Rights (15 November 2017), para. 62-63. For a comment see Ellen Hey and Alberto Quintavalla, 'The Role of Environmental and Human Rights in International Water Law' in Joseph Dellapenna and Joyeeta Gupta (eds) *Water Law* (Edward Elgar forthcoming).

[734] Seventy-First Report of the International Law Association (2004), 344.

[735] Dellapenna and Gupta (n 440).

What is argued is that devising a global water law cannot replace all local water laws and serve, especially in the short term, as the ultimate solution for establishing cooperation between individuals and communities.

Thus, it is necessary to look for alternative – or, better, complementary – solutions for the promotion of cooperation. As the following subsection will show, the response advanced in this chapter is less normative than the establishment of a "dominant" water law. It is instead more descriptive: we should acknowledge the existence of a pluralistic legal framework in water law and, accordingly, focus on enhancing its inner coordination. It is to this aspect that the chapter now turns.

3.3. A pluralistic legal framework

The water regulatory landscape consists of different laws (e.g. regulation for water pollution, drinking water, navigational uses) and legal systems at different levels of governance (e.g. local, state, regional, and international) and scales (e.g. political-administrative and hydrological units). This pluralistic regulatory framework refers to a complex model of institutional arrangements, typical for the management of natural resources.

In this regard, Ostrom proposes to use the definition of "polycentric governance system" to better capture this multi-institutional setting.[736] In contrast to monocentric systems, the concept of polycentricity implies nested institutions at multiple levels of governance and scales interacting with one another.[737] While the existence of this type of institutional setting has traditionally called for simplification, the current dominant view is that its complex nature should not be a reason, itself, for change.[738] A polycentric

[736] Elinor Ostrom, 'Beyond markets and states: polycentric governance of complex economic systems' (2010) 100(3) American economic review 641.
[737] Vincent Ostrom, Charles M. Tiebout and Robert L. Warren, 'The organization of government in metropolitan areas: A theoretical inquiry' (1961) 55(4) American Political Science Review 831, 831-2; Elinor Ostrom, *Understanding Institutional Diversity* (Princeton University Press 2005).
[738] Ostrom (n 736) 643.

governance, and its accompanying regulatory framework, may prove to be a more effective model than any simpler institutional and regulatory framework.[739]

In fact, nested institutions in multiple levels of governance and scales may enhance the functioning of complex socio-ecological systems. The existence of multiple centres of decision-making help address the specific water-related problem at the most appropriate level.[740] For example, the two issues of water pollution and legitimacy in the decisions pertaining to water management require distinct levels of governance. While the fight against water pollution becomes effective if addressed at a higher level (e.g. international or regional), the establishment of participatory mechanisms is usually effective at lower level, since these allow for human interactions.[741]

Having a polycentric governance faces one main challenge: these systems should be capable of striking a balance between centralised and fully decentralised institutions.[742] To do that effectively, there is a need for a clear allocation of power among the institutions involved. In more legal terms, this translates into the need to identify when an institution is responsible for dealing with a given issue. This exercise would respond to the call of enhancing cooperation in water management. Moreover, it would avoid "scale-shopping" by dissatisfied individuals who will tend to address a different institution whenever they are not satisfied with the outcome of a given centre of decision-making.

Against this background, the role of the legislator is not necessarily to simplify the regulatory framework. In line with what was suggested by Ostrom regarding the institutional arrangements, the legislator's efforts should be directed towards identifying workable solutions to enhance cooperation in a pluralistic legal framework. This task could be achieved in two ways. The first refers to the establishment of clearer rules; the

[739] Ibid.

[740] Peter P. Mollinga, Ruth S. Meinzen-Dick and Douglas J. Merrey. 'Politics, plurality and problemsheds: A strategic approach for reform of agricultural water resources management' (2007) 25(6) Development Policy Review 699.

[741] Jens Newig and Oliver Fritsch, 'Environmental governance: participatory, multi-level–and effective?' (2009) 19(3) Environmental policy and governance 197.

[742] Mark T. Imperial, 'Institutional Analysis and Ecosystem-Based Management: The Institutional Analysis and Development Framework' (1999) 24(4) Environmental Management 449.

second one calls for better coordination within the regulatory framework. In both cases, integration is not part of the answer.

In fact, the call for definitional clarity would not mean that there should be a single water law in which all water rights become immediately identifiable and readily applicable. It would mean clarifying what specific water rights stem from each single regulatory framework and what legal consequences these entitlements entail. This definitional endeavour would then contribute to mitigate conflicts when different regulatory frameworks overlap. A simple illustration drawn by the human right to water (hereinafter 'HRW') experience may help. The recognition of the HRW at international level provides certain legal entitlements to individuals. According to the General Comment No. 15 of the the Committee on Economic, Social and Cultural Rights, each person is entitled to safe, sufficient and affordable water.[743] However, some individuals may presume that the HRW would contrast with a private model for delivering water services, as occurs in certain national jurisdictions. By spelling out the normative content of the HRW, it will be possible to show that the existence of this conflict is misleading.[744] Eventually, this exercise would mitigate the emergence of conflicts among different laws or legal systems. Additionally, clearer definitions in terms of entitlements would very likely lead to more productive negotiations among individuals and communities when it comes to devise, amend or repeal water laws.[745]

However, the achievement of enhanced definitional clarity in a regulatory framework can only be realised in the long term, most likely through case-law. So, what should the role of law in this regard be in the short term? The law should strive to have better coordination between different laws and legal systems at different levels of governance and scales. Enhanced coordination would lead to less conflicts among different water rights. In this context, it should be underlined that coordination does not coincide with integration. While coordination limits itself to identifying the type of relationships and linkages that obtain between laws or legal systems, integration aims at devising a unique set of laws – and, in the extreme case, legal systems – that are hegemonic. In other words,

[743] Committee on Economic, Social and Cultural Rights (n 208).
[744] Ibid. par. 27.
[745] Pradhan and Meinzen-Dick (n 160).

the main difference is that only coordination recognises the existence of a plurality of laws and legal systems. That same plurality is important. It would indeed allow for the consideration of multiple perspectives that would eventually ensure greater protection for contextual factors and minority groups.[746] For example, it is unlikely that a single dominant water law will give appropriate weight to the claims of indigenous peoples due to their minority position. In such a legal context, these claims would be evaluated when adopting the unifying law; any decisions made to disregard them would be very difficult to revert.

It is no surprise that the need for (further) coordination has become a common topic in the discussion on the EU regulatory framework, too. Although the EU legislator has devoted most of her attentions to an integrated approach through the adoption of the WFD, commentators pointed at the need for (further) coordination across levels and sectors.[747] Likewise, the European Commission itself emphasised the lack of coordination between the water policy objectives set out in the WFD and other policy areas such as the Common Agricultural Policy, the Cohesion and Structural Funds and the policies on renewable energy, transport and integrated disaster management.[748]

Therefore, it is possible to conclude this subsection by stressing that an important feature of water management is the evident existence of a pluralistic legal framework where different laws and legal systems at different levels of governance and scale interact with one another. Building on the findings of this study, one may argue that integration is not the response needed for searching cooperative solutions. As previously mentioned, integration is only tangential to the actual problems of water management. The law should ensure coordination instead. One of the major issues of water management, then, is advancing better coordination among actors in a bid to find effective solutions. In line with Ostrom's renowned finding, a *well-functioning* (say, coordinated and coherent) polycentric governance system will help to deal with complex ecological systems, such

[746] Ibid.

[747] S.J. Junier and E. Mostert, 'The implementation of the Water Framework Directive in The Netherlands: Does it promote integrated management?' (2012) 47 Physics and Chemistry of the Earth, Parts A/B/C 2, 9.

[748] Interestingly, the European Commission used again the term 'integration' to denote a lack of coordination. See European Commission (n 618) 4.

as water management.[749] As will be argued *infra*, the creation of a European agency with an exclusive mandate on water may provide a clear focal point for all the actors concerned with water management, thus increasing coordination.

3.4. Legal uncertainty

The previous subsections argued that some of the major issues for water management are the need of better coordination among different laws and legal systems at the European level. Addressing these issues, however, would not bring conclusive solutions. The achievement of cooperation through coordination may be a tall order due to significant differences at local level.

Indeed, legal uncertainty adds an extra level of complexity to the idea of cooperation and coordination at the regional level. The complex web of sometimes conflicting interactions and perspectives on water-related issues generates – from a regulatory perspective – considerable uncertainty and demands the acquisition of information at the smallest scale. As proof of this, the previous chapters showed that local factors play a substantial role in water management, ultimately leading to variegated interpretations of legal provisions. Any effort aimed at integration did not (and could not) eliminate legal uncertainty, which still pervades the EU regulatory framework.[750]

At the root of this uncertainty is the scarcity of information at the time of adopting a law. Technical knowledge is lacking and existing knowledge is hard to align with context-dependent preferences.[751] The two sources of legal uncertainty are apparent in environmental regulation and, more concretely, in the WFD. The WFD is a framework directive that does not provide sufficient guidance on technical problems.[752] Local authorities usually decide the best course of action based on the contextual factors. For

[749] Elinor Ostrom, 'A general framework for analyzing sustainability of social-ecological systems' (2009) 325(5939) Science 419.
[750] Many scholars have examined the concept of uncertainty normatively, by promoting various conceptualisations. However, this chapter does not seek to enter this debate but simply consider that uncertainty is a characteristic feature of the European regulatory framework.
[751] Ker Rault and Jeffrey (n 518) 244.
[752] Ibid. 245.

instance, each member state can establish the measures that it deems more appropriate pursuant to Article 11 ("programme of measures") of the WFD.[753] This calls for the acquisition and subsequent application of the predominant perspectives at the local level, in line with the actual application of the EU subsidiarity principle.[754] The local scale is an essential complement to the regional scale. As Lee puts it, '[t]he Water Framework Directive demands the generation of a degree of information and knowledge (…) that is by no easy means easily available'.[755]

All this shows, once again, that integration cannot be the appropriate answer to this problem. It cannot guarantee full information on the part of the legislator. Legislation will never incorporate all the knowledge held by disparate individuals in society. On the other hand, decentralised governance complements the knowledge developed at the central level. The existence of context-dependent factors forecloses the acquisition of all information in a single homogeneous regulatory framework. In this context, the core of the problem in water management is not whether to embrace integration or to stay with sectoralism. It is how to deal most effectively with legal uncertainty.

Several policies are conceivable. Some may argue that the main issue for the EU regulatory framework is that it lacks clear guidance for the management of water resources. The EU legislator should focus on developing binding priorities that would help the actual implementation of the substantive law. However, this policy response may again run the risk of overlooking the context-dependence of water and the consequent futility of predetermined priorities. If arriving at a consensus on a set of priorities at the EU level is possible in principle, it would not eradicate uncertainty.

Others, instead, push for the establishment of common procedural rules.[756] The promotion of public participation, together with the broader concept of

[753] Article 11(3) and (4) only provide a few suggestions at a more general level.
[754] Kraemer (n 703).
[755] Lee (n 632) 44.
[756] See e.g. Newig et al (n 695); Jenny Steele, 'Participation and deliberation in environmental law: exploring a problem-solving approach' (2001) 21(3) Oxford Journal of Legal Studies 415, 442.

proceduralisation,[757] would improve the implementation of any environmental regulation. Public participation, which would require the involvement of both stakeholders and the general public, allows for the interpenetration of different perspectives (say, a societal dimension) in the decision-making process.[758] Further advantages include an increase in public awareness, greater acceptance of decisions due to increased legitimacy,[759] legal and political accountability[760] and opportunities for social learning[761].

Procedural laws and public participation have in the last decade attracted more attention from scholars at the EU level. According to them, there is a need to move the focus away from substantive law to procedural law.[762] While substantive law must be open-ended to respect local factors, procedural laws can be set homogenously across the member states. In this way, participation by the general public and the stakeholders would ensure that decisions follow an informed process. Better information will lead to more effective laws.

These considerations are not unknown to the EU. The WFD attempted to promote public participation, especially after the EU and its member states become a party to the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention).[763] By its adoption,

[757] Public participation is the most apparent example of proceduralism, but many others exist. See William Howarth, 'Aspirations and realities under the Water Framework Directive: proceduralisation, participation and practicalities' (2009) 21(3) Journal of Environmental Law 391, 395.

[758] European Commission, *Common Implementation Strategy for the Water Framework Directive (2000/60/EC) Guidance document No. 8* (European Communities 2003), 14.

[759] Maria Lee, *Public Participation, Procedure and Democratic Deficit in EC Environmental Law* (OUP 2004).

[760] Charles F. Sabel and William H. Simon, 'Epilogue: accountability without sovereignty' in Gráinne De Búrca and Joanne Scott (eds) *Law and New Governance in the EU and the US* (Bloomsbury Publishing 2006) 400.

[761] Newig et al (n 695) 341. Other authors stressed that social learning can be achieved only if intensive collaboration take place. See e.g. G. T. Raadgever, Erik Mostert and N. C. Van de Giesen, 'Learning from collaborative research in water management practice' (2012) 26(11) Water Resources Management 3251.

[762] Krämer argues that this approach may be a way out from the need to harmonise. See Ludwig Krämer, 'The environment and the Ten Commandments' (2008) 20(1) Journal of Environmental Law 5.

[763] Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC, [2003] OJ L 41/26 and Regulation (EC) No 1367/2006 of the European Parliament and of the Council of 6 September 2006 on the application of the provisions of the Aarhus Convention on Access to Information, Public Participation in

the EU showed a growing awareness of the need to facilitate participation of the public in environmental matters and ensure the public availability of environmental information. This move towards more public participation in environmental policymaking has demanded some amendments to previous directives.[764] Indeed, the compliance mechanism set up by the Aarhus Convention provides individuals and groups with the possibility to address issues such as non-compliance with standards on transparency, participation, and access to justice through claims. It must be noted, however, that the WFD did not undergo any changes. It is possible to observe that some of its recitals (i.e. 14 and 46) and Article 14 ('encourage the involvement of all interested parties') not only are compliant with the Aarhus obligations to collect information and guarantee consultation, but they attempt to 'go beyond'.[765]

The obligations of public participation arising from the WFD are though not entirely clear. Because of this, the common implementation strategy on public participation in relation to the WFD attempts to give more shape to these obligations. In this vein, it is possible to note the close interdependence between the Aarhus Convention – as incorporated in the EU regulatory framework – and the WFD. For example, given the silence of the WFD on the term 'public', the guidance document refers to the definition provided for by Article 2(4) of the Aarhus Convention.[766] In this way, it opens participation not only to stakeholders, but also to the general public as required by Aarhus.

However, the efforts made by the WFD seemed meagre to most commentators.[767] Rault and Jeffrey argue that the public participation promoted by the WFD is a 'wicked'

Decision-making and Access to Justice in Environmental Matters to Community institutions and bodies, [2006] 264/13.

[764] See e.g. Council Directive (EC) 2003/35 of the European Parliament and the Council providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with the regard to access to justice Council Directive (EEC) 85/337 and Council Directive (EC) 96/61, amends provisions on public participation in the national permitting procedures on environmental impact assessment and integrated pollution prevention and control, and introduces requirements for access to justice, [2003] OJ L 156/17.

[765] Howarth (n 757) 403-4. A similar point is made in Maria Lee and Carolyn Abbot, 'The usual suspects? Public participation under the Aarhus Convention' (2003) 66(1) The Modern Law Review 80, 100.

[766] European Commission (n 758) 15.

[767] For the English and Welsh areas see e.g. David Benson, Oliver Fritsch, Hadrian Cook and Marylise Schmid, 'Evaluating participation in WFD river basin management in England and Wales: Processes, communities, outputs and outcomes' (2014) 38 Land Use Policy 213.

process because – *inter alia* – there is no agreement on how participation should be realised.[768] In other words, uncertainty was not limited to substantive principles, but it extended to the procedural laws established by the WFD. Similar remarks can be found in other authors who argue that Article 14 of the WFD – and especially the notion of 'active involvement' – is vague and open-ended.[769] The vagueness makes the Article hard to implement.[770] The common implementation strategy has not helped significantly either, since there are guidelines whose implementation is a matter of discretion for member states. As Howarth stressed, many relevant issues are couched in complex scientific and technical terms and this may eventually exclude non-expert participants from the discussion.[771]

All this shows that the EU legislator has considered the introduction of participatory and deliberative mechanisms for the management of water resources. Yet, these same mechanisms were not laid down effectively. While the need for public participation is instrumental to fill knowledge gaps and should be flexible depending on the targeted audience, it is important that the rules be clear. There are several reasons why this has not happened, from history[772] to politics[773]. However, for the purposes of clarity, this study will not pursue this line of inquiry and will limit its scope to integration and showing its secondary role in effective water management.

This subsection showed that a central problem of water management – or, at least, EU water management – is legal uncertainty and information costs. Integration is again tangential to that: integrating all water laws would not work without information. Instead, lawyers should find suitable mechanisms to help accumulate knowledge. Public participation may help in this endeavour. However, as other authors have pointed out,

[768] Ker Rault and Jeffrey (n 518) 245.
[769] Lee and Abbot (n 765) 100.
[770] Howarth (n 757) 404
[771] Howarth (n 757) 407.
[772] The WFD was adopted only two years after the entry into force of the Aarhus Convention and, as acknowledged by many commentators, is one of the first EU regulatory acts to include participatory mechanisms. Therefore, there was not yet critical thinking in evaluating to what extent these participatory mechanisms could be effective.
[773] As for the substantive law, it may be very difficult to reach political agreement between member states in drafting clear procedural laws.

further studies will have to identify suitable methods.[774] Public participation alone, despite the good intentions by the EU legislator to incorporate the Aarhus Convention within the EU regulatory framework and devote Article 14 of the WFD to public participation, will not be enough.[775] *Effective* public participation is needed.[776]

3.5. Concluding remarks: we should stop searching for panaceas howsoever defined

The previous subsections highlighted three major issues for water management. The first is the quest for better cooperation between actors. The second is the difficulty of dealing with a pluralistic legal framework and the consequent need for better coordination. The third is the legal uncertainty that pervades water law and the consequent need to collect further information at the local level through public participation. In all these cases, better procedural laws may help to mitigate these problems. Admittedly, these ideas are not disruptive, but they represent consistent themes in water management and in the literature.

For example, these points were already relevant in the IWRM paradigm itself, which made reference to them. The second principle of the Dublin Statement contains an implicit reference to the multi-level governance and a more direct one to the engagement of stakeholders through a participatory approach.[777] However, the solution stemming from the IWRM paradigm, i.e. integration, did not prove to be conclusive for an effective water management, nor did it try to address these three major issues. This study developed a theoretical explanation of why IWRM was not successful. In line with a few other scholars, it showed that IWRM has become a panacea in water regulation, with limited operability.[778] As with all panaceas, IWRM has removed contexts from its prescriptions and merely developed standardised solutions of limited effectiveness.

Disenchantment with panaceas has currently become an important pillar in water management research. The literature on adaptive management is an example in point.

[774] Ker Rault and Jeffrey (n 518) 248.
[775] Lee and Abbot (n 765) 108.
[776] Erik Mostert, 'The challenge of public participation' (2003) 5(2) Water Policy 179.
[777] It reads as follows: 'Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels'.
[778] Biswas (n 506).

Adaptive management attempts to depart from panaceas in water management by stressing that contextual factors play a decisive role.[779] In other words, social and historical contexts shape individuals' preferences and recourse to standardised and idealised solutions will not necessarily lead to more effective water management systems. Therefore, by acknowledging the polycentric governance of water policy and its context-dependence on localised factors, adaptive management calls for establishing further public participation and social learning.[780]

In fact, the argument against panaceas is not a distinctive feature of adaptive management. It has deep roots, leading to Ostrom. By showing that Hardin's concept of the tragedy of the commons was an over-simplification, her work highlighted that complex social-ecological systems cannot be translated into simple models that cannot capture the various complexities of social-ecological systems.[781] Indeed, distinct cultural and social policy arrangements pervade the management of natural resources, impacting individual preferences and how information is spread and acquired.[782] Because of this, Ostrom developed a multi-variable model and identified a series of critical factors, whose practical elements may change depending on context, in order to ensure the effective governance of natural resources.

The findings reached by Ostrom are therefore particularly valuable, since they contained a strong analytical framework for the management of natural resources. Yet, at the same time, they leave ample margin for further research. Indeed, it is still necessary

[779] Claudia Pahl-Wostl, Louis Lebel, Christian Knieper and Elena Nikitina, 'From applying panaceas to mastering complexity: toward adaptive water governance in river basins' (2012) 23 Environmental Science & Policy 24; Helen Ingram, 'Beyond universal remedies for good water governance: a political and contextual approach' in Alberto Garrido and Helen Ingram (eds) *Water for Food in a Changing World* (Routledge 2011) 259.

[780] Claudia Pahl-Wostl, Paul Jeffrey, Nicola Isendahl and Marcela Brugnach, 'Maturing the new water management paradigm: progressing from aspiration to practice' (2011) 25(3) Water resources management 837; Claudia Pahl-Wostl, 'A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes' (2009) 19(3) Global Environmental Change 354; Dave Huitema, Erik Mostert, Wouter Egas, Sabine Moellenkamp, Claudia Pahl-Wostl and Resul Yalcin, 'Adaptive water governance: assessing the institutional prescriptions of adaptive (co-) management from a governance perspective and defining a research agenda' (2009) 14(1) Ecology and Society.

[781] Elinor Ostrom, 'A diagnostic approach for going beyond panaceas' (2007) 104(39) Proceedings of the National Academy of Sciences 15181; Ostrom (n 82).

[782] Ostrom (n 781).

to investigate what the specific conditions for successful water resource management are and how these may vary across space. For example, community management may function well at a small scale, while larger scales have very different needs, usually requiring more central state coordination.[783] All of this means that further research needs to be conducted in this direction. The aim of this study, however, was not to use the analytical framework by Ostrom as a starting point. Instead, this study focused on the IWRM paradigm and showed that integration is tangential to the major issues for water regulation. While doing so, this study shared some of Ostrom's findings. It observed that contextual factors are determinant of water regulation and that standardised solutions are not fit for purpose.

Thus, adaptive management seems to represent an advancement, compared to IWRM. It takes into consideration those elements of water management that were previously overlooked by the literature. But adaptive management may have a downside, too. It could become – or is already becoming – another theoretical paradigm of water management. That would be an oxymoron! Adaptive management's focus on contextual factors, experimentation and social learning would contrast with an abstracted management approach. Its total reliance on context, with few concrete policy suggestions, could turn out to be as abstract and open-ended as the integration paradigm. The literature on adaptive governance must therefore commit itself to research and evaluate some practical solutions to water management governance instead of advancing broad policy prescriptions (e.g. social learning) only. The foregoing point has a further implication. Consistently with this position, one cannot shy away from proposing more practical policy suggestions. The following section will address this task. In line with the rest of this study, the focus of those policy suggestions is the EU regulatory landscape.

4. A policy suggestion

4.1. Introductory remarks

Admittedly, this study was a theoretical analysis – a point that was already made explicit from its very first pages. This theoretical analysis led to some relevant findings that have

[783] David Harvey, 'The future of the commons' (2011) 109 Radical history review 101, 102.

been extensively discussed in the foregoing pages. It is then now reasonable to conclude this journey by enriching the theoretical analysis developed so far with a more practical suggestion. A theoretical exercise, despite lofty, can run the risk of being an end in itself if not complemented by a more practical suggestion. Because of this, this section would like to advance a specific policy suggestion, i.e. the establishment of an independent European agency on water aimed at better coordinating the EU water regulation, while enabling local communities to promote their context-specific knowledge.

This suggestion, despite tentative, has a twofold benefit. Firstly, it has the merit of showing that other solutions, different from the adoption of an integrated approach, are possible. Secondly, and relatedly, it attempts to show that this theoretical analysis can also steer the attention of scholars towards other, more practical avenues of research and attract policymakers' attention. But before substantiating why such an agency can be a possible answer to address some of the main problems of the EU water regulatory framework, the following subsection introduces an additional hurdle the EU regulatory framework faces.

4.2. Weak enforcement in the EU as an additional hurdle

The previous sections showed that integration is not part of the major issues of water management. These, instead, are the existence of a legal pluralistic framework that needs further cooperation through better coordination and legal uncertainty that pervades the regulatory framework because knowledge resides at the local level. A way of partially tackling the shortcomings of water policy could be the establishment of common procedural rules. Clear procedural rules would generate certain guidelines on how to handle water-related problems that may be at the intersection of different laws and legal systems at multiple scales. In addition, procedures would enable regulators to engage citizens at the local level, so that it will become possible to acquire further information. This strategy is not unknown to the EU legislator. As described in the previous pages, the EU attempted to devise procedural laws to address these issues.

However, this attempt has not been overly successful, due to open-ended legal provisions. In defence of the EU, one must say that reaching political agreement on clear procedural laws between member states is not an easy endeavour. Procedures very often

conceal the resolution of matters of substance. It is therefore easily imaginable that EU member states who hold conflicting interests will not come to terms with each other comfortably. In addition, well-drafted procedural laws are not the silver bullet to manage water resources effectively. Even if it is assumed that political consensus is found, there remains the need to monitor, and possibly enforce, member states' compliance. In other words, the drafting of procedural rules aimed at coordination and at reducing uncertainty through the engagement of stakeholders would not guarantee compliance with the EU rules. This is readily apparent in the events that followed the adoption of the WFD. Unambitious compliance and weak enforcement represent a critical shortcoming of the EU regulatory framework.[784]

Why is this so? A quick recap of the EU regulatory architecture may help frame the problem. The EU is not a federal state, but a supranational organisation whose laws complement international, national and local laws. Thus, the EU does not have the final say on many issues, especially if these are not in the realm of its exclusive competence. Member states retain their competence, and this is also the case for water policy, which is – under the broader category of environment – a shared competence.[785]

The legal instrument most commonly utilised by the EU in water policy is the directive. There are several reasons for that, but the most important is probably its flexible and dynamic nature. A directive demands that member states abide by set objectives, but it leaves them ample margin of discretion in their choice of means.[786] This legal instrument still carries some risks. If the set objectives are open-ended, states can limit themselves to the barest minimum to avoid complaints from the Commission and possible infringement procedures before the European Union Court of Justice.[787] This was what happened also in the case of the WFD, where subjectivity pervaded the EU regulatory

[784] Olivia O. Green, Ahjond S. Garmestani, Helena FMW van Rijswick and Andrea M. Keessen, 'EU water governance: striking the right balance between regulatory flexibility and enforcement?' (2013) 18(2) Ecology and Society.

[785] In addition, as indicated in some previous chapters, the EU treaties set a more cumbersome decision-making when it comes to deciding over quantitative issues of water since it requires unanimity pursuant to Article 192(2).

[786] Jan H. Jans and Hans Vedder, *European environmental law: after Lisbon* (Apollo Books 2012).

[787] Clifford Rechtschaffen, 'Shining the spotlight on European Union environmental compliance' (2007) 24 Pace Envtl. L. Rev. 161.

framework and a uniform implementation by member states was missing.[788] In this regard, Boscheck's word appear very trenchant, but accurate to describe the WFD as 'built on vague objectives and unclear monitoring criteria, it is a compromise that risks diluting pre-existing regulatory norms, invokes national discretion to close EU legislative gaps, and for all practical purposes may be unenforceable'.[789]

From the foregoing sketch, one can argue that the issue of compliance and (un)enforceability may hamper the effectiveness of common procedural rules. Enforcement mechanisms are relatively weak at the EU level.[790] The EU Commission is unable to monitor all transpositions accurately and it bases its action mostly on other EU member states', NGOs and public complaints as well as national implementation reports.[791] When there is an alleged violation by a member state, the Commission, which lacks binding dispute settlement powers as provided in the Treaties, can only submit an infringement of EU laws before the European Union Court of Justice. This situation also occurs when international disputes between EU member states arise since the Commission cannot fulfil any role but that of the mediator.[792] In other words, the Commission's 'offers a limited process for dialogue between the member States and the Commission on how best to attain its objectives'.[793]

The literature has not put much focus on possible strategies to improve the current state of the art. Some have limited themselves to arguing that a more aggressive use of the EU courts may help enforce European regulation.[794] Although this proposition may be theoretically valid, it overlooks some relevant features of the EU setting. Firstly, EU courts usually take a long time to settle disputes and policies whose implementing provisions are open-ended and involve a high degree of subjectivity by the adjudicator

[788] Andrea M. Keessen, Jasper JH van Kempen, Marleen van Rijswick, Jan Robbe, and Chris W. Backes, 'European river basin districts: are they swimming in the same implementation pool?' (2010) 22(2) Journal of Environmental Law 197.
[789] Boscheck (n 571) 268.
[790] Moss (n 597).
[791] Green et al (n 784).
[792] See for example the role the EU adopted in the *Gabcikovo-Nagymaros* dispute (n 732).
[793] Ellen Hey, 'Multi-dimensional public governance arrangements for the protection of the transboundary aquatic environment in the European Union: the changing interplay between European and public international law' (2009) 6 Int'l Org. L. Rev. 191, 210.
[794] Johnson (n 655).

make the final judgment less predictable, as in the case of water. Secondly, the likelihood that the Commission brings member states before EU courts would still be low due to the high cost of monitoring and collecting all relevant information.

This chapter suggests another, more viable strategy exists. The establishment of an European agency with an exclusive mandate on water would enhance cooperation and coordination, incentivise the exchange of information through public participation and improve compliance with the EU legal system. At the moment, there is no single EU decentralised agency devoted to water management, despite the existence of a relatively large regulatory framework that, directly or indirectly, touches upon water. This proposal, which may have various benefits, will be discussed in the next subsection.

4.3. The establishment of a decentralised European agency on water

At present, no information has arisen on any proposals advanced regarding a European agency on water. There may be some reasons behind the absence of such a proposal. Recent years have witnessed the setting up of many European decentralised agencies – a process known as agencification.[795] Although the activities of decentralised agencies have become essential for the EU's executive governance,[796] some problems have emerged over the years.[797] For example, the "independent" status of decentralised agencies often raises considerable concerns due to the seemingly arbitrary power they could exert.[798] According to scholars, the existing legal and institutional provisions do not ensure adequate accountability mechanisms for these agencies.[799] Likewise, the impact of the EU

[795] Koen Verhoest, 'Agencification in Europe' in Edoardo Ongaro and Sandra Van Thiel (eds) *The Palgrave handbook of public administration and management in Europe* (Palgrave Macmillan 2018) 327.
[796] Deirdre Curtin, *Executive Power of the European Union. Law, Practices and the Living Constitution* (OUP 2009).
[797] Madalina Busuioc, *European agencies: Law and practices of accountability* (OUP 2013) 3 ss.
[798] Michelle Everson, 'Agencies: The 'Dark Hour' of the Executive?', in Hewig Hofmann and Alexander Türk (eds), *Legal Challenges in EU Administrative Law. Towards an Integrated Administration* (Edward Elgar 2009), 190.
[799] Busuioc (n 797) 6.

agencies, as a centre of decision-making, might be limited due to the nature of management boards (e.g. size and composition of boards).[800]

The policy suggestion of setting up an EU agency therefore does not come without challenges. Nonetheless, it is reasonable to believe that a decentralised agency on water could make EU water management better off. To substantiate this claim, this section provides the theoretical grounds on which this policy suggestion is based. Thereafter, it discusses why an EU agency on water could help tackle – at least partially – the major issues previously highlighted in this chapter.

To start with, the concept that water governance systems require effective institutions can be drawn from Ostrom's suggestion to focus on ensuring well-functioning polycentric governance systems. As described in the previous section, Ostrom argues that it is not necessary to simplify complex institutional settings, but to better coordinate them so that local social and environmental conditions are respected.[801] The establishment of an agency aimed at enhancing the level of cooperation between multiple centres of decision-making would go in this direction.

The idea of an agency on water can find further support in the literature and previous experiences in terms of international practice. For example, other scholars argue that further research is necessary on ways to promote cooperation among different types of institutions through dedicated bodies, such as agencies.[802] One of the reasons is that agencies may help solve collective action problems,[803] which often characterise water management as shown in chapter II.

Additionally, in 2011, the United Nations (hereafter 'UN') created the UN Water Agency, due to the lack of a 'clear focus and loci for action by the water community at global scale'.[804] The situation of the EU does not look so dissimilar. At the EU level, there

[800] Morten Egeberg and Jarle Trondal, 'Researching European Union agencies: What have we learnt (and where do we go from here)?' (2017) 55(4) JCMS 675, 680-1.
[801] Ostrom (n 736) 13.
[802] Meinzen-Dick (n 11).
[803] Michelle Everson, 'Independent agencies: hierarchy beaters?' (1995) 1(2) European Law Journal 180 and Ellen Vos, 'Reforming the European Commission: what role to play for EU agencies' (2000) 37 CMLR 1113.
[804] Gupta et al (n 209).

is no institution that has a coherent view on all regulations that touch upon water, nor does anyone collect information acquired at the local level. This function is in principle fulfilled by the European Environment Agency.[805] However, the fact that this agency deals with water issues presents some drawbacks: it tends to approach water issues exclusively from an environmental perspective, its mandate covers many topics other than water and its limited resources are insufficient to ensure that all the multifaceted issues of water are afforded priority.

All this shows that proposing the establishment of a decentralised agency on water is theoretically grounded. The discussion now moves to why a decentralised agency on water could help improve the current state of the art of the EU water management.

As previously mentioned, the creation of decentralised agencies has been on the rise due to their dynamic and flexible nature. While EU agencies had technical and scientific problems as their original *raison d'être*, subsequently they started encompassing many other activities.[806] Today, the role of agencies includes *inter alia* coordinating national authorities, providing technical and scientific support, collecting information at the local level, maintaining contact with relevant stakeholders at national and EU level and assisting in the implementation of EU law. From this brief description, it is already apparent that some of the agencies' activities tie in with the formerly pinpointed issues of water management.

What might be the specific functions and powers of such an agency? Previously, it was argued that the major issues the EU water management should focus on are the need for cooperation and coordination and the fact that legal uncertainty characterises the regulatory framework due to localised knowledge. Moreover, the foregoing subsection also showed that procedural rules set by the EU are not very successful due to unambitious implementation and weak enforcement.

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[805] Council Regulation (EEC) 1210/90 [1990] OJ L120/1, as amended by Council Regulation (EC) 933/1999 of 29 April 1999 on the establishment of the European Environment Agency and the European environment information and observation network [1999] OJ L117/1.

[806] Giandomenico Majone, 'The Rise of the Regulatory State in Europe' (1994) 17(3) West European Politics 77; Renaud Dehousse, 'Regulation by Networks in the European Community: The Role of European Agencies', (1997) 4(2) Journal of European Public Policy 246.

Considering all these issues, it is reasonable to think of a decentralised agency on water as a 'hub of regulatory networks'[807] in the EU's multi-dimensional setting (e.g. EU, national, local levels). This specific position would translate into various functions that would allow the agency on water to address some of the challenges posed by the EU water management.

To start with, ensuring cooperation and coordination should become a central objective of a decentralised agency on water. It is often the case that one of the roles of decentralised agencies is to facilitate cooperation between the institutions at different levels.[808] In other words, agencies take on some functional tasks that should be carried out at the EU level, but it would not be politically wise to leave them to the European Commission. Equipping a decentralised agency on water with those functions would also be beneficial in the case of water management. The EU and its member states have shared competence and it is evident that no institution at either level is willing to relinquish its own competence.[809] Therefore, an independent EU agency on water could enhance cooperation and coordination between different levels of governance by (e.g.) setting up advisory and working groups formed by European, national and stakeholders delegates, assisting national and local levels in a coherent implementation of EU water law and providing technical assistance.

In addition, its action framework could extend to supranational institutions, too. For instance, an EU agency on water could conclude agreements with organisations with a similar mandate at the international level[810] such as the UN Water Agency that was mentioned previously. In other words, this function could facilitate the development of

[807] Daniel Kelemen, 'The Politics of Eurocracy: Building a New European State?' in Nicolas Jabko and Craig Parsons (eds) *The State of the European Union* (OUP 2005) 173, 181.
[808] Madalina Busuioc and Martijn Groenleer, 'The Theory and Practice of EU Agency Autonomy and Accountability: Early Day Expectations, Today's Realities and Future Perspectives' in Michelle Everson, Cosimo Monda and Ellen Vos (eds), *European Agencies in Between Institutions and Member States* (Wolters Kluwer 2014), 179; Daniel R. Keleman, 'The Politics of 'Eurocratic' Structure and the New European Agencies' (2002) 25(4) West European Politics 93, 95.
[809] It is sufficient to recall the (opposing) behaviour of the Spanish government when it came to adopt a Directive regulating water quantity issues. See Page and Kaika (n 278) 333.
[810] See Paul Craig, *EU Administrative Law* (OUP 2006), 155.

more concerted responses to transnational issues beyond the EU regulatory sphere such as global water pollution.

An additional relevant function that should help increase cooperation and acquire information at the local level is that a decentralised agency on water would facilitate the exchange of information and best practices among different actors. An example may help in this regard. The WFD requires coordination among various administrative units (Article 3) and an active involvement of the interested parties (Article 14). As a response to these regulatory requirements, most member states have established participation and coordination boards at the river basin level. The characteristics of these boards tend to differ depending on the member state at hand.[811] Therefore, a European agency on water could be the appropriate body to accumulate all the knowledge developed by different boards. As a result, it would be possible to assess the effectiveness of the various strategies in the promotion of participatory river basin planning in different member states and social learning could become part of the policy process. In other words, the task of the agency should be to acquire all localised knowledge, assess it and disseminate it across the EU.

These specific functions of a decentralised policy process would provide for more active participation of all actors at any level (e.g. EU, national and local) involved in the EU water management process. By creating a better dialogue, the purpose of which should be developing a system for monitoring implementation as well, the EU may see an increase in the compliance with its regulatory framework.

Aside from these specific functions, it is relevant to discuss what the status of a decentralised agency on water could be. It would be reasonable to suggest the establishment of an *independent* agency. This would provide for more independent administration and budget compared to a more centralised, executive agency. In other words, by guaranteeing the independence of a decentralised agency would ensure that it is not perceived as a "long arm" of the EU institutions, but rather an "impartial" body that would help accommodation to each and every local solution while respecting EU law.

[811] Emilia Pellegrini, Lucia Bortolini and Edi Defrancesco, 'Coordination and Participation Boards under the European Water Framework Directive: Different approaches used in some EU countries' (2019) 11(4) Water 833.

This latter consideration would be particularly important, especially given the agency's role in promoting and ensuring cooperation, coordination and monitoring – as should be the case.

Yet, the decentralised agency on water should take some extra measures if it wants to be perceived as fully independent from the Commission. Despite the factual independence in terms of legal personality, decentralised agencies may still be perceived as bodies that implement and enforce EU law, constituent parts of the EU Commission and catalysts of EU and member states' policy preferences.[812] Because of this, it is advisable that the decentralised agency on water should have member states representation, as well as stakeholders' representatives in the management board. These precautions should, in principle, facilitate a more constructive dialogue between authorities at different levels.

These are only a few of the points that must be investigated prior to the establishment of a decentralised agency on water.[813] Others may be the need to develop suitable methods for controlling agencies *ex ante* and making them accountable for their action *ex post*. Academic research should help identify the possible features an agency must possess to make EU water management more effective. Once all of this has been done, the creation of a decentralised agency will only be a matter of political will. From a budgetary perspective, the creation of a decentralised agency should not incur significant extra costs. It would indeed be possible to destaff some DGs of the Commission and some sub-units of the European Environmental Agency so that an agency on water could be established at a lower cost.[814]

Admittedly, this policy suggestion would not solve all the problems of the EU water management. However, the preceding paragraphs show that the establishment of an independent decentralised agency could improve the current state of the art. By becoming

[812] Morten Egeberg and Jarle Trondal, 'Agencification of the European Union administration: Connecting the dots' ARENA Working Paper No. 3/2016, 2–3.
[813] A good starting point would be the so-called Common Approach, a comprehensive set of guiding principles for the creation and functioning of decentralised agencies adopted by the EU.
[814] See e.g. <https://www.eea.europa.eu/about-us/who/staff/chart> and <https://ec.europa.eu/dgs/environment/pdf/org_en.pdf> (accessed 11 June 2020).

a ‘hub of regulatory networks’, a decentralised agency on water could enhance cooperation between multiple centres of decision-making and ensure a more coordinated view on EU water management. In addition, it could collect all the information that resides at local level and use it for social learning. All these tasks could also lead to a higher rate of implementation of the EU regulatory framework.

5. Conclusion

This study discussed the regulatory consequences of the IWRM paradigm from a theoretical perspective. Its finding is clear-cut: the benefits of integration do not necessarily outweigh sectoralism, especially when certain prior policy arrangements are in place. Integration does not ensure more effective water resource management. It does not significantly change the *status quo*. Conversely, efforts directed at integration divert legislators’ precious energies. There are some major challenges in the EU water management that deserve more attention. Enhancing definitional clarity, promoting coordination, reducing uncertainty through public participation and ensuring compliance must all take priority. Water management research should help address these points instead of advancing the integration paradigm. A possible answer that this chapter proposed was the establishment of a decentralised agency with an exclusive mandate on water. This idea builds on considerations highlighted by scholars and international experiences, as analysed in this chapter.

All these arguments are important because they complement the discussions on water management from a regulatory perspective. Too often, water research has experienced division. Different disciplines have approached water management from their own angle. Scientists from different academic disciplines – i.e. natural and social sciences – have been reluctant to adopt an interdisciplinary approach when addressing the issue. The same is true within the different disciplines of social sciences (e.g. economics vs. law vs. political geography). Only recently have there been attempts to open an interdisciplinary forum of exchange and dialogue. In that forum, many disciplines coexist and interact. However, with a few notable exceptions, water lawyers are not part of that

environment.[815] This study is therefore an attempt to further contribute to the cross-fertilisation of different disciplines. Such an approach could be helpful to both water lawyers *and* water scientists. Water lawyers can use it to broaden their views when discussing water law. Other water scientists can use it as an induction into the essential discipline of water management that is water law.

[815] Dellapenna and Gupta (n 440); Jonas Ebbesson and Ellen Hey, 'Introduction: where in law is social-ecological resilience?' (2013) 18(3) Ecology and Society.

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SUMMARY

This dissertation contributes to the answering of one question – if we conceptualise water as fragmented, should we adopt an integrated regulatory approach? The response is that we can, but we should not. While the integration of water resource management has become the dominant paradigm among water experts, its results are mixed at best. Integration has not been a panacea for water management; it is only under certain conditions that integration functions well. The thesis corroborates this point by analysing European Union water regulation, in particular, its Water Framework Directive. This dissertation thus reflects on integration from a regulatory perspective and concludes that its role is tangential compared to the central problems of water management: the literature's emphasis on integration is misplaced.

While arguing that, this study shows that water regulation depends on physical and sociocultural perceptions that may vary across space and over time. Water is indeed a complex resource, encompassing multifaceted conceptualisations in science and society. Such conceptualisations not only contribute to how water is made known, but also appeal to various legitimisations and logics of how this resource is to be managed. It follows that a unique set of economic and legal arrangements devised *a priori* will not do justice to the multiple social constructions of water.

Against this background, this study highlights that it is not imperative to embrace integration, especially in polities with entrenched traditions of sectoralism, such as the EU regulatory framework. Instead, it is advisable to devise water regulation in a manner that would pay more attention to other issues: the quest for cooperation, the existence of a pluralistic legal framework that triggers the need for coordination and the fact that uncertainty pervades the regulatory framework, calling for the establishment of public participation to acquire localised knowledge.

In order to reach these findings, this study embraces two research routes. Firstly, it discusses the context-dependence of water both across space and over time in the first three content chapters. Secondly, it analyses what the Integrated Water Resource Management concept is and what its effects at the regulatory level are in the last two content chapters. These two research routes, in conjunction, provided the reader with new

lenses through which to look at the paradigm of Integrated Water Resource Management in the legal realm. This study, however, attempts to relate to more than one discipline by combining doctrinal legal research, economic analysis, political science and hydrology.

SAMENVATTING

Dit proefschrift draagt bij aan het beantwoorden van één belangrijk vraag – als we waterbeheer beschouwen als een gefragmenteerd concept, zouden we dan een geïntegreerde regelgevingsaanpak moeten gebruiken? Het antwoord is dat we dit wel kunnen, maar dat we dit niet zouden moeten doen. Ondanks dat de integratie van waterbeheer het dominante paradigma geworden is onder waterdeskundigen, zijn de resultaten van deze aanpak echter gemengd. Integratie is geen wondermiddel voor waterbeheer want de integratie van waterbeheer functioneert alleen onder bepaalde omstandigheden goed. Dit proefschrift zal dit punt kracht bijzetten door het analyseren van waterbeheer in de Europese Unie en hierbij vooral de 'Water Framework Directive'. Dit proefschrift reflecteert dus op de integratie van waterbeheer vanuit een regelgevend oogpunt en concludeert dat de rol van integratie slechts klein is vergeleken met de centrale problemen in watermanagement. De nadruk in de literatuur op integratie is dus misplaatst.

Met dit punt laat deze studie zien dat het succes van waterbeheer afhangt van fysieke en socio-culturele percepties die van plaats tot plaats en over verschillende tijdsperiodes kunnen variëren. Water is dan ook een complexe hulpbron waarvan in de wetenschap en in de maatschappij, veel verschillende conceptualisaties bestaan. Dergelijke conceptualisaties dragen niet alleen bij aan de manier waarop water als hulpbron in de maatschappij bekendstaat, maar zijn ieder ook gebaseerd op verschillende legitimaties en zienswijzen op de manier waarop deze hulpbron moet worden beheerd. Hieruit kan geconcludeerd worden dat een enkele, unieke reeks van economische en juridische constructies die a priori zijn bedacht geen recht kunnen doen aan de veelzijdige sociale constructies op water als hulpbron.

In deze context benadrukt deze studie dat het niet noodzakelijk is om integratie te omarmen, vooral niet in politieke systemen met diepgewortelde tradities van sectoralisme, zoals het EU-regelgevingskader op het gebied van waterbeheer. In plaats daarvan is het raadzaam om de regelgeving op waterbeheer zo te ontwerpen dat er meer aandacht is voor andere kwesties zoals de zoektocht naar samenwerking, het creëren van een pluralistisch wettelijk kader dat ervoor zal zorgen dat coördinatie op het gebied van waterbeheer noodzakelijk wordt. Ook is het belangrijk dat er in het beleid van de EU ruimte is voor

verschillende percepties op waterbeheer zodat publieke participatie tot stand kan komen om lokale kennis te verwerven.

Om tot deze conclusies te komen, worden in deze studie twee onderzoekroutes gebruikt. Ten eerste, zal in de eerste drie inhoudelijke hoofdstukken de contextafhankelijkheid van water besproken worden, door zich te richten op de aanpak van waterbeheer in verschillende plaatsen en gedurende verschillende tijdsperiodes. Ten tweede zal in de laatste twee inhoudelijke hoofdstukken de betekenis van het concept 'Integrated Water Resource Management' besproken worden en zal uitgediept worden wat de effecten van dit concept zijn op de regelgeving op het gebied van waterbeheer. Deze twee onderzoekroutes geven de lezer samen nieuwe invalshoeken op het paradigma van geïntegreerd waterbeheer in de juridische wereld. Deze studie beperkt zich echter niet alleen tot de juridische wereld, maar probeert met een multidisciplinaire aanpak een relatie te leggen met meer dan één discipline door doctrinair juridisch onderzoek, economische analyse, politicologie en hydrologie met elkaar te combineren.

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Short bio	
Alberto Quintavalla is a PhD candidate at the Erasmus University Rotterdam. He has been a visiting researcher at the Hebrew University of Jerusalem and the European University Institute. He received a law degree from the University of Parma and a Master in European Studies from LUISS Rome. Alberto's research interests include environmental governance, technology and EU and international law. He has also been admitted to the Italian Bar.	
Education	
PhD candidate – Erasmus University Rotterdam	2016-2020
Visiting researcher – European University Institute	2019
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Master in European Studies (*with distinction*) – LUISS Rome	2013-2015
Law 5 years single cycle degree (*cum laude*) – University of Parma	2008-2013
Erasmus Exchange Programme – Utrecht Universiteit	2013
Work experience	
Teaching Assistant at the Jean Monnet Chair of Economic Analysis of EU law	2015-2016
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Prizes and awards	
Erasmus + Funds (Research Visit European University Institute)	2019
Erasmus Flagship Initiative (Organisation Erasmus Early-Career Scholars Conference)	2017
Stichting Erasmus Trustfonds (Organisation Erasmus Early-Career Scholars Conference)	2017
Call for Ideas Competition (EGSL)	2016
The Guidetti Prize (Research Visit Hebrew University of Jerusalem)	2016
Myllenium Award	2015
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Publications	
E. Hey and **A. Quintavalla**, 'The Role of Environmental and Human Rights in International Water Law' in J. Dellapenna and J. Gupta (eds), *Edgar Elgar Environmental Law Series. Volume on Water Law* (Edgar Elgar 2020) (forthcoming)	2020
C.N. Focacci and **A. Quintavalla**, 'Unpredictable spillovers among water uses? An analysis of agricultural, industrial, and household uses of water in the Balkans' (2020) *PloS One*	2020

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A.E. Buonocore and **A. Quintavalla**, 'L'iniziativa dei cittadini europei: analisi dell'istituto e del suo funzionamento' (2015) 2 *La cittadinanza europea* 117	2015
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PhD training

EGSL courses	***year(s)***
Academic Writing in English	2015-2016
Research Lab	2015-2016
Collaborating with your supervisor	2015-2016
Introduction to Legal Methods	2015-2016
Reflection on Social Science Research	2015-2016
Writing Clinic I	2015-2016
Writing Clinic II	2015-2016
Specific courses	***year(s)***
Philosophy of Human Rights	2015-2016
Seminars and workshops	***year(s)***
Erasmus Graduate School of Law (EGSL) Lunch Lectures	2016-2020
Behavioural Approach to Contract and Tort (BACT) Seminars	2016-2020
ATLAS Agora Graduate Programming (Queen Mary University)	2017
Workshop on Experiment at the Crossroads of Law and Economics	2017-2018
European Doctorate in Law & Economics (EDLE) seminars	2015-2016
Presentations	***year***
Public Participation for the Improvement of Sustainable Development in the EU. NWO Synergy Conference [poster presentation]	2020
A right to energy? Some considerations from a human right to water perspective. Co-Creating The 'Right to Energy' In Theory and Practice – University of Groningen	2020
Flowing Waters in History. EGSL Lunch Lecture – Erasmus School of Law	2019
Water Management: A Matter of Cognitive Complexity. Environmental Law and Governance Working Group. European University Institute	2019

The View of Water: A Matter of Cognitive Complexity? 11th Joint Seminar 'The Future of Law and Economics' – Erasmus University Rotterdam	2019
The Nexus Between 'Energy Security' and 'Ecological Security': The Case for an Integrated Policy Framework for Effective Mitigation and Adaptation to Climate Change. IUCN Academy of Environmental Law – University of Strathclyde	2018
Water: A Complex Value for a Complex Resource? Society of Economic Anthropologist – Arizona State University	2018
Water(s): Is H20 enough? EGSL Lunch Lecture – Erasmus School of Law	2018
Free Trade Agreements: Analysing the problematic allocation of competences between the EU and the Member States and suggesting a way forward. Radboud Economic Law Conference – Radboud University	2018
Trade Agreements have bitten off more than they can chew, Edinburgh Postgraduate Law Conference 2018 – Edinburgh Law School	2018
The evolution of the right to water as a unitary and independent right in the Inter-American Human Rights System. II Inter-American Congress on the Environmental Rule of Law organized by the Organization of American States (OAS), United Nations Environment and the World Commission on Environmental Law (WCEL), Santiago Chile	2017
The Conduit between Water and Human Rights. Workshop by the Association of Transnational Law Schools – Queen Mary University of London	2017
The Right to Water as a Non-Unitary Concept – A Positive and Normative Analysis of Recent Legal Developments. McGill Law Graduate Conference – McGill University	2017
Organisation conferences	***year***
Erasmus Early-Career Scholars Conference: New Business Models and Globalized Markets: Rethinking Public and Private Responsibilities, Erasmus University Rotterdam	2018
Teaching	***year***
The Political Economy of European Integration – 15 ECTS	2016-2020
Economic Analysis of European Law – 5 ECTS	2016-2020
Invited lecture for the course 'Global Media Seminar: Media, Activism & Democracy' – New York University (Florence campus)	2019
Invited lecture for the course 'EU Energy Policy' – European College of Parma	2018
Invited lecture for the course 'Onderzoek' – Erasmus Honours Law College	2018