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European water law and hydropolitics: an inquiry into the resilience of transboundary water governance in the European Union

Ph.D. Dissertation

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To László Trócsányi
whose unconditional
support made this
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INTRODUCTION

The problem of transboundary river basins in international relations

All living things run on water. While the amount of accessible freshwater in the world is limited and remains constant, it has to satisfy the ever growing demands of an ever growing number of users, be it human beings, the economy or the natural environment. Moreover, the various human-induced pressures of our era – population growth, urbanisation, climate change to name a few – are leading to a massive degradation of the quality and quantity of freshwater resources worldwide. As a result, by 2030, the world is projected to face a 40% water deficit, if current trends remain unchanged[1].

Consequently, water security in the broadest sense of the term will be one of the critical questions of development, peace and stability in the 21st century. Not surprisingly the World Economic Forum has repeatedly identified water as one of the top global sources of risk. The US National Intelligence Council in a recent report also concluded that "water may become a more significant source of contention than energy or minerals out to 2030 at both the intrastate and interstate levels"[2].

Changing hydrological conditions are further complicated by the geography of water: around 47% of the Earth's surface waters lie in basins shared by at least two countries. These basins are home to some 40% of the world's population and account for about 60% of the global river flow[3]. Thus, the bulk of world's unfolding water crisis will have to be solved in an international context.

The rise and fall of the water wars thesis

In view of the conflict potential of shared waters, the 1980s and early 1990s saw the emergence, in mainstream political discourse and scientific literature, of a widely held conviction that wars for water were both inevitable and imminent. The rise of the water wars thesis, however,

[1] *See* section I.5.2.2. below.
[2] *See* section I.5.5.3. below.
[3] *See* section I.1.3. below.

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inspired not only political speculation, but also gave impetus to a new wave of empirical research into the drivers of interstate conflicts over shared river basins. Such research has laid the foundations of a new discipline coined hydropolitics that is concerned with the study of the resilience of co-riparian relations in transboundary basins. The basic findings of the various schools of hydropolitics are probably best summarised by Aaron T. Wolf, a leading authority in the field, as follows:

- in recent history shared water resources have been a driving force of cooperation, rather than conflict. Thus water tends to connect nations more than it divides them;
- the stability of co-riparian relations, in other words: hydropolitical resilience, is not determined by one single hydrological or political factor, such as scarcity in the basin or the ambitions of a downstream hegemon. Rather, it is defined by the legal and institutional arrangements riparian states have put in place to manage the shared resource;
- if a given legal and institutional arrangement is sufficiently robust and flexible, it may absorb even very significant changes in the basin without negatively affecting the efficiency of cooperation among riparian states;
- the chance of serious conflict emerges, if the magnitude and/or the speed of change (be it physical or political or both) in the basin exceeds the absorption capacity of a given governance regime. The absorption capacity of a governance scheme is thus not a stationary condition, riparian states can always adapt it to changing hydrological or political circumstances[4].

The case of the European Union: a cause for complacency or concern?

The fact that the stability of co-riparian relations is, to a large extent, a function of certain legal and institutional variables makes it possible to subject it to systematic measurement. Consequently, an impressive array of hydopolitical assessments has been conducted in the past decade at various depths and geographical scales[5]. Most of these studies seem to suggest that Europe, and most prominently the European Union (EU), is a true paradise of water cooperation. The intricate web of multi- and bilateral water conventions and, most importantly, the crown jewel of the EU's indigenous water policy: the Water Framework Directive, create a

[4] *See* section I.5.4. below.
[5] *See* section I.5.4.3. below.

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comprehensive transboundary water governance regime that will save Europe from the evil of inter-state water conflicts.

Not surprisingly, these positive, but somewhat unsophisticated conclusions seem to have led to a loss of political and scientific interest in the study of the EU's own affairs. While EU institutions, governments, think tanks and NGOs travel the world to preach the European model of prudent transboundary water cooperation elsewhere, very little attention is being paid to the future political stability of shared river basins inside the European Union.

This complacency seems grossly unjustified on several grounds. Although the relevant hydropolitical assessments confirm the relative stability of the cooperation frameworks in the EU, many of them also pinpoint to emerging risks. These risks are of multiple origins. The most obvious is the fact that much of EU's relevant legal and institutional apparatus was laid down in the well-watered, densely populated and heavily industrialised north-western Europe in the 1980s and early 1990s. Naturally, these frameworks reflect the hydrological challenges prevailing at the time and place of their births. Also, existing governance regimes are based on a dominant technocratic water management paradigm that presumes the stationarity of the underlying hydrological conditions. Yet, the "age of man", the Antrophocene brings about new challenges that are likely to alter the natural hydrological cycle beyond recognition[6]. With stationarity being declared dead by science, the policy and governance frameworks must move on too.

All the more so as the relevant forecasts by the EU's environmental monitoring centre, the European Environment Agency, projects that the most important changes in hydrology in Europe will be manifested through increased fluctuations in river flow, a rise in hydrological extremes and, in many parts of the continent, loss of precipitation and prolonged droughts. This is in sharp contrast with the dominance of water quality considerations and the (almost) complete ignorance of water quantity management under contemporary European water law. In other words, the focus of collective action problems in shared EU basins is gradually shifting from transboundary pollution towards cross-border water quantity management. If, however, interstate competition for the shared, but limited resource becomes the main challenge in the numerous European watersheds, the one-sided ecological programme of today's EU water

[6] *See* section I.5.2. below.

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policy is likely to prove inadequate to prevent differences, disputes or even serious conflicts in co-riparian relations.

The research question

This study aims to investigate the nature and the magnitude of the growing misfit between the objectives and tools of contemporary European water law and policy and the emerging hydrological realities. Challenges to the adequacy of the actual transboundary water governance regime may emerge not only as a result of the discrepancy between the regime in place and the hydrological conditions they are supposed to handle. They may also develop as a result of the inability of the governance system to adapt to new circumstances. These represent two interconnected, yet autonomous aspects that can be expressed through the following questions:

- is the existing governance regime fit to handle current and emerging hydrological and political challenges in a transboundary context?
- is the existing regime capable to dynamically adapt to new hydrological and the ensuing political challenges or its evolution is blocked by systemic legal, institutional or political obstacles?

The first question represents the *static dimension* of the issue. In this narrower sense the resilience (and its antonym: vulnerability) of transboundary water governance is understood as the presence (or the lack) of risks of political dispute over shared water systems in the European Union. This condition can be best analysed through the various legal and institutional indicators developed by different schools of hydropolitics.

The second question relates to the *dynamic aspect* of resilience, *i.e.* the ability of the governance system to evolve so as to perform its original functions under new circumstances without major disruptions. This condition can be best evaluated by various indicators developed by resilience science to measure the adaptive capacity of socio-economic systems.

Scope, methodology and terminology clarified

As already mentioned, the stability of co-riparian relations is very much determined by a number of normative factors. Therefore, the main focus of this study is the *analysis of the legal*

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frameworks that govern the interaction of states in shared river basins within the European Union. Thus, the analyses to follow are predominantly normative in nature, *i.e.* drawing conclusions from the existence (or lack) and the content of relevant legal norms. Where the sheer content of norms does not permit to come to conclusive findings, an *assessment of the actual application* of the legal rule at issue will also be undertaken from the perspective of administrative structures, political circumstances, cultural conditions, etc. as the latter also tend to influence the behaviour of basin states significantly. Following the established terminology of the relevant literature these legal and non-legal factors will be referred to collectively as "transboundary water governance". While "*water governance*" on its own is a somewhat fluid construct, it is nonetheless widely used as an umbrella concept encompassing the institutional, legal, political and policy framework of water management[7]. Consequently, in this context water law will be referred to as a sublet of water governance that comprises legally binding norms.

Given the inter-disciplinary character of the research questions, this study will also borrow the applicable terminology of other disciplines such as *international relations*, *resilience* or system *science*. Wherever the specific technical content of these terms so requires, a definition or explanation will be provided.

The *geographical focus* of this study is confined to *international river systems* shared fully or partly by the member states of the European Union. This implies two important limitations. First, not all transboundary movements of water will be covered, only those taking place as a result of the hydrological cycle in natural (or man-made) catchment areas. Consequently, the impact of the import or export of water as a stand-alone commodity (through pipelines or in bottles) or as a component of other commodities (in foods or other drinks) on international relations will not be analysed. Also, the (otherwise critical) issue of transboundary aquifers will be addressed only as an ancillary subject. This is due to the fact that the bulk of the regulatory regimes studied have been designed from a clear surface water perspective. As a result, the rules governing transboundary groundwater management are either very general in nature or very narrow in terms of geographical coverage. These conditions significantly constrain the

[7] SZILÁGYI, János Ede (2018): *Vízszemléletű kormányzás – vízpolitika – vízjog* [Water governance – water policy – water law], Miskolc, Miskolci Egyetemi Kiadó, p. 23. PAHL-WOSTL, Claudia, GUPTA, Joyeeta and PETRY, Daniel (2008): Governance and the Global Water System: A Theoretical Exploration, *Global Governance* 14, pp. 419-436, p. 419.

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scope for generalisation as opposed to the case of surface water. Second, the below analysis will not cover European rivers basins that lay entirely outside the European Union (Volga, Dnepr, Dniester, etc.). Thus, the term "*Europe*" and "*European Union*" will not be used interchangeably: Europe will refer to the European continent, while the European Union will denote the territory of the European Union or the EU as supranational legal and political entity. In turn, "European water law" will be used to encompass four regulatory layers of transboundary water governance: (i) the treaty framework of the United Nations Economic Commission for Europe (UNECE), (ii) the European Union's *sui generis* legislative framework as well as (iii) multilateral and (iv) bilateral water treaties to which at least one EU member state is a party. Although these regulatory regimes do not form a comprehensive corpus of law, they nonetheless have to be applied by national water managers even against occasional internal collisions.

In view of the above qualifications the *first research question* will be answered through the application of a number of well-established formal legal and institutional indicators to all four layers of European water law. This implies a detailed analysis of UNECE and EU law as well as multilateral basin and bilateral water treaties. Given the straight-forward character and the wide use of these indicators, their application to the EU situation provides clear-cut and easily comparable results. The *second research question* will be answered through three indicators relating to the adaptive capacity of natural resource governance systems as developed by resilience science. Here, the more fluid nature of the topic does not permit to draw unambiguous conclusions. Yet, by way of identifying certain critical legal, institutional and political obstacles the resilience indicators chosen may nonetheless provide useful information about the capacity of EU water governance to adapt to emerging hydrological and political challenges.

Structure

This study comprises four parts.

Part I provides a summary of the general questions of transboundary water governance, including the geography, the theories, the laws and institutions of transboundary water cooperation. Part I closes with a detailed analysis of the challenges posed by the Antrophocene

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to co-riparian relations and introduces the notions of water security and hydropolitical resilience.

Following an exposition of the geography and hydrology of shared river basins in the European Union, Part II contains an introduction to the specific European model of transboundary water governance. This includes the detailed description of all four layers of European water law as well as a critical analysis of the interaction among them.

Part III contains the bulk of the research underpinning this study. The first research question is analysed along the following indicators: management of water quantity, management of water quality, cooperation over planned measures and the management of hydrological variability in shared river basins as well as dispute settlement within the European Union. It is followed by a qualitative assessment of the adaptive capacity of the European system of transboundary water governance along three additional indicators: coordination among the different levels and actors of governance, transfer of information and feedback and the authority and flexibility in decision-making and problem-solving.

Part IV summarises the main findings of the study and formulates recommendations to European and national decision-makers with a view to eliminating the hydropolitical vulnerabilities identified.

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PART I
GENERAL QUESTIONS OF TRANSBOUNDARY WATER GOVERNANCE

Chapter 1
Geography of transboundary water governance

I.1.1. Transboundary river basins defined

Following commonly accepted geographical definitions[8] a "*river basin*" is understood in the context of this study as an area which contributes to a first order stream[9]. First order streams are those that communicate directly with the final recipient of water (oceans, closed inland lakes or lakes). As a result, subsidiary basins are not accounted for as independent hydrological units however sizable they may be (*e.g.* the entire Sava catchment forms part of the Danube basin).

A river basin is considered "*transboundary*" ("international", "shared", etc.) when it intersects or demarcates political boundaries. Such intersection or demarcation can take several forms. In fact, the relevant literature distinguishes no less than 14 (!) geographical configurations just for rivers shared by two countries[10]. Importantly, a river basin qualifies as transboundary not only where a particular stream effectively flows through or creates state borders, but where political borders intersect parts of the catchment area that discharges water into the basin only through downhill drain of rain or snow melt or through the subsoil. Such broad construction of a "transboundary" or "international" river basin is supported by relevant international legal instruments, including the UN Watercourses Convention[11], the UNECE Water Convention[12] or the EU's Water Framework Directive[13]. This is an important condition as earlier political and

[8] WOLF, Aaron T. et al. (1999): International river basins of the world, *International Journal of Water Resources Development* 15:4 pp. 387–427, p. 389.
[9] The terms "catchment", "drainage area" "river" and "watercourse" will be used interchangeably with "river basin" throughout this study.
[10] DINAR, Shlomi (2008): *International Water Treaties – Negotiation and cooperation along transboundary rivers*, London, Routledge, Appendix B, p. 132.
[11] "Watercourse means a system of surface waters and groundwaters constituting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus". Article 2.a., Convention on the Law of Non-navigational Uses of International Watercourses, New York, 21 May 1997.
[12] "Transboundary waters means any surface or ground waters which mark, cross or are located on boundaries between two or more States; wherever transboundary waters flow directly into the sea, these transboundary waters end at a straight line across their respective mouths between points on the low-water line of their banks". Article 1.2, Convention on the Protection and Use of Transboundary Watercourses and Lakes, Helsinki, 17 March 1992.
[13] „River basin means the area of land from which all surface run-off flows through a sequence of streams, rivers and, possibly, lakes into the sea at a single river mouth, estuary or delta." Article 2.13, Directive 2000/60/EC of

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judicial practice followed a much narrower approach, attaching legal relevance only to the navigable sections of international rivers. Although this is no longer the case today, some countries have, until relatively recently, used this argument to deny the international character of the basin[14].

While this study does not address the issue in any length, mention also must be made of "federal river basins", *i.e.* basins that are shared by the constituent units of the 28 or so federal or quasi federal countries of the world[15]. While in the eyes of international law, these basins lay within a single constitutional system (*i.e.* they are not international), they too are governed by multiple jurisdictions displaying characteristics similar to those of the "proper" transboundary watersheds. Some of the largest river systems of the world are actually both "transboundary" (international) and "federal"[16].

I.1.2. Delineating transboundary river basins: the methodological challenges

Delineation of transboundary surface waters is a complex cartographical and political exercise and, as such, it is not completely free from controversy. Given the potentially contentious nature of the issue research on the precise extent of international river basins has, until relatively recently, been somewhat neglected[17]. Thus, up to the year 2000 the most commonly used data source was a *1978 United Nations compendium – the Register of International Rivers*[18] (the "1978 Register") – developed by the now defunct Centre for Natural Resources, Energy and Transport of the UN Department of Economic and Social Affairs. The 1978 Register – essentially a desktop study using solely maps available at the time at the UN Map Library, – grossly underestimated the number of transboundary basins, giving an erroneous impression of the overall magnitude and extent of the phenomenon[19].

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the European Parliament and of the Council establishing a framework for Community action in the field of water policy.

[14] ALLOUCHE, Jeremy (2005): *Water Nationalism: An Explanation of Past and Present Conflicts in Central Asia, the Middle East and the Indian Subcontinent?* Ph.D. Thesis No. 699, Geneva, Université de Genève, p. 11.

[15] GARRICK, Dustin et al. (2013): *Federal rivers: managing water in multi-layered political systems,* Cheltenham, Edward Elgar Publishing, p.2.

[16] *See* section 1.1.3. below.

[17] BISWAS, Asit K. (2007): Management of Transboundary Waters: an Overview. In VARIS, Olli, TORTAJADA, Cecilia and BISWAS, Asit K. (Eds.): *Management of Transboundary Rivers and Lakes,* Berlin, Heidelberg, Springer, pp. 1-21., p. 6-8.

[18] UNITED NATIONS (1978): *Register of International Rivers*, Oxford, Pergamon Press

[19] BISWAS (2007) *op. cit.* p. 7.

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This knowledge base has been substantially refined by Aaron Wolf and his team in the late 1990s using modern satellite mapping technologies[20]. The results of this seminal research is summarised and regularly updated in the frame of the *Transboundary Freshwater Dispute Database* ("TFDD") maintained by the Oregon State University[21].

Yet, despite recent political attention dedicated to the subject and the massive improvement in digital mapping, the most widely referenced international databases that exist on the subject today contain slightly different figures on the scale and distribution of international river basins. Some of these *variations* are attributable to differences in map coverage and technology. Others are due to deliberate choices over the classification of various fluvial sub-systems. For instance, geographers usually consider river systems to form a single basin solely on the basis of their confluence into a single coastal unit (*e.g.* the Rhine/the Meuse/the Scheldt), while others treat such rivers as autonomous[22]. In many cases the catchment area of a river is located almost exclusively in one country (*e.g.* 99% of the river Seine can be found in France). Thus, in view of the insignificant contribution of the lesser riparian such a basin is unlikely to qualify as international, even though in the strict sense of the term it should be considered so. Changes in or uncertainties over political boundaries evidently complicate the picture too (*e.g.* the gradual disintegration of Yugoslavia since 1991 increased, in several steps, the number of international basins in the Balkan region significantly). Finally, the rapid development of satellite imaging technologies also necessitate the regular refinement of the core geographical information relating to international river basins that may eventually lead to the minor corrections in existing databases.

Nevertheless, despite the above uncertainties and minor discrepancies it is widely recognised that today we have a reasonably precise knowledge of the key relevant indicators, such as the location and number of transboundary river basins around the world[23]. In the context of this study, however, figures relating to international rivers systems are only used for illustrative purposes. Differences among various datasets therefore do not influence the substance of the underlying research objective and methodology.

[20] WOLF et al. (1999) *op. cit.*
[21] http://transboundarywaters.science.oregonstate.edu/content/transboundary-freshwater-dispute-database (accessed 12 February 2019).
[22] *E.g.* the TFDD considers the river Meuse/Maas as part of the larger hydrological system of the Rhine, while it Europe it is commonly treated as a distinct river system. See WOLF et al. (1999) *op. cit.* p. 389.
[23] BISWAS (2007) *op. cit.* p. 6.

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1.1.3. Distribution of transboundary river basins in the world

Transboundary river basins are ubiquitous around the world. The Transboundary Freshwater Dispute Database identifies *263 international river basins* (Figure 1). According to this dataset the European continent has the largest number of international basins (69), followed by Africa (59), Asia (57), North America (40), and South America (38). The number of countries that contribute to transboundary basins is 145, thus the majority of countries share at least one transboundary river basin with neighbouring countries. 33 of these, including such sizeable countries as Bolivia, Chad, the Democratic Republic of Congo, Hungary, Niger or Zambia have more than 95% of their territories within the hydrologic boundaries of international river basins.

Transboundary basins cover about 47% of the Earth's surface (Antarctica excluded). These basins account for about 60% of the global river flow. About 40% of the global population lives in basins shared by at least two countries[24]. Countries with no shared basins are either islands or microstates, except for the countries of the Arabian Peninsula where no permanent watercourses exist[25].

All basins differ in terms of size, political complexity, hydro-logical conditions, etc. Some, however, are extremely complex, the most notable of which is the Danube basin in the European continent with 19 riparian states[26]. There are three other basins shared by more than 10 countries: the Congo (13), the Niger (11) and the Nile (11). The Rhine, Zambezi, Amazon, Aral Sea, Ganges-Brahmaputra-Meghna, Jordan, Kura-Araks, La Plata, Lake Chad, Mekong, Neman, Tarim, Tigris-Euphrates-Shatt al Arab, Vistula, and Volga basins each extend to the territory of at least five countries. Yet, the vast majority of international basins (176) are just shared by two states[27].

Needless to say, these raw figures conceal important differences among the various basins. *E.g.* there are some 100 rivers that flow from one country to another without ever forming a common border (through-border or contiguous rivers), while 17 rivers have been identified that define

[24] WOLF et al. (1999) *op. cit.* p. 391-392.
[25] STRATEGIC FORESIGHT GROUP (2015): *Water Cooperation Quotient*, Mumbai, p. 37.
[26] *See* section II.2.2.3. below.
[27] WOLF et al. (1999), *op. cit.* p. 392-393.

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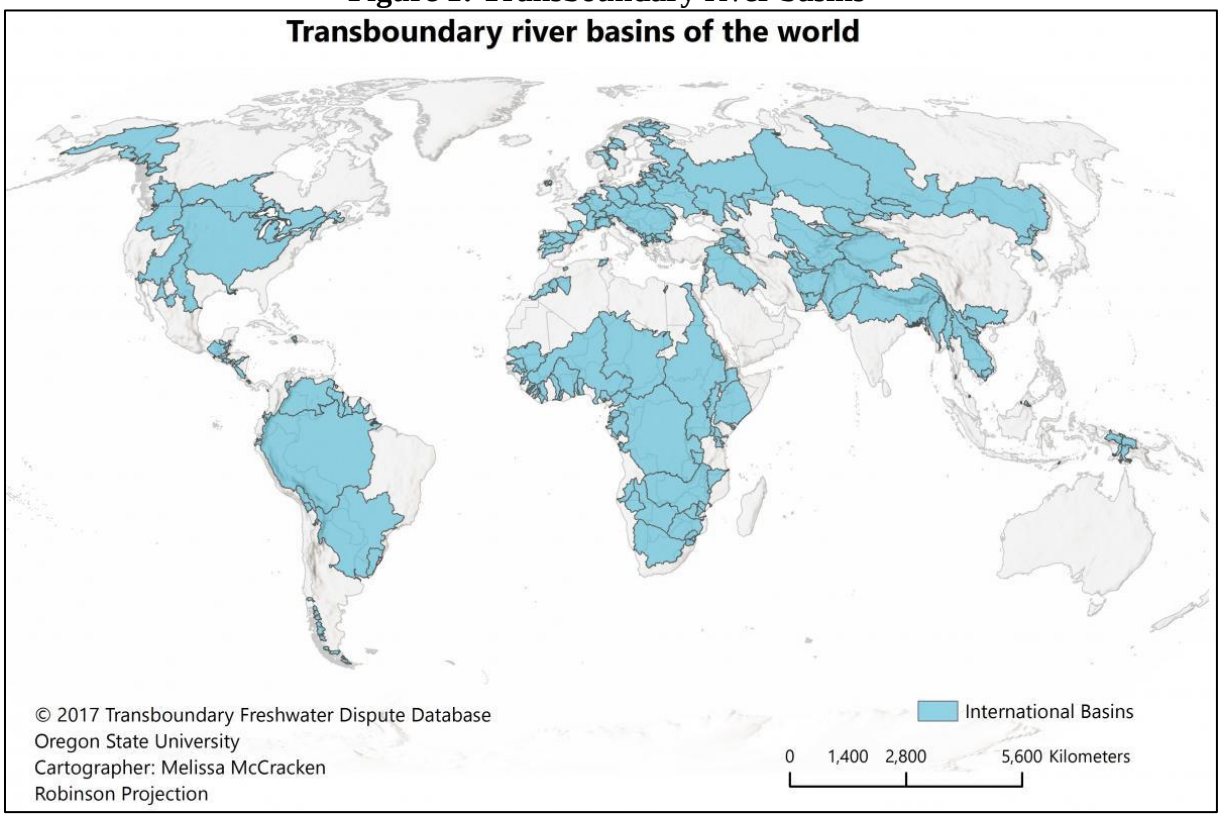
the entire border between two countries without ever entering either of those (border-creator rivers)[28].

Figure 1: Transboundary river basins



Source: Transboundary Freshwater Dispute Database[29] http://transboundarywaters.science.oregonstate.edu/content/data-and-datasets (accessed 12 February 2019)

Rivers and lakes that are shared by the constituent units of federal or quasi federal countries serve around 40% of the global population[30]. They include some of the world's largest river basins (Indus, Ganges-Brahmaputa, Amazon, etc.), a great number of which are international rivers at the same time (Figure 2).

[28] DINAR (2008) *op. cit.* p. 1.
[29] Product of the Transboundary Freshwater Dispute Database, College of Earth, Ocean, and Atmospheric Sciences, Oregon State University. Additional information about the TFDD can be found at: http://transboundarywaters.science.oregonstate.edu.
[30] GARRICK et al. (2012) *op. cit.* p. 1.

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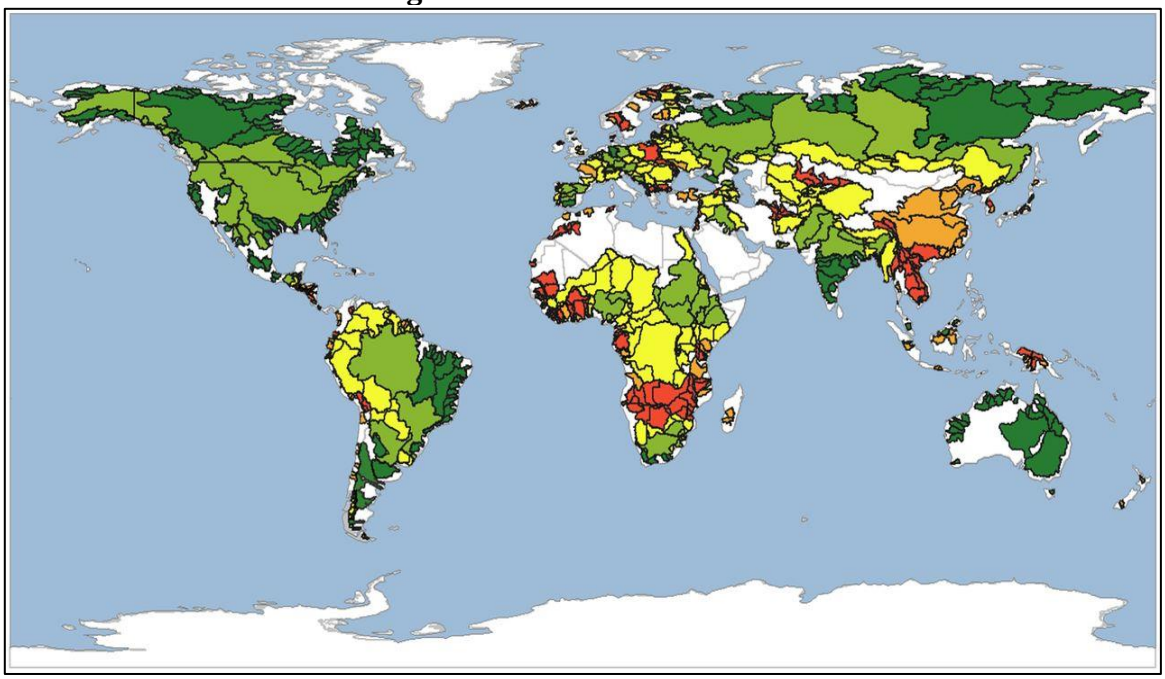
Figure 2: Federal river basins



Dark green: domestic rivers falling with a single federal country, light green federal portion of a river basin shared by two or more countries (at least one being federal), yellow: non-federal basin units of international federal rivers, light orange: domestic rivers in unitary countries.
Source: GARRICK at al. (2013) *op. cit.*, p. 13, Figure 2.

I.1.4. River basin typology

Naturally, all river basins, transboundary or not, vary largely with regards to their particular *hydro-climatic conditions*. Based on such conditions rivers can be classified along three broad categories: highly variable/monsoonal, arid and semi-arid, and temperate[31]:

- *highly variable/monsoonal basins* are characterised by extreme intra-annual variability (unpredictable seasonal and annual rainfall and runoff) and, consequently, a high degree of hydrological uncertainty that often implies severe floods and droughts. As their name suggests, they are mainly located in tropical monsoon areas. Historically these rivers have been a major source of rainfed and floodplain agriculture so the basins tend to be very densely populated (*e.g.* Ganges-Brahmaputra or the Mekong basins). Monsoonal basins also happen to be relatively poor and underdeveloped,
- *arid and semi-arid basins* face challenges of high freshwater variability and, ultimately, absolute scarcity. Chronic scarcity normally leads to intensive groundwater exploitation and extensive surface water infrastructure development,

[31] Based on the classification by SADOFF, Claudia W. et al. (2015): *Securing Water, Sustaining Growth: Report of the GWP/OECD Task Force on Water Security and Sustainable Growth*, Oxford, University of Oxford, p. 29.

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putting the ecological conditions of the river under severe strain. Arid and semi-arid basins are scattered in both developed and developing regions of the world. Examples include the Aral Sea basin in Central Asia, the Murray-Darling system in Australia, the lower Nile or the Colorado river in the US, etc.,

- *temperate basins* are relatively evenly watered with moderate seasonal variations both in terms of precipitation and river flow. Many of such rivers systems can be found in the western hemisphere (*e.g.* the Rhine, the Great Lakes, the Danube) and have contributed very significantly to the development of modern economies and statehood.

The above typology also provides a rough indication about the character and magnitude of the *hydrological complexities* – a combination of natural and human-induced water challenges – that are associated with particular river basins. Thus, temperate basins, especially with no radical and/or rapid changes in water use by riparian states, are relatively easy to govern collectively. On the other end of the spectrum lie those shared arid basins where fierce competition for water resources often lead to complex collective action problems, rendering political cooperation over transboundary basins cumbersome or almost impossible[32].

[32] *See* section I.2.2.4.a) below.

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Chapter 2
Theories of transboundary water governance

I.2.1. The context: collective action problems and the hydropolitical cooperation dilemma

While geography defines the possibilities for where, how and when water can be developed and used, political boundaries impose serious constraints on the actual water management choices available to national governments[33]. The disconnect between political and geographical scale – often coined as "*spatial misfit*" – gives rise to complicated cooperation dilemmas among riparian states of international river basins.

At the core of such cooperation problems lies the natural *asymmetry between upper and lower basin states* created by the downstream motion of water that creates externalities that are mainly of negative and unidirectional in character. The changes in water quantity and/or flow timing, water quality, river morphology, etc. induced by one upper riparian can trigger widespread consequences on fluvial ecology, irrigation, agriculture, fisheries, energy production or navigation in downstream states. Consequently, upstream and downstream basin states are likely to have divergent interests, especially when reaping the benefits of the river is perceived as a zero-sum game.

Externalities however do not always unfold in an upstream-to-downstream direction, neither are they necessarily negative in terms of their impact[34]. Measures taken by upstream countries to improve water quality (*e.g.* pollution prevention or flood control) have beneficial effects on downstream states too (without having to pay for it). A downstream riparian can also influence the use of water by upstream parties in a significant manner. The most evident domains of action include navigation (*e.g.* control of access to the recipient sea) and ecology (*e.g.* blocking fish migration)[35].

[33] ELHANCE, Arun (1999): *Hydropolitics in the 3rd World: Conflict and Cooperation in International River Basins*, Washington D.C., United States Institute of Peace Press, p. 15.
[34] MOELLENKAMP, Sabine (2007): The "WFD-effect" on upstream-downstream relations in international river basins? insights from the Rhine and the Elbe basins, *Hydrology and Earth System Sciences Discussions*, European Geosciences Union 4 (3), pp.1407-1428, p. 1410.
[35] *Ibid*, p. 1411.

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In summary: transboundary river basins are necessarily characterised by so-called *collective action problems* where all concerned players (basin states) would benefit from cooperation, but the magnitude and/or the difference in the associated costs to be borne by the parties can create an impediment to joint action.

What are the typical collective action problems relative to shared rivers?

Susanne Schmeier, a monographer of transboundary water cooperation, identifies the following 12 broad categories of collective action problems:

a) water quantity and allocation problems relating to the use of and the competition over water resources;
b) water quality and pollution problems stemming from the intrusion of pollutants;
c) hydropower and dam construction affecting the watercourse as a consequence of electricity generation;
d) infrastructure development and its environmental consequences (other than d));
e) (other) environmental problems;
f) climate change consequences;
g) fishery problems (overfishing, competition for fishing grounds, etc.);
h) economic development and the exploitation of river basin resources;
i) invasive species;
j) flood effects;
k) biodiversity protection issues;
l) navigation and transport-related problems[36].

Naturally, these collective action problems appear at different frequencies and represent very different levels of political complexity. Based on the study of 116 international river basins Schmeier concludes that issues related to *water quantity and allocation* clearly stand out both in terms of frequency and complexity. This is followed by concerns related to water

[36] SCHMEIER, Suzanne (2013): *Governing International Watercourses - River Basin Organizations and the sustainable governance of internationally shared rivers and lakes*, London, Routledge, p. 68. Although such categorisation displays some inherent inconsistencies (*e.g.* how to distinguish between environment protection, invasive species, biodiversity etc.), it nonetheless does provide a representative collection of the main issues riparian states regularly face in shared river basins.

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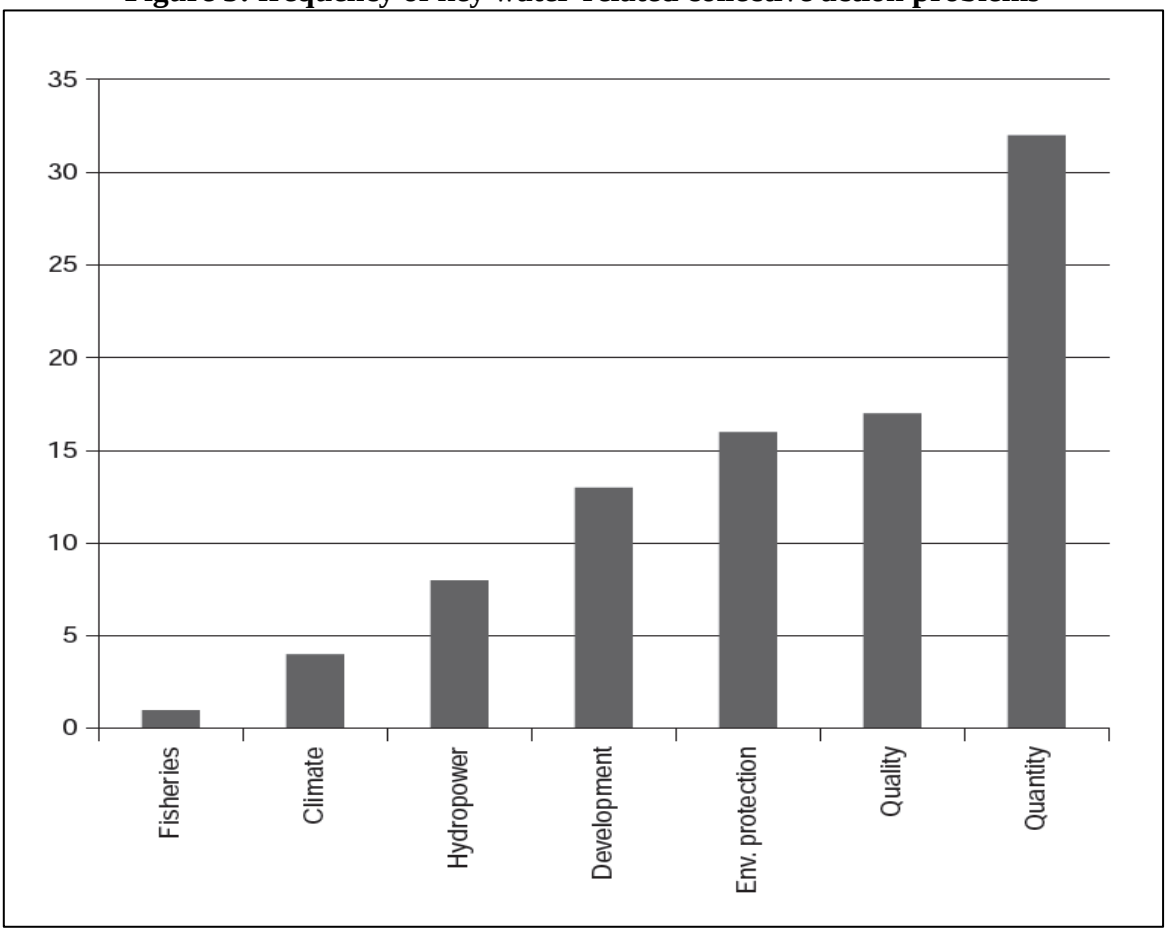
quality/pollution. Other collective problems, such as hydropower development or fisheries emerge in much smaller numbers (Figure 3)[37].

Figure 3: frequency of key water-related collective action problems



Source: SCHMEIER (2013) *op. cit.* p. 68, Figure 3.3.

Moreover, different collective action problems influence the prospects of conflict or cooperation in very different ways. Certain issues may touch upon vital national interests (*e.g.* the presence or lack of water downstream), while others, such as navigation or fisheries, usually represent a much lower level of conflict potential[38].

The *hydro-political cooperation dilemma*, *i.e.* why some countries cooperate over shared watercourses while others do not, is therefore very much influenced by a number of variables relating to the underlying hydrological conditions of the basin at issue as well as the nature of the collective action problems prevailing in given co-riparian relations.

[37] *Ibid.*
[38] *Ibid*, p. 71.

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I.2.2. Theories of conflict and cooperation over transboundary watercourses

I.2.2.1. Overview

The 1970s brought environmental preoccupations into the forefront of the study of interstate relations, elevating water among the mainstream subjects of international security discourse[39]. Early studies relating to the international politics of water, however, almost exclusively focused on the *conflict potential of transboundary basins* and relied on the analytical and linguistic apparatus of such established concepts of international relations as realism, liberalism and their multiple variations. The expansion of empirical research on the subject in the 1980s and 1990s gave new impetus to the "the systematic study of conflict and cooperation between states over water resources that transcend international borders", commonly referred to as *hydropolitics*[40].

Within the first generation of hydropolitical studies two distinct schools of thought emerged: one concentrating on the potential of conflicts triggered by competition for water and one focusing on the cooperative imperative over transboundary water resources[41]. Over time, the initial "*water wars*" literature has largely been proven unfounded by the relatively low number of water-related interstate incidents and the growing number of cooperative arrangements worldwide. Yet, the so-called *institutionalist approach* – underlining the importance of formal cooperative arrangements – has also failed to provide a comprehensive explanation of the grossly divergent quality of co-riparian relations. More recently, a new wave of research has emerged with a view to overcoming the conflict and cooperation divide. Scholars of this branch recognise the inherent complexity of water relations, underlining that the empirics of hydropolitics suggest that conflict and cooperation are not necessarily contradictory, but can occur simultaneously[42].

[39] ALLOUCHE (2005) *op. cit.* p. 39.
[40] ELHANCE (1999) *op. cit.* p. 3.
[41] SCHMEIER (2013) *op. cit.* p. 10.
[42] *Ibid* p. 13.

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I.2.2.2. Theoretical foundations: realism, liberalism and the management of transboundary water resources

a) Realism and neorealism: cooperation as an anomaly

The realist and neorealist schools of international relations are based on the proposition that *interstate relations* are fundamentally *anarchical* in nature as countries are driven by egoism, the need for survival and power[43]. States are considered rational actors, although their behaviour largely reflects human nature. Short of an overarching global authority states are left to their own devices, a condition that favours self-help, suspicion and insecurity. Under these circumstances international relations are nothing, but a constant struggle for power and relative gains. In this harsh environment, cooperation is an anomaly. Therefore, cooperation only emerges where a regional power takes the initiative to formulate a cooperative regime on its own terms (*hegemonic stability theory*). Cooperation arrangements may be concluded in the absence of a regional hegemon too. They will, however, be a mere reflection of the existing distribution of power. Cooperation may also emerge where the agreement favours the participants in equal measure, but that is considered an exception[44].

The realist approach to transboundary water governance is eloquently formulated by Lord Birdwood, a senior British colonial army officer, who in 1954 summed up the political character of co-riparian relations as a zero-sum game burdened with suspicion and distrust:

> "[o]f the elements that make for political controversy in human affairs, the control of water is one of the most persistent… The last community to get the water is always suspicious of the intentions of those upstream"[45].

b) Liberalism, institutionalism: cooperation as a rational choice

The liberal school of international relations views interaction among states through the lens of positive mutual interdependencies. Thus, states cooperate not because of coercion or a sense of vulnerability, rather, out *of mutual interest*. As such, unilateralism and sheer power politics,

[43] GOODIN, Robert E. (2010): *The Oxford Handbook of International Relations,* Oxford, Oxford University Press, p. 133.
[44] DINAR (2008) *op. cit.* p. 12.
[45] Lord Christopher Birdwood, quoted by DINAR (2008) *op. cit.* p. 37.

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projected by the realist theory, may turn counterproductive as in reality no state may act completely freely without some kind of cooperation with others[46]. It follows that in international river basins the various water-related and non-hydrological *interdependencies* among upstream and downstream countries create powerful incentives to cooperate so as to collectively maximise the benefits of water in the entire basin. In other words, states seek to *maximise* their *absolute benefits* through cooperation and are less concerned with the relative gains of other countries[47].

Within the liberal school the so-called *institutionalism* is one of the most relevant theories. In the institutionalists' view the creation of formal institutional arrangements greatly enhances the success of cooperation as these institutions provide states with a platform of discussion, decision-making, information gathering, technical assistance, etc. They also contribute to confidence building and a culture of compliance thereby creating an atmosphere conducive to collaboration[48].

I.2.2.3. Modern hydropolitics: schools of water wars and the water cooperation

a) The water wars thesis

The water wars literature flourished in the 1980s and 1990s during and after the demise of the bi-polar global political system that gave rise to new global security challenges[49]. However, the water war prognostics gained fresh currency in more recent times in the light of the intensification of climate change whose impacts are mainly manifested through changes in hydrology[50].

[46] DINAR (2008) *op. cit.* p. 13.
[47] DOMBROWSKY, Ines (2009): Revisiting the potential for benefit sharing in the management of transboundary rivers, *Water Policy* 11, pp. 125-140, p. 125.
[48] REES, Gerdy (2010): *The Role of Power and Institutions in Hydrodiplomacy: Does Realism or Neo-Liberal Institutionalism offer a stronger theoretical basis for analysing inter-state cooperation over water security?* MA paper, London, School of Oriental and African Studies, p. 13.
[49] TURTON, Anthony (2008): The Southern African Hydropolitical Complex. In VARIS, Olli, TORTAJADA, Cecilia and BISWAS, Asit K. (Eds.): *Management of Transboundary Rivers and Lakes,* Berlin, Heidelberg, Springer, pp. 21-80, p. 22.
[50] DINAR, Shlomi et al. (2014): *Climate Change, Conflict, and Cooperation – Global Analysis of the Resilience of International River Treaties to Increased Water Variability*, Policy Research Working Paper 6916, The World Bank Development Research Group, Washington D.C., p. 3.

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The starting point of the water wars theory is that water is such a fundamental natural asset that competing human, economic, social and ecological needs inevitably lead to *competition for the same resource*. Consequently, when water becomes scarce states may choose to respond to this pressure by seeking a solution outside their boundaries. *Water scarcity* and *poor distribution* therefore magnify the potential for conflict in transboundary basins[51]. This potential grows significantly when the availability of water drops below a critical level (*i.e.* the downward supply curve crosses the demand curve)[52]. In addition to scarcity, a number of other factors may augment tensions among riparian states. These include the relative power of basin states and their respective location, the presence of negative transboundary impacts (other than unsatisfactory allocation) or interlinkages between water and other issues[53]. Psychological factors, such (the perceived) exposure to unilateral overexploitation or degradation of the resource by another riparian also make countries more prone to conflict[54].

Despite its popular appeal, however, the water war thesis has turned out to be largely unfounded. While the potential for conflict undeniably exists, the water war theorists have been rightly criticised as alarmists whose conclusions have been based more on *speculation* than examination of how water relates to conflict. Empirical research by Aaron Wolf and his team at the Oregon State University have unambiguously demonstrated that water wars are neither prevalent, nor inevitable. Water war theorists wrongly based their arguments on a number of water conflicts confined to the Middle East which displays a rare and particularly flammable combination of water scarcity and political instability. In reality, cooperative engagements among riparian states grossly outnumber water-related incidents worldwide. Armed conflicts triggered directly by water are even less common, with the last recorded hostility having ended in the 1970s[55].

Theoretical arguments also support cooperation, rather than conflict over shared water resources. Wolf contends that launching military action for water would only make sense by a downstream regional hegemon against a weaker upstream riparian. There are only a few river

[51] DINAR (2008) *op. cit.* p. 10.
[52] *See e.g.* COOLEY, John. K. (1984): The war over water, *Foreign Policy* 54, pp. 3–26, STARR, Joyce R. (1991): Water wars, *Foreign Policy* 82, pp. 17–36; HOMER-DIXON, Thomas (1999): *Environment, scarcity, and violence*, Princeton NJ, Princeton University Press.
[53] SCHMEIER (2013) *op. cit.* p. 11.
[54] ELHANCE (1999) *op. cit.* p. 4.
[55] DELLI PRISCOLI, Jerome and WOLF, Aaron T. (2009): *Managing and Transforming Water Conflicts*, Cambridge, Cambridge University Press, p. 12-14.

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basins in the world where such a scenario may become plausible at all (*e.g.* Nile, La Plata)[56]. Even in such cases, however, the political, economic and human costs of an armed intervention would be disproportionately high for a natural resource that, in many cases, is relatively cheap to obtain through other methods, *e.g.* seawater desalination[57].

b) Institutionalism and the cooperation imperative

The prevalence of the water wars thesis throughout the 1980s and 1990s has given rise to a new school of hydropolitical research focusing on the *cooperative potential* of international rivers. The cooperation school significantly expanded the empirical research base of the water wars theorists focusing on legal and institutional arrangements that bode for the stability of riparian relations. The large body of qualitative analyses carried out by Aaron Wolf, Arun Elhance, Anthony Turton, etc. has led to the development of a number of theoretical conclusions that provide an explanation as to why cooperation, rather than conflict, dominates co-riparian relations in most parts of the world.

They argue that *mutual interdependencies* among basin states and the limited chance of success through violence create powerful incentives for states to cooperate even over the most difficult water-related issues. This is eloquently demonstrated by the fact that riparian states of arid basins – particularly prone to clashes over water according to the realist view – indeed display high level of cooperation under institutional arrangements that tend to survive otherwise strained interstate relations[58]. Thus, the cooperative school of hydropolitics follows an *institutionalist approach* in so far as it views the existence of formal basin arrangements (treaties, institutions, mechanisms) as the main token of the stability of co-riparian relations for they provide the platform to turn collective action problems into cooperation[59].

[56] *Ibid* p. 22.
[57] "Why go to war over water? For the price of one week's fighting, you could build five desalination plants. No loss of life, no international pressure, and a reliable supply you don't have to defend in hostile territory" (Israeli Defence Forces analyst responsible for long-term planning during the 1982 invasion of Lebanon). Quoted in DELLI PRISCOLI and WOLF (2009) *op. cit.* p. 23.
[58] WOLF, Aaron T. (2009): Hydropolitical vulnerability and resilience. In UNEP: *Hydropolitical Vulnerability and Resilience along International Waters – Europe*, Nairobi, pp. 1-16., p. 11.
[59] SCHMEIER (2013) *op. cit.* p. 12.

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c) Moving beyond the conflict and cooperation divide

The institutionalist school of hydropolitics has been hugely successful in disproving the water wars theory and in identifying the drivers of transboundary water cooperation. Yet, there are several large river basins in the world that experience a "*no war, no cooperation*" phenomenon. These are where significant cooperation gaps exist, yet the situation does not evolve into a serious conflict either. This paradox has given rise to a new generation of hydropolitical research that relies on the observation that conflict and cooperation are not necessarily contradictory, but can occur simultaneously[60].

New approaches to transboundary water politics also emerge outside the traditional hydropolitical schools. Game theory and economic analyses of basin state conduct have recently made important contributions to explaining why states choose to cooperate over shared water resources. Several authors have analysed the cooperation of riparian states through their strategic interactions (*i.e.* the impact of basin state behaviour on others) and come to the conclusion that states can maximise their use of the shared nature resource ("pay-offs" in game theory jargon) by way of establishing cooperative arrangements[61]. For an arrangement like that to be workable, however, it should be based on an incentive structure and institutional design that guarantees that no party can gain by leaving the agreement or by failing to comply. In other words, the success of cooperation is based on the presumption that the participating states can maximise their collective payoffs with regards to the shared river only together[62].

I.2.2.4. Geographical and political variables influencing interstate cooperation

The above theories explain state conduct with regards to shared water resources in broad general terms. There exists, however, a number of *variables* that in specific basins may influence riparian behaviour significantly and, as such, may turn out to be critical drivers of conflict or cooperation irrespective of the foregoing theoretical premises. The relevant literature clusters these factors as follows:

a) Geography and the availability of water

[60] *Ibid* p. 13.
[61] *E.g.* DINAR (2008) *op. cit.*, DOMBROWSKY (2009) *op. cit.*.
[62] DINAR (2008) *op. cit.* p. 14.

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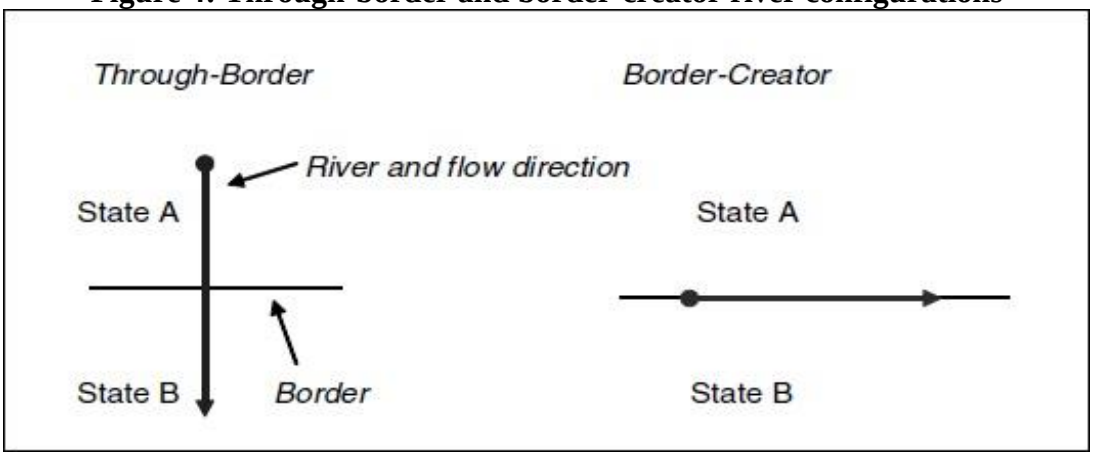
The starting point of the politics of transboundary water cooperation is that the *geography* of river systems hardly coincides with political boundaries. This discrepancy, however, shows significant variations. While in a pure "through-border" configuration upstream-downstream asymmetry applies in its fullest, in "border-creator" situations riparian states are exposed to the consequences of each other's actions in equal measure (Figure 4). Consequently, although the upstream-downstream dichotomy pervades through most transboundary relationships, each basin faces its own unique problems and challenges based on riverine geography.

Figure 4: Through-border and border-creator river configurations



Source: DINAR (2008) *op. cit.* p. 3, Figure 1.1.

The other geographical/hydrological factor most likely to determine the quality and nature of co-riparian relations is the *availability of water*. Availability of water is, on the one hand, determined by supply, *i.e.* the physical hydro-climatic conditions of the basin (precipitation, evaporation, groundwater reserves) as well as accessibility to the resource (infrastructure). On the other hand, availability is equally influenced by water demand. When demand exceeds supply water becomes scarce. Indeed, water scarcity lies at the core of the water war theory suggesting that a high degree of scarcity is directly linked to an increased likelihood of conflict and a low likelihood of institutional cooperation[63]. However, as shown above, while scarcity undeniably increases competition for water both domestically and internationally, the causal link between water scarcity and conflict has not been proven[64]. Instead, empirical research shows that although the lack of water can become an important irritant in co-riparian relations, but it usually acts only as an indirect cause for transboundary conflict at most[65].

[63] SCHMEIER (2013) *op. cit.* p. 14.
[64] *See* section I.2.2.3.a) above.
[65] ALLOUCHE (2005) *op. cit.* p. 90.

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b) Sovereignty, territorial integrity and security

Countries often feel that cooperation over transboundary watercourses and lakes affects core concerns of statehood such as *sovereignty, territorial integrity and security*[66]. The sovereignty implications of the management of transboundary waters, however, vary greatly with region and issue.

In regions characterised by *high political tensions* or a history of unilateralism, entering into legally regulated or institutionalised cooperation over shared rivers may give rise to a suspicion of external intrusion or a concern to surrender decision-making power to a supranational entity[67]. Such complacency is more characteristic of upstream states, especially, if they follow the concept of extreme territorial sovereignty over natural resources or they perceive that a planned agreement would cede some control over the flow of water to downstream users[68]. Interestingly, such strong sentiment of exposure and vulnerability often emerges very intensely among the constituent units of federal countries, rendering shared river basin management a major test of federal systems of governance[69].

Naturally, not all water-related issues have strong sovereignty or security implications. Empirical evidence suggests that many of the most prevalent transboundary water challenges are relatively neutral or even "benign" in nature. The resolution of such issues as navigation or flood management is usually perceived by riparian states as mutually beneficial. On the other hand, certain questions, especially those relating to water quantity and water allocation have a very strong conflict potential, particularly in areas where water resources are scarce or under intensive human pressures. Such "malign" water issues are therefore treated as highly relevant for national security, a factor that may weaken the prospects of effective cooperation (Figure 3)[70].

[66] DINAR (2008) *op. cit.* p. 16.
[67] SUBRAMANIAN, Ashok, BROWN, Bridget and WOLF, Aaron T. (2014): Understanding and overcoming risks to cooperation along transboundary rivers, *Water Policy* 16, pp. 824-843, p. 835.
[68] *E.g.* in the Ganges basin signing an agreement that guaranteed flows of the river to Bangladesh was perceived as a risk by India as it recognised the right of the downstream riparian to certain flows from the Farakka dam, *ibid.*
[69] GARRICK et al. (2014) *op. cit.* p. 3.
[70] SCHMEIER (2013) *op. cit.* p. 70-71.

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c) The geopolitical setting and non-water-related political integration

The *aggregate* political and economic *power* of the countries concerned may play a crucial role in transboundary water relations too. Significant imbalances in regional power relationships may impede or foster cooperation, depending on the position of the hegemonic actor in the basin. The presence or the lack of major power asymmetries in the watershed and the behaviour of the regional hegemon is likely to determine the nature and structure of the relevant hydropolitical regime[71]. *E.g.* where no major power asymmetries exist, states are likely to create egalitarian basin-wide cooperation regimes. Such arrangements normally emerge in wider political settings such as the European Union[72]. However, in regions dominated by a regional hegemon such parity may not be in the interest of the hegemonic party, if it implies relinquishing existing control or influence over water resources[73]. Especially, where the regional hegemon lays upstream (*e.g.* China, India, Turkey), the likelihood that it will unilaterally exploit its position remains high. In such basins the regional hydropolitical regime is likely to be dominative with no pretence of equality. Where the regional power lays downstream, it may find it more beneficial to become the engine of cooperation (*e.g.* South Africa in the framework of the Southern African Development Community)[74].

It must be underlined, however, that the mere *location of a hegemon* in the basin is not a necessary precursor to either conflict or cooperation. There are positive examples where the upstream regional power is a real driver of cooperation (*e.g.* in the US-Mexico context). Equally, experience shows that downstream hegemons can have significant interests in blocking, rather than fostering broader transboundary cooperative arrangements so as to exploit upstream political division to its own benefit (*e.g.* Egypt in the Nile basin)[75]. In any case, the lack of major power imbalances in the basin tends to be conducive of creating resilient cooperation mechanisms even among a large number of riparian countries (Danube, Lower Mekong, etc.).

[71] ZEITOUN, Mark and WARNER, Jeroen (2006): Hydro-hegemony – a framework for analysis of trans-boundary water conflicts, *Water Policy* 8, pp. 435–460, p. 436.
[72] REES (2010) *op. cit.* p. 18.
[73] NEWTON, Joshua (2014): *"Water, Water Everywhere, Nor any Drop to Drink": An Exploration of the Lack of a Formal Global Water Governance Regime*, PhD Thesis, Medford, Tufts University, Fletcher School of Law and Diplomacy, p. 257.
[74] DINAR (2008) *op. cit.* p. 19-21.
[75] SCHMEIER (2013) *op. cit.* p. 76.

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d) The level of economic development and the economic importance of the river

Different *level*s and/or dynamics *of national development* in the same basin can also become important drivers of tension or cooperation. The increasing water demand of a fast developing riparian inevitably leads to a stronger competition for the same resource. Not surprisingly, as explained above, most water conflicts are therefore triggered by water allocation and infrastructure development[76]. On the other hand, more developed regions with limited or controllable urbanisation/developmental/population pressures tend to have better political and technological capabilities to manage a shared river basin[77].

The actual *economic importance* of the shared water resources at issue also influences the dynamics of co-riparian relations. Arid downstream countries whose supplies depend on the headwaters of large transboundary rivers (*e.g.* Nile→Egypt, Tigris-Euphrates→Iraq) are particularly sensitive to any upstream manipulation of river flow or water quality. The key economic importance of a river is not necessarily linked to its central geographical position, peripheral rivers can also play vital roles in a nation's economy (e.g. Moldova only controls 450(!) meters of the shore of the Danube at the outermost corner of the country, yet it hosts the nation's only port accessible by seagoing vessels).

e) Domestic issues

Internal issues, such as domestic political rivalry, identity or national values may also hamper efforts of transboundary water cooperation. The strong political and emotional mobilising power of water renders intra-basin cooperation an easy subject for national(istic) political rhetoric. Therefore, transboundary water disputes often arise or remain unresolved due to domestic political determinations[78]. Indeed, some authors even contend that it is "*water nationalism*" – an ideological proposition linking water to state-building and nation-making – that is the main driver of transbounday water conflicts[79]. Take, for example, the notorious Gabčíkovo-Nagymaros dispute which seems to remain unresolved for decades due to competing political narratives in Slovakia and Hungary surrounding the construction of the

[76] *See* section I.2.2.4.a) above.
[77] DELLI PRISCOLI and WOLF (2009) *op. cit.* p. 18.
[78] DINAR (2008) *op. cit.* p. 30-32.
[79] ALLOUCHE (2005) *op. cit.* p. 91.

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Gabčíkovo hydropower complex, leaving no room for a common ground acceptable in both countries[80].

Certain authors underline the central role of *political leaders* in the emergence or resolution of water disputes. Records show that when politicians at most senior level engage in the resolution of transboundary water problems the chances of a rapid solution rises significantly[81]. Likewise, national political leaders may choose to exploit the negative mobilising force of transboundary water issues in view of its potential impact on the decision-maker's public image and re-election potential[82].

f) Capacity shortages

Managing co-riparian relations demands significant administrative and technical capacities. Some countries, especially developing ones, however, often *lack* the *resources* to establish or maintain robust mechanisms for transboundary water cooperation. This does not only pose an evident technical barrier, but may also give rise to a fear that they may not be able to negotiate an optimal deal or fully benefit from a new or existing governance framework. This is particularly problematic, if there are large discrepancies among riparian states in terms of aggregate power that usually reflects similar gaps in basin hydrology, ecology, infrastructure, economics, etc. Examples include the cumbersome and wary negotiations in the Nile and the Zambezi basins, where certain countries deliberately impede or frustrate negotiations, even if they are likely to benefit from the eventual cooperation regime[83].

g) Cultural factors

Transboundary water issues often revolve around core values and cultural constructions that date back to generations. These cultural or psychological factors (or the "*national water ethos*" coined by Aaron Wolf) may determine how a nation "feels" about its water resources. Such factors may include the "mythology" of water in national history, the religious dimensions of

[80] BARANYAI, Gábor and BARTUS, Gábor (2016): Anatomy of a deadlock: a systemic analysis of why the Gabčíkovo–Nagymaros dam dispute is still unresolved, *Water Policy* 18, pp. 39-49, p. 45.
[81] DINAR (2008) *op. cit.* p. 31.
[82] SUBRAMANIAN, BROWN and WOLF (2014) *op. cit.* p. 836.
[83] *Ibid* p. 833.

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water, the importance of water in national security discourse, etc.[84] The importance of these domestic cultural factors tends to intensify in a transboundary context.

Likewise, *cultural differences* (stereotypes of neighbouring nations, enemy images) can become major hindrances to cooperation. This applies particularly between riparian states with different religious backgrounds and/or where the river concerned is embroiled in identity concerns (examples include cooperation over the Ganges by Hindu India and Islamic Bangladesh)[85]. On the other hand, *cultural similarities* can be a major facilitator of cross-border water cooperation. *E.g.* the highly sophisticated system of transboundary water cooperation in Europe is attributed to a long history of cooperation, high degree of cultural homogeneity among the countries and a widely shared ecological consciousness[86].

[84] DELLI PRISCOLI and WOLF (2009) *op. cit.* p. 18.
[85] ELHANCE (1999) *op. cit.* p. 169-171.
[86] MCCAFFREY, Stephen (2015): The 1997 UN Convention: Compatibility and Complementarity. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 51-59, p. 57.

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Chapter 3
Laws of transboundary water governance

I.3.1. The evolution of international water law

International law started to address the problem of transboundary watercourses in a significant way following the Napoleonic wars when the expansion of *commercial navigation* on international rivers necessitated, for the first time, some kind of systematic collaboration among riparian states. As other uses, such as irrigation, hydropower or industrial consumption were at initial stages of development in the early nineteenth century, non-navigational activities escaped the attention of international politics and law altogether until relatively recently[87].

The first milestone in the evolution of international water law was the recognition of the principle of *freedom of navigation* on shared rivers by the Final Act of the Congress of Vienna in 1815. This principle was reinforced and expanded repeatedly by various international treaties and was recognised by the Permanent Court of International Justice in 1929 in the River Oder Case as customary international law[88].

Before World War II *non-navigational questions*, such water allocation, water quality or flood defence, were addressed only marginally, despite the fact that Treaties of Versailles after World War I already dealt explicitly with such issues as hydropower, irrigation and water supply[89]. *E.g.* the 1921 Convention and Statute on the Regime of Navigable Waterways of International Concern (Barcelona Convention), adopted under the auspices of the League of Nations, recognised the non-navigational uses of international rivers, but it did not go in any length to regulate the matter. Also, the 1923 General Convention Relating to the Development of Hydraulic Power Affecting More Than One State addressed a non-navigational issue *per se*, however, it never played any significant role in the development of the emerging principles of international water law[90].

[87] SALMAN, Salman M. A. (2009): *The World Bank Policy for Projects on International Waterways: An Historical and Legal Analysis*, Law, Justice and Development Series, Washington D.C., The World Bank, p. 10.
[88] Case Relating to the Territorial Jurisdiction of the International Commission for the River Oder, PCIJ, Series A, No. 23, 1929.
[89] ALLOUCHE (2005) *op. cit.* p. 33.
[90] SALMAN (2009) *op. cit.* p. 19.

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Following World War II non-navigational uses of transboundary basins have grown in importance in view of the multiplication of new and competing demands for water by agriculture, industrial, urban users, etc.[91] Yet, it was not the riparian governments concerned or international organisations who were the drivers behind the development of the relevant international norms. Rather, they evolved incrementally through the work of two international legal associations and the jurisprudence of international courts and tribunals. Particularly critical in this process were two arbitral awards and a judgement by the International Court of Justice: the 1941 *Trail Smelter Arbitration*[92], the 1949 *Corfu Channel case*[93] and the 1957 *Lake Lanoux Arbitration*[94]. The Trail Smelter case established the principle that no state can cause or permit its territory to cause serious environmental damage to another state. The Corfu Channel case confirmed the international legal responsibility of states for acts that occur in contravention of international law within their territory and result in damage to another states. Finally, the Lake Lanoux Arbitration concluded that the rights of downstream riparian states must be respected and its interests be taken into account by upstream users in the development of a shared waters.

Equally important was the contribution of two international scholarly bodies, the *Institute of International Law* (IIL) and the *International Law Association* (ILA). The IIL had been active on the subject of non-navigational uses of international water since the early twentieth century. Its main contribution was its landmark *Madrid Declaration* that laid down the "no harm" principle, a cornerstone of today's international water law as early as in 1911[95]. The ILA started to work on transboundary water governance only in the 1950s, though its influence turned out to be even more important in the progressive development of international water law. In 1966 the ILA adopted the so-called *Helsinki Rules on the Uses of the Waters of International Rivers* whose foundational concept was the principle of equitable utilisation[96]. Soon after their issuance the Helsinki Rules were seen as the most authoritative set of rules concerning the use and protection of international watercourses and gradually became accepted by the international

[91] ALLOUCHE (2005) *op. cit.* p. 31.
[92] Trail Smelter Arbitration (United States v. Canada) (1938, 1941) 3 RIAA 1905.
[93] Corfu Channel Case (United Kingdom v. Albania), ICJ Reports 1949, 4.
[94] Lake Lanoux Arbitration (France v. Spain) (1957) RIAA 281.
[95] International Regulation regarding the Use of International Watercourses for Purposes other than Navigation - Declaration of Madrid, 20 April 1911.
[96] The Helsinki Rules on the Uses of the Waters of International Rivers, Helsinki Declaration, 14-20 August 1966.

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community as reflecting customary international law[97]. In recognition of the work of these academic bodies the preamble to 1997 UN Watercourses Convention makes a special tribute for their critical contribution "to the codification and progressive development" of international freshwater law[98]. An updated and extended version of the Helsinki Rules were adopted by the ILA in 2004 under the title of the *Berlin Rules on Water Resources*[99].

Interestingly, in contrast to the dynamic evolution of the law of the non-navigational aspects of transboundary watercourses in the past decades, international law on *navigation* has remained largely unchanged during these years[100].

I.3.2. International water law today

I.3.2.1. Sources

Today, the use and protection of shared watercourses is governed by a number of fundamental principles rooted in *general international law*, two global legal instruments that lay down general cooperation frameworks for transboundary river basins – the 1997 *UN Watercourses Convention* and the 1992 *UNECE Water Convention* – as well as the considerable *jurisprudence* of the International Court of Justice and other international courts and tribunals[101]. Most of daily cross-border water management, however, takes place through the vast body of *regional, basin and bilateral treaties* that regulate co-riparian relations at various levels of detail. Indeed, the latter provides the real skeleton of transboundary water cooperation as the rather general nature of international water law and the lack of a robust supranational enforcement framework often creates situations where the solemn principles enshrined in the UN conventions provide very little guidance for countries to manage complicated intra-basin relations[102].

[97] SALMAN (2009) *op. cit.* p. 56. BRUHÁCS, János (2011): The International River Law in the Early 2000s. In KOVÁCS, Péter (ed): *International Law – a Quiet Strength*, Budapest, Pázmány Press, p. 233.
[98] Recital 10, Preamble, Convention on the Law of Non-navigational Uses of International Watercourses.
[99] The Berlin Rules on Water Resources, Berlin Declaration, 21 August 2004.
[100] BRUHÁCS (2011) *op. cit.* p. 232.
[101] *Ibid* p. 232-237.
[102] DELLI PRISCOLI and WOLF (2009) *op. cit.* p. 61.

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I.3.2.2. Principles

There appears to be scholarly consensus over the fact that the contemporary law of international watercourses is based on three core principles: *equitable and reasonable utilisation*, the *prevention of* significant (transboundary) *harm* and the *prior notification of planned measures*[103]. While no formal hierarchy exists among these principles, certain authors are nevertheless of the view that the equitable and reasonable utilisation principle enjoys prominence in international water law[104].

a) The beginning: early extreme doctrines

Today's principles of international water law have evolved in the past two centuries out of conflicting doctrines on state conduct concerning the permissible margin of sovereign action over shared natural resources.

The first such fundamental concept is the so-called "*absolute territorial sovereignty*" or "Harmon" doctrine. It advocates the unlimited freedom of a state to exploit the waters of international rivers flowing through its territory, suggesting that states are not bound by international legal obligations whatsoever in relation to such water resources[105]. In other words, as the international river forms part of the public domain of the state concerned it may dispose of the water in its territory as it sees fit. A lower riparian cannot thus demand the continued free and uninterrupted flow of water from upper basin states[106]. Historically, the absolute sovereignty doctrine has been advocated by upstream regional powers in defence of a free hand approach over their section of international rivers.

The second such concept is known as "*absolute territorial integrity*". Contrary to the previous one, it favours downstream states by way of stipulating a right to demand the continuation of the natural flow of an international river into their territories. Such demand is often linked to historic appropriations. This theory has, too, been rightly criticised – like the Harmon-doctrine

[103] McCaffrey (2015) *op. cit.* p. 58.
[104] *Ibid* p. 54.
[105] Dinar (2008) *op. cit.* p. 39.
[106] Allouche (2005) *op. cit.* p. 51.

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– for it allocates rights without imposing corresponding obligations, favouring one-sidedly lower basin states[107].

The two extreme concepts have been consistently rejected by recent state practice and general international water law, even though a handful of countries continue to advocate them with a view to justifying their hegemonic use of complex international rivers (*e.g.* Turkey's claim of absolute territorial sovereignty over its sections of the Tigris and Euphrates rivers or Egypt's demands on historic allocations)[108].

b) Moderate principles

The third early concept of transboundary water governance: the "*limited territorial sovereignty/integrity*" doctrine, curtails the excesses of the previous principles by asserting that every riparian has an equal right to use an international watercourse. At the same time, all states in the basin remain under the duty not to cause significant harm to fellow basin states[109]. Out of all early principles the limited territorial sovereignty/integrity concept has gained the widest endorsement for it encompasses the principles of equitable and reasonable utilisation, no-harm and cooperation principles, *i.e.* the foundations of contemporary international water law[110].

Mention also must be made of the concept of the "*community of riparian states*". This concept envisions international river basins as highly integrated and cooperative communities of states where the benefits and the burdens of the management of the shared resource are not allocated along a rudimentary upstream-downstream dichotomy. Rather, basin states cooperate on a multitude of water management issues with a view to maximising the collective good of the river[111]. The concept was accorded an early authoritative endorsement in the above-mentioned *River Oder case* by the Permanent Court of International Justice in 1929[112]. Despite its somewhat idealistic approach the concept received fresh support by the International Court of Justice in 1997 in the *Gabčíkovo-Nagymaros case* in which the ICJ recognised the validity of

[107] *Ibid* p. 52.
[108] SALMAN (2009) *op. cit.* p. 14.
[109] ALLOUCHE (2005) *op. cit.* p. 52.
[110] *See* section I.3.2.2.c) below.
[111] ALLOUCHE (2005) *op. cit.* p.15.
[112] Case Relating to the Territorial Jurisdiction of the International Commission for the River Oder, PCIJ, Series A, No. 23, 1929.

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the "community of interest" concept to all uses of international rivers[113]. Some authors argue that this "community spirit" of riparian states also permeates the EU's core water legislation, the Water Framework Directive[114].

c) Principles of contemporary water law

As mentioned above, the foundations of today's international water law are three principles: equitable and reasonable utilisation of shared watercourses, the prevention of significant harm (the "no-harm" rule) and the prior notification of and consultation on planned measures with a transboundary impact. These principles find their clearest legal expression in the UN Watercourses Convention (the principles at issue are discussed in detail in relation to the Convention below)[115].

d) General principles of international law

Naturally, the above water-related legal principles do not exist in isolation, but form an integral part of the corpus of public international law. Therefore, the basic principles of co-riparian relations must be implemented hand in hand with a set of core principles governing interstate conduct under the *Charter of the United Nations*. These include the principle of good neighbourliness, the commitment to promote peace and security, the duty to cooperate, the obligation to resolve disputes by peaceful means or the principle of the "rule of law"[116]. Moreover, certain so-called *peremptory norms of international law*, *e.g.* those relating to the protection of human rights, humanitarian crises or self-determination, are also applicable in the management of shared basins[117]. Finally, international water law is supplemented by some *general environmental law principles*, such as the precautionary principle, the polluter pays principle or the sustainability principle[118].

[113] Case Concerning the Gabčíkovo-Nagymaros Project (Hungary v. Slovakia), Judgement, ICJ Reports 1997, 7.
[114] MOELLENKAMP (2007) *op. cit.* p. 1418.
[115] *See* section I.3.2.3. below.
[116] WOUTERS, Patricia (2013): *International Law - Facilitating Transboundary Water Cooperation*, Global Water Partnership Technical Committee, Background papers No. 17, p. 13-22.
[117] BRUHÁCS (2011) *op. cit.* p. 238-244.
[118] The inherent link between the latter environmental principles and international water law is probably best illustrated by the interaction of the UNECE Water Convention and the various environmental conventions adopted by the UNECE. *See* section I.4.3.2. below.

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I.3.2.3. The UN Watercourses Convention

Since 2014 states have at their disposal two multilateral treaties that provide basic frameworks for transboundary water cooperation: the 1997 Convention on the Law of the Non-navigational Uses of International Watercourses (*UN Watercourses Convention*) and the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes (*UNECE Water Convention*). The two instruments largely cover the same subjects, although following somewhat different approaches[119].

The UN Watercourses Convention was preceded by two decades of deliberation and codification within the UN's *International Law Commission*. The project leading to the Convention was initiated in 1970 and was completed in 1997 by the adoption of the Convention text by the UN General Assembly. The Convention has generally been received as an *authentic codification* of the principles of international law relating to the non-navigational uses of international watercourses[120] and received immediate judicial endorsement by the ICJ in the above-mentioned Gabčíkovo-Nagymaros case in the same year[121]. However, despite the lengthy preparatory phase, it took another 17 years to gather a sufficient amount of ratifications to trigger its entry into force.

The Convention contains, for the most part, highly general provisions whose *fil conducteur* is the "combination of the principles of equitable and reasonable utilization, on the one hand, and prevention of significant harm, on the other"[122].

The principle of *equitable and reasonable utilisation*, as codified by the Convention, implies a broad range of obligations[123]. First of all, the use and development of the transboundary rivers must take place "with a view to attaining optimal and sustainable utilization thereof and benefits therefrom", taking into account the interests of other riparian countries. Second, the principle encompasses the right of states to utilise the shared river as well as the duty to cooperate in the protection thereof. The Convention also enumerates the most important factors that have to be

[119] McCaffrey, Stephen (2016): UN Watercourses Convention – Implementation and Relationship to the UNECE Water Convention, *Environmental Policy and Law*, 46/1, pp. 35-39, p. 36. The UNECE Water Convention is discussed in detail in the context of European transboundary water law. *See* section II.2.2.2. below.
[120] McCaffrey (2015) *op. cit.* p. 53.
[121] Case Concerning the Gabčíkovo-Nagymaros Project (Hungary v. Slovakia), Judgement, ICJ Reports 1997, 7.
[122] McCaffrey (2015) *op. cit.* p. 54.
[123] Article 5, UN Watercourses Convention.

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taken into account in determining whether a particular use can be considered equitable and reasonable[124]. Importantly, there is no set hierarchy among competing water uses, but in the case of a conflict among competing uses, special attention must be paid to the "requirements of vital human needs"[125].

The other overarching principle of international water law enshrined in the Convention is the so-called *"no-harm" rule* that has grown out of the Roman law maxim of *sic utero tuo ut alineium non laedes*[126]. It implies that states utilising their share of the international watercourse must take all necessary measures to prevent causing significant harm to other riparian states. If such harm is nevertheless caused, all appropriate measures must be taken to eliminate or mitigate it[127]. The "no-harm" rule is not a passive obligation. It implies the continuous, long-term, pro-active and anticipatory engagement of basin states to avert not only large scale and apparent incidents, but also the "accumulation of small and isolated modifications of water quality and quantity" that may generate unforeseeable adverse effects[128]. (Evidently, such progressive interpretation raises the threshold of due diligence well-above the original formulation of the rule by the Train Smelter Arbitration that only called for the avoidance of "injuries […] to the territory of another […] when the case is of serious consequence and the injury is established by clear and convincing evidence"[129]).

The Convention also describes the duties of states to *cooperate over planned measures* that may have a significant negative impact on other riparian states as well as the related procedures that include prior notification and consultation[130]. In fact, the Convention treats this obligation

[124] "(a) Geographic, hydrographic, hydrological, climatic, ecological and other factors of a natural character; (b) The social and economic needs of the watercourse States concerned; (c) The population dependent on the watercourse in each watercourse State; (d) The effects of the use or uses of the watercourses in one watercourse State on other watercourse States; (e) Existing and potential uses of the watercourse; (f) Conservation, protection, development and economy of use of the water resources of the watercourse and the costs of measures taken to that effect; (g) The availability of alternatives, of comparable value, to a particular planned or existing use.". Article 6.1, *ibid.*

[125] Article 10, *ibid.*

[126] "Do not use your property so as to injure the property of another".

[127] Article 7, UN Watercourses Convention.

[128] TANZI Attila and KOLLIOPOULOS, Alexandros (2015): The No-Harm Rule. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 133-145, p. 137.

[129] RIEU-CLARKE, Alistair, MOYNIHAN, Ruby and MAGSIG, BjØrn-Oliver (2012): *UN Watercourses Convention - User's Guide*, Dundee, University of Dundee, p. 116-117.

[130] Articles 11-19, UN Watercourses Convention.

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equal to the previous ones, actually devoting more provisions (nine) to this subject that any other issue in the entire text[131].

In addition to the above bedrock principles, the Convention also sets out basic requirements concerning *pollution prevention and control* and the protection of riverine and marine ecosystems[132]. Finally, the Convention introduces detailed mechanisms for *dispute resolution*. Transboundary water disputes must be resolved peacefully bilaterally or through the involvement of a third-party, such as good offices, mediation or conciliation, etc. A special feature of the Convention is the possibility for any party to trigger the mandatory procedure of a fact finding commission that enjoys broad investigative powers. While the outcome of the procedure is not binding, the operation of the commission is indeed a major step towards a mandatory third-party dispute settlement[133]. Irrespective of these extra-judicial mechanisms, the parties may always refer their dispute to the International Court of Justice or an arbitral tribunal[134].

The long-awaited entry into force of the 1997 UN Watercourses Convention has not been met with universal jubilation. It was criticised as being too conservative, just stating the obvious. Some authors argue that it was out-of-date even before it was adopted and scarcely attempted to address the water challenges of the twenty-first century, in particular those linked to environmental protection, human rights and investments[135]. According to some critiques the fact that the Convention draws a stark distinction between the domestic sphere of water management and the transboundary dimension defies the daily experience of water management[136].

[131] McCaffrey (2015), p. 56.
[132] Articles 20-23, UN Watercourses Convention. BUJDOS, Ágnes (2017): *The Analysis of the Rules on Transboundary Water Pollution*, PhD Thesis, Debrecen, Debreceni Egyetem, p. 90-97.
[133] TANZI, Attila and CONTARTESE, Cristina (2015): Dispute Prevention, Dispute Settlement and Implementation Facilitation in International Water Law: The Added Value of the Establishment of an Implementation Mechanism under the Water Convention. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 319-329, p. 325.
[134] Article 33, Annex, UN Watercourses Convention.
[135] DELLAPENNA, Joseph. W., GUPTA, Joyeeta, LI, Wenjing and SCHMIDT, Falk (2013): Thinking about the future of global water governance, *Ecology and Society* 18:3, pp. 28-37, p. 33.
[136] CONCA, Ken (2006): *Governing Water: Contentious Transnational Politics and Global Institution Building*, Cambridge MA, MIT Press, p. 120.

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Such criticisms seem somewhat unfair. First, the slow pace of the ratification and the actual implementation of the Convention is an eloquent illustration of the complacency of the international community to tackle core issues of transboundary water governance in any substantial fashion. The (relatively) low level of ambition of the Convention is thus not the fault of its draftsmen, it is just an accurate footprint of the difficult political climate surrounding its lengthy conception. Second, there is no doubt that the Convention has, even before its entry into force, strongly influenced important emerging regional water governance regimes such as the Southern African Development Community's (SADC) 2000 Revised Protocol on Shared International Watercourses or the 2002 Framework Agreement on the Sava River Basin and inspired the establishment of basin organisations[137]. Finally, real implementation has only started a few years ago, thus more time will be needed to evaluate its impact on the progressive development of international water law. Unfortunately, however, it is unlikely that the Convention will reach its full potential so long as the question of institutional structure for implementation remains unresolved (uniquely, the Convention itself does not set up institutions for its own management)[138].

I.3.2.4. Regional, basin and bilateral water treaties

a) Evolution, scope and distribution

While the two global treaties lay down a set of principles as well as basic substantive and procedural rules for transboundary water cooperation, real life cross-border water management takes place mainly under regional, basin and bilateral treaties[139]. In fact these latter treaties constitute the true laboratories of the development of water law, heavily influencing the evolution of universal water governance as well[140]. This is only natural, if one considers that

[137] *See* sections I.3.2.4.b) and III.2.2.3.c) below.
[138] MCCAFFREY (2016) *op. cit.* p. 36.
[139] For the purposes of this general overview multilateral and bilateral water treaties will be treated in this subsection as a homogenous group of legal instruments (*i.e.* everything whose geographical scale is below global). Evidently, such unsophisticated categorisation hides important structural differences among the regional, basin, sub-basin and bilateral treaties. The crucial differences among multilateral and bilateral agreements will only be elaborated in the context of European water governance in Part III. For a general account of multilateral versus bilateral treaty-making *see* ESPEY, Molly and TOWFIQUE, Basman (2004): International bilateral water treaty formation, *Water Resources Research* 40, W05S05, doi:10.1029/2003WR002534; ZAWAHRI, Neda A. and MCLAUGHLIN MITCHELL, Sara (2011): Fragmented Governance of International Rivers: Negotiating Bilateral versus Multilateral Treaties, *International Studies Quarterly* 55, pp. 835–858.
[140] BOISSON DE CHAZOURNES, Laurence (2013a): *Fresh Water in International Law*, Oxford, Oxford University Press, p. 51-53.

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these regional or sub-regional instruments provide the evident framework to deal with the geographical, political and sociological particularities of individual watercourses and their basins.

The pivotal role of regional and basin treaties in the management of co-riparian relations is specifically recognised, on the one hand, by the UN Watercourses Convention[141] that encourages and, on the other hand, the UNECE Water Convention that even prescribes the adoption of new multilateral or bilateral water agreements[142].

The past decades have witnessed important *positive trends* in the institutionalisation of regional and basin level water governance. Today, according to the Transboundary Freshwater Dispute Database there are over 250 proper basin or sub-basin agreements[143]. According to a recent global survey by Giordano et al. the relevant treaties apply to the most significant river basins, accounting for 70% of the world's transboundary areas (42 million km^2) and 80% of the people living in those regions (2.8 billion). The trend of the past 50 years shows that about 30 new treaties are signed every decade[144].

Regional, basin-level and bilateral treaties have not only evolved in terms of numbers. The *purpose and focus* of water treaties show promising improvements too. Water allocation issues – the cornerstone of early water management agreements – no longer dominate contemporary treaty-making. Water quality and environmental considerations are now the most common focus area of water agreements[145]. *Procedural rules and mechanism*, including conflict resolution, have also expanded at the expense of purely regulatory provisions, indicating a shift towards cooperative water management[146].

Yet, regional and basin treaties offer no panacea to all challenges of transboundary governance. In fact, these multi- or bilateral agreements often lack a comprehensive character, covering only selected aspects of river basin management[147]. A large number of transboundary treaties omit

[141] Article 3, UN Watercourses Convention.
[142] Article 9.1, UNECE Water Convention.
[143] GIORDANO, Mark et al. (2014): A review of the evolution and state of transboundary freshwater treaties, *Int Environ Agreements* 14 pp. 245-264, p. 252.
[144] *Ibid* p. 262.
[145] *Ibid* p. 255.
[146] *Ibid* p. 255.
[147] BOISSON DE CHAZOURNES (2013a) *op. cit.* p. 52.

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basin-specific issues, either because they are too general in nature or because they apply to all waters between riparian states without further specifications[148]. Geographical coverage may also be inconsistent. As Giordano et al. underline only around one-third of multilateral basins have treaties have at least three signatories, only 11 basins have treaties that include all riparians and only about a quarter of all treaties cover the entire basin to which they apply[149]. Consequently, the proliferation of regional and sub-regional water treaties do not render universal water law redundant as they continue to play an important role where no regional norm applies[150].

b) Examples of major regional, sub-regional and basin treaties[151]

The origins of transboundary water agreements in *Africa* are rooted in the colonial past. Colonial powers had a preference to use transboundary waters to demarcate their spheres of influence. To that effect they concluded a number of bilateral treaties to which today's watercourse states were not parties. Such colonial arrangements had a lasting impact on today's co-riparian relations and can constitute a major impediment to effective basin-wide cooperation even today[152]. In the wake of decolonisation the number of transboundary water agreements multiplied quickly, followed by the establishment of the first river basin organisation in 1964 (Niger River Commission, today: Niger Basin Authority). Such a shift towards joint management is, however, attributed more to the influence of international organisations and lending institutions that the cooperative spirit of the newly independent African states[153]. Today, while Africa has a growing number of basin treaties, over half of the basins are still not covered (at all or comprehensively) by treaties. The greatest progress in this regard has been achieved in Southern Africa, where under the auspices of the *Southern African Development Community* (SADC) and the leadership of the Republic of South Africa the treaty framework of water cooperation and the related institutional structure have been significantly expanded and strengthened[154]. The SADC adopted its first transboundary water governance agreement –

[148] SCHMEIER (2013) *op. cit.* p. 255.
[149] GIORDANO et al. (2014), p. 254.
[150] BOISSON DE CHAZOURNES (2013a) *op. cit.* p. 52.
[151] This subsection only addresses non-European examples. Regional and sub-regional treaties in the European Union and its neighbours is covered in section II.2.2.2. and II.2.2.3. below.
[152] TURTON (2008) *op. cit.* p. 31.
[153] *Ibid* p. 32.
[154] *Transboundary water management in Africa: challenges for development cooperation* (2006), Study for the research and consultancy project „Cooperation on Africa's transboundary water resources" on behalf of the Ministry for Economic Cooperation and Development (BMZ)/Waltina Scheumann et al. (Eds.). Dt. Institut für Entwicklungspolitik, p. 3. Members of the SADC include: Botswana, Democratic Republic of Congo, Lesotho,

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the SADC Protocol on Shared Watercourses – in 1995. This was replaced by a Revised Protocol[155] in 2000 that entered into force in 2003. To a large extent, the Revised Protocol mirrors the provisions of the 1997 UN Watercourses Convention. It is based on the equitable and reasonable utilisation principle and the no-harm rule. The Revised Protocol also foresees the adoption of basin agreements and commissions. Given that the borders of SADC member states intersect 15 major international rivers the implementation of the Revised Protocol has global significance[156]. In addition, in 2018 the countries of the *Central African* region adopted a new regional instrument under the title Convention for the Prevention of Conflicts Related to the Management of Shared Water Resources in Central Africa[157]. The new Convention is strongly rooted in the UNECE Water Convention and the UN Watercourses Convention. It lays down the governing principles of co-riparian relations such as the equitable and reasonable use of shared resources; the prevention of transboundary impact; transboundary and regional cooperation; the development of basin agreements and the establishment of transboundary basin organizations or the integrated management of transboundary water resources[158]. Finally, highly developed *basin-regimes* have been put in place other parts of Africa too, such as the Senegal, the Niger or the Chad catchment areas. Significant challenges remain, however, all over the continent, but most particularly in the Nile basin where there is a fundamental tension among the basin states over historic water allocation rights, accentuated by divergent developmental needs and policies of upstream and downstream riparians[159].

In *North America* the treaty frameworks addressing transboundary waters between the United States and Canada, on the one hand, and the United States and Mexico, on the other, were developed over a century ago[160]. Not surprisingly, North America does not have a continent-

Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, United Republic of Tanzania, Zambia, Zimbabwe. Source: http://www.sadc.int/member-states/ (accessed 12 February 2018).

[155] SADC Revised Protocol on Shared Watercourses, Windhoek, 7 August 2000.

[156] KINNA, Rémy (2015): The UNECE Water Convention Viewed from the Perspective of the SADC Revised Protocol on Shared Watercourses. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 466-485, p. 467.

[157] Convention for the Prevention of Conflicts Related to the Management of Shared Water Resources in Central Africa, Brazzaville, 22 December 2018.

[158] https://www.unece.org/info/media/presscurrent-press-h/environment/2017/central-african-countries-approve-regional-convention-on-transboundary-water-cooperation-with-unece-support/doc.html (accessed 12 February 2019). Contracting parties include Angola, Burundi, Cameroon, Central African Republic, Chad, Democratic Republic of Congo, Equatorial Guinea, Gabon, Republic of Congo, Rwanda and São Tomé and Príncipe.

[159] DE STEFANO, Lucia et al. (2012): Climate change and the institutional resilience of international river basins, *Journal of Peace Research* 49:1, pp. 193-209, p. 202.

[160] NEIR, Alyssa M., KLISE, Geoffrey T. and CAMPANA, Michael E. (2009): The concept of vulnerability as applied to North America. In UNEP: *Hydropolitical Vulnerability and Resilience along International Waters – North America*, Nairobi, pp. 17-22, p. 17.

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wide transboundary water treaty or organisation (even though both the US and Canada are members of the UN Economic Commission for Europe, thus could have become a party to the UNECE Water Convention even before its global opening[161]). Instead, the institutional backbone of the North American transboundary water cooperation is comprised by two bi-national water commissions and a series of treaties adopted since the late 19th century. The US-Canada International Joint Commission was established by *the 1909 Boundary Waters Treaty*. The Treaty's geographical scope extends to all waters that flow across or along the US-Canadian international border. It applies to all infrastructure developments, diversions and other alterations affecting the other riparian. The Treaty also places restrictions on transboundary water pollution through the stipulation of an early version of the "no-harm" principle. Naturally, the original 1909 Treaty does not address a number of topical issues of our current era such as the ecological status of waters or groundwater management. The two countries also singed a range of additional bilateral treaties addressing transboundary water management in specific basins such as the Great Lakes, the Niagara River, Columbia River, Skagit River, St. Lawrence River, etc.[162] The legal and institutional foundations of US-Mexico cross border water cooperation also go back to the late 19th century. In 1889 the International Boundary Commission was created to handle specifically border and water issues (it was changed to *International Boundary and Water Commission in 1944*). Given the predominantly arid environment of the border region, allocation issues have dominated bilateral water relations since the outset. The first agreement on the subject was adopted as early as in 1906, setting the precise amount of water the US must deliver to Mexico. This was replaced in 1944 by a more comprehensive agreement covering both the Rio Grande and the Colorado rivers[163].

Despite various efforts to create comprehensive Inter-American water cooperation mechanisms since the 1930s the institutionalisation of transboundary water governance in *Latin America* is still at an early phase of development[164]. Exceptions include the La Plata, Amazon or the Titicaca basins[165]. In the *La Plata* watershed formalised basin-wide cooperation goes back to the signing of the La Plata Basin Treaty in 1969 which, to a large extent, was triggered by the development of hydro-electric power in the region. The treaty provides a framework for the

[161] *See* section II.2.2.2. below.
[162] NEIR, KLISE and CAMPANA (2009) *op. cit.* p. 18.
[163] *Ibid* p. 21.
[164] NEWTON, Joshua (2007): Hydropolitical vulnerability of South America's international watercourses. In UNEP: *Hydropolitical Vulnerability and Resilience along International Waters – Latin America and the Caribbean*, Nairobi, pp. 45-78, p. 58.
[165] NEWTON (2007) *op. cit.* p. 66.

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joint development of the catchment area, calls for open transport along the river and its tributaries, requires joint management of non-water resources (soil, forest, flora, and fauna), etc.[166]. As regards the *Titicaca* basin the first formal cooperation agreement – the Preliminary Convention for the Study of the Use of the Waters of the Lake Titicaca – was adopted in as early as 1957 (it however only entered into force in 1986 when Bolivia finally ratified it). The Convention is based on the "indivisible and exclusive joint ownership by both countries of the waters of the lake," whose control is carried out by a joint management body (the Autonomous Binational Authority of Lake Titicaca). The purpose of the Convention is to promote development within the basin of Lake Titicaca in a manner that would not disrupt the flow and volume so as to affect the navigational uses of the body of water, an objective that is being fulfilled only partially even these days[167].

South and Southeast Asia is home to about 2 billion people and covers four major international river systems: the Ganges-Brahmaputra-Meghna, the Indus, the Mekong and the Salween basins. While all of these basins have some kind of treaty based-cooperation (except for the Salween river), the relevant treaties largely fail to deal with the emerging new problems and pressures with a comprehensive, basin-wide approach[168]. As regards the Ganges-Brahmaputra-Meghna river system disputes between India and Bangladesh have been prevalent since the partition of the Indian subcontinent in 1947. The most notable such event was the damming of the Ganges by India in 1975 so as to divert the majority of water into other rivers running into the Bay of Bengal. The differences between India and downstream Bangladesh were reconciled only in 1996 by the adoption of the Ganges Water Sharing Treaty. A similarly notorious water allocation issue in the subcontinent concerns the Indus river system. Here, India's unilateral manipulation of discharges into Pakistan after the partition in 1947 led to the adoption, in 1960, of the Indus Waters Treaty between two counties. While the Treaty, brokered by the World Bank at the time, has withstood the test of difficult times between the two countries, its relatively rigid structure and narrow scope has already become a core concern in the region[169]. There are, however, more promising examples of cooperation in the Southeast Asia region. This includes the collaboration among the riparian states of the lower *Mekong*, the longest river of

[166] DELLI PRISCOLI and WOLF (2009) *op. cit.* p. 211.
[167] *Ibid* p. 212.
[168] KANWAR, Shalini, GUPTA, Ashim Das and NEWTON, Joshua (2009): Background on the concepts of vulnerability and resilience as applied to the South and Southeast Asian region. In UNEP: *Hydropolitical Vulnerability and Resilience along International Waters - Asia*, Nairobi, pp. 17-56, p. 53.
[169] KUMAR SINHA, Uttam (2010): 50 Years of the Indus Water Treaty: An Evaluation, *Strategic Analysis* 34:5, pp. 667-670, p. 667.

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the region, which dates back to the 1950s. Such cooperation, however, remains ineffective with regards to many basin-wide issues as China stays outside all relevant formal arrangements. Today, the framework of collaboration in the lower Mekong Region is the 1995 Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin signed by Cambodia, Laos, Thailand and Vietnam[170].

Many of the international rivers of West Asia (*Middle East*), such as the Tigris, Euphrates, Jordan, suffer not only from severe human and climatic pressures. Cooperation is also hampered by the general political instability prevailing in the region. Not surprisingly, the management of the largest water system in the region: Tigris-Euphrates/Shatt Al-Arab has been the subject of continuous uncertainty and disagreement[171]. The lack of a basin agreement is largely the result of upstream Turkey's unilateral development policies that reflects the country's projection of the out-dated doctrine of absolute territorial sovereignty over water resources[172].

While inter-state disputes over water tend to reach high political intensity in the *Central Asia*n region too, the countries concerned also benefit from the UNECE Water Convention and the various international development programmes aimed at stabilising the hydro-political situation through cooperation[173]. Unlike many other Asian regions, Central Asia does have an established legal framework for transboundary water cooperation[174]. These include, on the one hand, the various bilateral and multilateral agreements relating to the Interstate Commission for Water Coordination of Central Asia[175] and, on the other, the 1999 Agreement on the status of the International Fund for saving the Aral Sea and its organisations[176]. Importantly, a comprehensive multilateral transboundary water governance treaty was also adopted in 1998 under the auspices of the *Commonwealth of Independent States* entitled Agreement on the General Principles of the Rational Use and Protection of Transboundary Water Bodies of the State Members of the Commonwealth of Independent States[177]. The Agreement – which largely

[170] KANWAR, GUPTA and NEWTON (2009) *op. cit.* p. 45.
[171] KLISE, Geoffrey T. et al. (2009): Hydrovulnerability of West Asia. In UNEP: *Hydropolitical Vulnerability and Resilience along International Waters - Asia*, Nairobi, pp. 57-88, p. 77.
[172] NEWTON (2014) *op. cit.* p. 172-173.
[173] UNECE (2011): *Strengthening Water Management and Transboundary Water Cooperation in Central Asia: The Role of UNECE Environmental Conventions*, Geneva, p. 1.
[174] *Ibid* p. 14.
[175] http://www.icwc-aral.uz/legal_framework.htm (accessed 12 February 2019).
[176] http://ec-ifas.waterunites-ca.org/aral_basin/legal-issues/conventions-and-agreements/166-law-applied-to-transboundary-waters-in-the-aral-sea-basin.html (accessed 12 February 2019).
[177] Agreement on the General Principles of the Rational Use and Protection of Transboundary Water Bodies of the State Members of the Commonwealth of Independent States, Moscow, 11 September 1998.

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follows the provisions of the UNECE Water Convention – entered into force in 2002. As, however, only Russia, Belarus and Kyrgyzstan ratified it, the real significance of this instrument has hitherto remained minimal in Central Asia[178].

I.3.2.5. Critical assessment: shortcomings of international water law

One might reasonably assume that the prominence of transboundary watercourses in international relations has, thus far, brought about solid global legal and institutional solutions to address the issue of shared water resources. Reality, however, suggests the opposite. While the past two decades have usefully raised the profile of water policy considerations, *legal norms* and institutions dedicated to water *at global level* remain *fragmented* and are likely to remain so for the foreseeable future[179]. This applies particularly in the context of transboundary water governance which still belongs to the politically most controversial subjects of international law and politics.

Some recent developments, however, give hope to a *significant improvement* of the present situation. These include the entry into force of the 1997 UN Watercourses Convention in 2014 and the opening of the UNECE Water Convention in 2013 to parties outside the UN Economic Commission for Europe. It is a legitimate expectation that these two instruments will solidify the legal and institutional bases of water cooperation globally[180].

Despite the above positive developments international water law remains the subject of *sharp criticism* by legal professionals and water managers alike, prompting one author to describe international water law to be still in the state of "*conceptual infancy*"[181]. Indeed, as seen above, universal water law remains mainly a collection of general and vague principles that "only offer suggestions and broad guidelines how [the conflicting interests of riparians] might be moderated and reconciled"[182]. In fact these solemn principles are formulated with such generality that often inhibits their ultimate application[183]. As a result, researchers on the subject

[178] VINOGRADOV, Sergei (2007): Regime Building for Transboundary Water: The Evolution of Legal and Institutional Frameworks in the EECCA Region, *Water Law* 18, pp. 77-94, p. 83.
[179] DELLAPENNA et al. (2013) *op. cit.* p. 28.
[180] BOISSON DE CHAZOURNES (2013a) *op. cit.* p. 52.
[181] DELLI PRISCOLI and WOLF (2009) *op. cit.* p. 62.
[182] DINAR (2008) *op. cit.* p. 49.
[183] GIORDANO, Meredith A. (2002): *International River Basin Management: Global Principles and Basin Practice*, PhD Thesis, Corvallis, Oregon State University, p. 22.

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"found surprisingly little relationship between the worlds of theory and practice"[184]. For instance, the equitable and reasonable utilisation principle – jurists' jolly joker when it comes to transboundary water allocation – is hardly ever referred to in treaties concerned with water allocation. This, as Aaron Wolf concludes, is due to the lack of guidelines for quantifying each country's share of the water[185]. Moreover, not only is international water law ambiguous and contradictory, goes the verdict, it also fails to provide a *mechanism to enforce* agreed-on principles[186]. This, among others, is illustrated by the snail-pace of the entry into force of the 1997 UN Watercourses Convention and the deliberate omission of institutional framework to oversee its implementation. In fact, several shortcomings of transboundary international water law have been recognised by the craftsmen of the treaty framework too. Steven McCaffrey, special rapporteur of the International Law Commission's draft articles leading to the UN Watercourses Convention, admits that the evolution of modern water law was strongly influenced by the climatic conditions of humid regions where modern states initially took root, by the dominance of navigational issues and the poor understanding of hydrology. This incomprehensive basis of development has inevitably left major *loopholes in the legal framework*[187].

Given the consistent expansion of transboundary water treaties in the past decade, however, the above harsh criticism seems somewhat exaggerated. Undoubtedly, international water law and the supporting institutional framework have proved inadequate far too often to prevent or to solve major transboundary water conflicts. One should not forget, however, that it is not the intellectual foundations that international water law is still missing (indeed the Helsinki Rules, the cornerstone of contemporary water law have been around since 1966). Rather, the inherent deficiencies are rooted in the complacency of the international community to adopt binding rules that limit the sovereignty of states to freely dispose of their respective share of international watercourses.

[184] WOLF, Aaron T. (2000): From Rights to Needs: Water Allocations in International Treaties. In FEITELSON, Eran and HADDAD, Marwan (Eds.): *Management of Shared Groundwater Resources*, Dordrecht, Kluwer, pp. 133-165, p. 147.
[185] *Ibid.*
[186] DELLI PRISCOLI and WOLF (2009) *op. cit.* p. 61.
[187] MCCAFFREY, Stephen (2001): *The Law of International Watercourses: Non-navigational Uses*, Oxford, Oxford University Press, p. 34.

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Chapter 4
Institutions of transboundary water governance

I.4.1. Overview

Most legal instruments concerned with transboundary water management, be it global, regional, basin-wide in scope, provide for some kind of institutional arrangements to oversee their implementation.

The role and presence of such institutions is most prominent at *basin and bilateral level*. This is only natural in view of the fact that – as Stephen McCaffrey noted – "the management of international watercourse systems through joint institutions is [...] almost indispensable, if anything approaching optimum utilisation and protection of the system of waters is to be attained"[188]. Thus, given the pivotal importance of institutional frameworks the UN Watercourses Convention suggests the establishment of joint mechanism and bodies among watercourse states[189]. By the same token, the UNECE Water Convention even goes as far as to specifically require riparian states to establish "bilateral or multilateral commissions or other appropriate institutional arrangements for cooperation"[190].

Institutional arrangements to manage shared rivers may take several shapes. The simplest of such mechanisms is where the parties to an interstate water agreement do not designate specific institutions for the implementation of the agreement, but use established *bilateral channels* instead. An important step towards institutionalisation is the appointment of permanent government representatives (*plenipotentiaries*) to manage (mainly bilateral) water issues of common interest. The most complex arrangements for the governance of shared water resources are the various *river basin organisations* ("RBOs")[191].

In addition to basin-related or bilateral joint management bodies, there are a number of intergovernmental and non-governmental organisations that are engaged, directly or indirectly, in the facilitation of transboundary water management. Such facilitation may take place through

[188] 379 ILC, 'Sixth Report on the Law of the Non-navigational Uses of International Watercourses, by Mr Stephen C McCaffrey, Special Rapporteur', UN Doc A/CN.4/436 and Corr 1, para. 7.
[189] Article 8.2, UN Watercourses Convention. RIEU-CLARKE et al. (2012) *op. cit.* p. 125.
[190] Article 9.2, Article 1.5, UNECE Water Convention.
[191] UNECE (2009): *River Basin Commissions and Other Institutions for Transboundary Water Cooperation*, Geneva, p. 1.

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regime-building, monitoring of implementation (UNECE), policy development (OECD), technical assistance (UNEP), financing institution-building (World Bank), etc.

I.4.2. River basin organisations

I.4.2.1. The evolution of river basin organisations

The world's numerous river basin organisations constitute the institutional backbone of transboundary water cooperation. These organisations have evolved in number and in focus parallel to the expansion of the regional and sub-regional treaty framework described above[192].

River basin organisations first appeared in the European continent following the Napoleonic wars. The emergence of the new political order as a result of the Congress of Vienna in 1815 coincided with the rapid expansion of navigation in the major rivers of the continent[193]. Thus, the Final Act of the Congress of Vienna already envisaged the cooperation of riparian states with a view to jointly regulating navigation. River commissions were established for several major shared European rivers by 1920[194]. These early river commissions subsequently inspired the creation of and served as a model for basin organisations all over the world[195].

Against their *narrow original mandate* (navigation only), basin organisations gradually obtained *additional responsibilities* such as cooperation over fisheries, irrigation, hydro-electric plants, environmental protection, joint regulation, etc. While the form and structure of each RBO is highly contextual, there appears to be a *recent trend of harmonization* of core functions towards integrated water resources management[196]. This development has been largely triggered by the expansion of international water law at global, regional and basin level[197].

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[192] *Ibid*. Also *see* section I.3.2.4. above.
[193] BOISSON DE CHAZOURNES (2013a) *op. cit.* p. 14.
[194] Importantly, these commissions came into being not only as a result of the cooperative spirit of the riparian countries concerned, but were, to a large extent, the products of European power politics. Consequently, non-riparian states were also members of the commissions with a broad mandate to defend their own interests in navigation, a right explicitly recognised by the Permanent Court of International Justice in the River Oder case (Case Relating to the Territorial Jurisdiction of the International Commission for the River Oder, PCIJ, Series A, No. 23, 1929).
[195] BOISSON DE CHAZOURNES (2013a) *op. cit.* p. 178.
[196] SCHMEIER (2013) *op. cit.* p. 84.
[197] BOISSON DE CHAZOURNES (2013a) *op. cit.* p. 179

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Today, most RBOs focus on *water quantity*, *water quality* or the general protection of the environment. Other typical functions of RBOs include basin management planning and monitoring, data sharing, technical assistance and capacity building, investment facilitation, etc. In certain developing regions, RBOs are also charged with the promotion of socio-economic development through the river's water resources[198]. Some RBOs also carry out or facilitate joint activities for their members, especially in developing regions where riparian states themselves may lack the necessary capacities to do so[199]. In a few cases RBOs have functions that are not directly related to the river, such as economic integration or the promotion of peace and security[200]. Given their basic function as a platform of dialogue, *conciliation* is also a recognised core function of RBOs even where dispute settlement powers are not explicitly provided for in the founding instrument of the actual basin organisation[201]. The expansion of RBO functions is also reflected in general water law is so far as the UNECE Water Convention provides a list of 10 major groups of tasks that basin organisations must be entrusted with as a minimum[202].

I.4.2.2. Distribution of river basin organisations

A recent mapping of basin organisations by Suzanne Schmeier identified 119 RBOs worldwide, covering 116 shared river basins[203]. The vast majority of international watercourses with an RBO are shared by two riparian countries only (49 out of 116)[204]. 47 of the total 119 RBOs do not provide full geographical coverage, *i.e.* one or more riparian states with a share of more than 1% of the catchment area are excluded from institutionalised cooperation. Such non-inclusive RBOs can be found all over the world, from the Aral Sea through the Ganges, Incomati to the Mekong basins[205].

River basin organisations are distributed unevenly across the world. *Europe* not only has the highest number of international river basins, it also boasts the highest number of basin

[198] SCHMEIER (2013) *op. cit*. p. 83.
[199] BOISSON DE CHAZOURNES (2013a) *op. cit.* p. 180.
[200] SCHMEIER (2013) *op. cit.* p. 85.
[201] Case Concerning Pulp Mills on the River Uruguay (Argentina v. Uruguay), Judgement, ICJ Reports 2010, 14, para 91.
[202] Article 9.2, UNECE Water Convention.
[203] SCHMEIER (2013) *op. cit.* p. 65. This discrepancy is due to the fact that some river basins have more than one basin organisations (*e.g.* Rhine, Danube), on the other hand, there a number of RBOs that govern more than one international river (*e.g.* the International Joint Commission between the US and Canada).
[204] This is due to the fact that most transboundary rivers are shared only by two countries. *See* section I.1.3. above.
[205] SCHMEIER (2013) *op. cit.* p. 83.

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organisations (20), that accounts for 40% of all transboundary basins subject to an RBO. At the other end of the spectrum lie Asia and Latin America, both with around 28% of RBO coverage[206].

Africa has 36 RBOs that cover some 35% of all river basins. The most comprehensive network of RBOs in the continent has been set up in the South African Development Community under the auspices of the 2000 SADC Revised Protocol that foresees the adoption of basin agreements and commissions[207]. Today, the 15 transboundary watercourses of the SADC are governed by 12 basin commissions or authorities, all at different stages of development and capacity[208]. The Senegal, the Niger or the Chad basins are also well-known examples of institutionalised transboundary management. Yet, important gaps remain in Africa, in particular in the Nile basin where the fundamental tensions among upstream and downstream riparian states hinder the establishment of a comprehensive RBO. Also, a recent analysis of the subject show that the impressive presence of RBOs in the continent is not matched with efficient delivery capacities, especially where the establishment of river commission is the result of donor pressure, rather than the cooperative spirit of riparian states[209].

North America only has two major RBOs but they practically cover all (95%) transboundary waters. The US-Canada International Joint Commission (IJC) was established by the 1909 Boundary Waters Treaty. Despite its relatively soft mandate, the operation of the IJC is largely regarded as a success[210]. The predecessor of today's US-Mexico International and Boundary Water Commission (IBWC) was established in 1889. The statutory status of the IBWC is stronger than that of the IJC in so far as it adopts decisions that are binding on their respective governments. The successful operation of the IBWC is considered as a token of the commitment of the two countries to stable cooperative transboundary water management in a predominantly arid area suffering from severe water problems[211].

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[206] *Ibid* p. 65-67.
[207] *See* section I.3.2.4. above
[208] http://www.sadc.int/themes/natural-resources/water/ (accessed 2 May 2018)
[209] MERREY, Douglas J. (2009): African models for transnational river basin organisations in Africa: An unexplored dimension, *Water Alternatives* 2(2), pp. 183-204, p. 198.
[210] NORMAN, Emma S., COHEN, Alice and BAKKER, Karen (2015): The Water Convention from a North American perspective. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 423-434, p. 428-431.
[211] NEIR, KLISE and CAMPANA (2009) *op. cit.* p. 21.

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In *Latin America* transboundary cooperation is ensured through RBOs, if such cooperation exists at all. Many basins however have no (*e.g.* the Orinoco basin) or relatively basic joint governance schemes in place. Where joint management regimes do exist, their scope, however, tend to be limited, with some exceptions such as the La Plata, Amazon or the Titicaca basins[212].

RBOs in *Asia* show vast variations in terms of mandate, coverage and effectiveness. While most of the largest international water systems (Amur, Aral, Ganges-Brahmaputra-Meghna, Indus, Jordan, Mekong) are covered by some kind of formal cooperation body, many of these suffer from insufficient political mandate, geographical coverage, resources, etc. The most notable exception is the Mekong River Commission, a robust intergovernmental entity of the riparian states of the lower section of the Mekong river, which is seen as one of the most successful examples of institutionalised multilateral water cooperation outside Europe[213].

I.4.2.3. Effectiveness of river basin organisations

Institutionalist scholars consider the presence of an RBO as an important indicator of hydropolitical stability[214]. Empirical research, however, suggests that institutionalisation on its own does not necessarily deliver effective basin governance. RBOs can act as effective players only if their activity is based on strong legal foundations, broad political mandate, solid financing and extensive cooperation with all involved stakeholders. These conditions, however, do not assume the existence of supersized and omnipotent RBOs. Experience shows that the growing level of institutionalisation (or the size of an institution) does not always yield in additional or proportional governance gains. Overgrown, bureaucratic RBOs with very extensive mandates are likely to fail on some of the core river basin governance functions and tend to display a declining problem-solving impact. On the other hand, basin commissions with a limited, but clear mandate, lean administration and sufficient budget can be important drivers of an improved cooperation and joint basin development[215].

[212] DEL CASTILLO LABORDE, Lilian (2015): The UNECE Water Convention from a Latin American Perspective. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 435-450, p. 436-437.
[213] SCHMEIER (2013) *op. cit.* p. 170.
[214] *See* section I.5.4.2. below.
[215] SCHMEIER (2013) *op. cit.* p. 90.

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These empirical findings have, recently, received political endorsement in the context of the UNECE Water Convention: in 2015 the Meeting of the Parties adopted a decision promoting the efficiency of joint bodies of transboundary water cooperation[216]. The decision lays down a number of principles that "aim to synthesize valuable lessons from the collective experience of joint bodies for transboundary water cooperation" with a view to "generally increas[ing] the efficiency of joint bodies for transboundary water cooperation and contribut[ing] to reaching a higher level of cooperation between riparian States"[217]. To that end, the document sets out a number of basic characteristics that underpin RBO efficiency regarding establishment, structure and functions, operation from a procedural, technical and financial and human resource management perspective, etc.

I.4.3. Beyond the river basin: institutions of transboundary water governance at global and regional level

I.4.3.1. Global institutions

Water – unlike similarly important policy areas – does not have a dedicated specialised agency, fund or programme within the *United Nations system*. Nor is it supported by a robust comprehensive treaty and a well-resourced convention secretariat (as in the case of the United Nations Framework Convention on Climate Change) that could steer decision-making, institution building and mobilise resources at global scale. Paradoxically, however, this does not imply that water is not looked after within the UN. Conversely, there are 31(!) various UN bodies that are engaged significantly in water policy issues. This institutional cacophony results in considerable overlaps and rivalry among the various actors, despite the existence of an internal coordination platform called *UN-Water*[218]. Given, however, its weak mandate and the lack of political leadership the influence of UN-Water is limited and is unlikely to evolve into a global water governance platform[219]. This gap was partly filled in the past two decades by the establishment of other international organisations dedicated to water issues as the *Global Water Partnership* (GWP), the proliferation of water-related activities by international development banks or the significant engagement in water issues by the *Organisation of Economic*

[216] Principles for Effective Joint Bodies for Transboundary Water Cooperation, ECE/MP.WAT/49/Add.2.
[217] *Ibid* points 3 and 4.
[218] http://www.unwater.org/about-unwater/members/ (accessed 12 February 2019).
[219] BAUMGARTNER, Thomas and PAHL-WOSTL, Claudia (2013): UN-Water and its Role in Global Water Governance, *Ecology and Society* 18, pp. 9-19, p. 6.

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Cooperation and Development (OECD) or the activities of the *World Water Council*, an international umbrella organisation of governments, international organisations, companies, universities and other non-governmental bodies[220]. Notwithstanding some successful initiatives in and outside the UN system, the global framework of water governance can therefore be best described as a "fragmented, Mobius-web arrangement"[221].

It follows from the foregoing that transboundary water governance – a sublet of global water governance – has no dedicated institutional structure within the UN system either. Nor have the major UN environmental/sustainable development conferences addressed the institutional aspects of transboundary water governance to any significant extent. Indeed, anecdotal evidence suggests that the inflammatory potential of the issue is such that any substantial mention of the matter in multilateral political documents can impede the discussion of all other (water-related) subjects[222]. Against this backdrop the fact that *Sustainable Development Goal* (SDG) No. 6 on water, adopted by the 2015 UN Sustainable Development Summit, makes a specific reference to the transboundary cooperation constitutes a welcome, but a rather limited development[223].

Yet, some organisations scattered within broader UN framework do address the legal, institutional and political aspects of transboundary water cooperation in a significant way. *E.g.* the *United Nations Environment Programme* (UNEP) commissioned, in the early 2000s, a seminal in-depth analysis of the risks of transboundary water cooperation, entitled Hydro-political vulnerability and resilience in international river basins, for Africa, Asia, Europe, Latin America and North America[224]. The *World Bank* too, has engaged actively in solving cross-border water issues both at political and policy level, the most notable example of which is the decade long pressure on India and Pakistan over the conclusion of the Indus Waters Treaty in 1960[225].

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[220] NEWTON (2014) *op. cit.* p. 129-169.
[221] PAHL-WOSTL, Claudia (2015): *Water Governance in the Face of Global Change: From Understanding to Transformation*, Berlin, Heidelberg, Springer, p. 110.
[222] NEWTON (2014) *op. cit.* p. 172.
[223] UNGA A/RES/70/1 Transforming our world: the 2030 Agenda for Sustainable Development.
[224] UNEP (2005): *Hydropolitical Vulnerability and Resilience along International Waters – Africa*, Nairobi; UNEP (2007a): *Hydropolitical Vulnerability and Resilience along International Waters – Latin America and the Caribbean*, Nairobi; UNEP (2009a): *Hydropolitical Vulnerability and Resilience along International Waters – Asia*, Nairobi; UNEP (2009b): *Hydropolitical Vulnerability and Resilience along International Waters – Europe*, Nairobi; UNEP (2009c): *Hydropolitical Vulnerability and Resilience along International Waters – North America*, Nairobi.
[225] SALMAN (2009) *op. cit.* p. 68.

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Mention also must be made of other international or non-governmental organisations that play a significant role in advancing transboundary water governance. First, the OECD plays a leading role in the elaboration and implementation of the principles of water governance, including transboundary cooperation[226]. The World Water Council through its flagship events, the World Water Forum series, also aims to advance river basin cooperation, although its efforts tend to be hampered by the same political complacency that elevates the subject into the most problematic area of international water governance[227].

I.4.3.2. Regional frameworks

Institutionalisation has been more successful at regional level. The true beacon of transboundary water collaboration is probably the *UN Economic Commission for Europe* (UNECE), the UN's regional cooperation body for North America, Europe and the countries of the former Soviet Union. Based on the UNECE Water Convention and its protocols, the Convention's decision-making bodies and secretariat have become a real laboratory of progressive cross-border water cooperation[228]. Importantly, the Convention also benefits greatly from the broader environmental legal architecture of the UNECE[229]. The success of the institutional set-up of the UNECE Water Convention also gave rise to significant discussions so that its secretariat should also act for the UN Watercourses Convention[230].

Besides the UNECE, *Africa* has also created an intergovernmental body dedicated to international water management issues: the African Ministers' Council on Water (AMCOW) established in 2002. AMCOW provides a continent-wide cooperation platform to address, among others, transboundary water management issues. AMCOW's 2011 Governance and Management Action Plan specifically calls for the development and implementation of basin

[226] http://www.oecd.org/env/watergovernanceprogramme.htm (accessed 12 February 2019).
[227] NEWTON (2014) *op. cit.* p. 172.
[228] *See* section II.2.2.2. below.
[229] These include the Convention on Environmental Impact Assessment in a Transboundary Context, Espoo, 25 February 1991 (Espoo Convention); the Convention on the Transboundary Effects of Industrial Accidents, Helsinki, 17 March 1992; Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, Aarhus, 25 June 1998 (Aarhus Convention) and the Protocol on Strategic Environmental Assessment (SEA) to the Convention on Environmental Impact Assessment in a Transboundary Context, Kiev, 21 May 2003 (Kiev Protocol).
[230] MCCAFFREY (2016) *op. cit.* p. 36.

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level principles[231]. Such ambition seems justified by the success of the world's second largest regional water governance arrangement developed under the SADC Revised Protocol on Shared Watercourses[232].

In the *Americas* the Organisation of American States (OAS) have been active in drawing up programmes and implementing projects dealing with transboundary watercourses, but its limited mandate, financial means and technical capabilities do not allow the organisation to grow into a true supranational centre of water governance. North America, for the obvious reasons mentioned above, does not have a regional intergovernmental transboundary water cooperation body[233]. Nor does Latin America, despite repeated efforts to create comprehensive Inter-American water cooperation mechanisms since the 1930s. While the various integration bodies of the region, such as the Southern Common Market (MERCOSUR), Community of Andean States (CAN) or the Union of South-American Nations (UNASUR) are, to a limited extent, also concerned with the sustainable use of natural resources, none of them have created any substantive regional institutional arrangement to address issues of transboundary water governance[234].

Similarly, the *Asia*n continent has no formalised regional transboundary water cooperation body. Nevertheless, there are important sub-regional bodies concerned with cross-border water management. The most notable example is Central Asia's complex framework for transboundary water cooperation, whose key institutional platform is the Interstate Commission for Water Coordination of Central Asia established in 1992[235]. Since 1999 the relevant states also participate in the work of the International Fund for Saving the Aral Sea. While both bodies have had partial successes at technical level, none of them have been able to bridge the fundamental political differences surrounding divergent water uses[236].

[231] http://www.amcow-online.org/images/about/Governance%20and%20Management.pdf (accessed 12 February 2019).
[232] *See* section I.3.2.4.b) above.
[233] *Ibid.*
[234] DEL CASTILLO LABORDE (2015) *op. cit.* p. 447-449.
[235] UNECE (2011) *op. cit.* p. 14.
[236] *Ibid* p. 15.

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Chapter 5
Emerging challenges to transboundary water governance

I.5.1. Overview

The theories, laws and institutions of today's transboundary water governance regimes have evolved in relatively stable hydro-climatic conditions over the past century or so. These regimes therefore reflect *a high degree of stationarity*, an assumption that the physical design parameters of the management of international rivers are sufficiently well-known and are largely predictable.

The past few decades have, however, brought about such fundamental changes into the key factors of water management, *i.e.* natural hydrology and human uses that may render established frameworks of transboundary water governance unsuitable in the future. Order-of-magnitude increases in human population, atmospheric greenhouse gas emissions or agricultural water use – just to name a few – have triggered an unfolding *global water crisis* that is likely to have significant repercussions on co-riparian relations even in historically water-abundant, cooperative and wealthy regions of the world. Evidently, the security and political implications of the water crisis multiply in areas characterised by arid conditions, high anthropogenic water stress or political instability[237].

As a consequence, the stability of political relations among states sharing freshwater resources has recently become a major subject of interest for governments, international organisations and academia alike. Findings of empirical research on the issue in the past two decades suggest that the key determinants of transboundary water cooperation are not one (or a handful) powerful hydrological or political driver(s), such as water scarcity or unilaterism. Instead, the stability of transboundary water relations depends on the *capacity of the governance regime* in place to absorb changes that go beyond the ranges of previously observed events. Such capacity can be measured through the presence of a number of formal components of treaty design (*e.g.* allocation formula, dispute settlement mechanism, etc.) and a series of qualitative criteria (*e.g.* history of regional conflicts, relative wealth discrepancies among riparian states, etc.).

[237] *See* section I.2.2.4. above.

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Recent academic, policy and political assessments reveal that all regions of the world face significant *water security challenges* both internally and in a transboundary context. The risk of serious political conflict is likely to arise or intensify in a growing number of international river basins in the Middle East, North Africa, Central Asia, the Indian subcontinent or South East Asia. These regions are not only at high risk because of rapid changes in hydrology and the scale of human interventions, but – even more prominently – because their transboundary governance regimes are not sufficiently robust and flexible to absorb multiple and simultaneous changes. Other regions of the world are not immune from these challenges either. Changing hydroclimatic conditions are likely to force political decision-makers to revisit the fundamentals of transboundary basin management even in such politically balanced and well-watered regions as the joint watersheds between Canada and the United States or the European Union.

I.5.2. The Anthropocene and the global water crisis

I.5.2.1. The concept of the Anthropocene

"*Anthropocene*" (the "Age of Man") is a term widely used to describe the present time interval in which many geologically significant conditions and processes are fundamentally altered by human activities[238]. While not yet formally recognised as a unit of the international Geological Time Scale, the term usefully informs scientists and policy-makers about the overwhelming power and scale of man's impact on Earth generated by the sky-rocketing increase in industrial and agricultural production in the past 150 years.

The most visible of such changes is the unprecedented *increase in human population*: since the 19th century the global population has risen from one billion to over 7 billion by 2015. Currently, 80 million new fellow human beings are born annually, with the global population likely to reach 9 billion by 2050. The population boom went hand-in-hand with a massive acceleration of *urbanisation* (6 billion people are projected to be city-dwellers by 2050) that has produced a

[238] ZALASIEWICZ, Jan et al. (2017): The Working Group on the Anthropocene: Summary of evidence and interim recommendations, *Anthropocene* 19, pp. 55-60, p. 55.

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25-fold increase in megacities (urban areas with more than 10 million inhabitants) between 1950 and 2005[239].

The Anthropocene has, however, brought about a wide range of *negative environmental consequences*. These include an order-of-magnitude increase in the long-term rate of soil erosion and sedimentation, unprecedented loss of biodiversity, growth in atmospheric CO_2 concentration over a third above preindustrial level, etc. The ensuing rise in temperature has important repercussions on the state of the polar ice-sheet, glaciers and snow-packs as well as sea levels and river flows. The rate of change seems to exceed the adaptive capacities of the biosphere. Species will migrate (if they can) to trace their optimal climatic conditions, resulting in cascade-like changes in entire ecosystems both in land and sea. Coupled with other human stressors (habitat fragmentation, invasive species, etc.) accelerating climate change may trigger the sixth great extinction event on planet Earth[240].

I.5.2.2. The impacts of the Anthropocene on freshwater resources: the global water crisis

Water is one of the key environmental media through which the above negative changes are manifested. As Rockström et al. conclude in their flagship publication on planetary boundaries:

> „[t]he global freshwater cycle has entered the Anthropocene because humans are now the dominant driving force altering global scale river flow and the spatial patterns and seasonal timing of vapour flows"[241].

The UN's regular publications on water security, the *World Water Development Reports*, identify the ever increasing global demand as the main stressor on the availability and quality of freshwater resources. Expanding economies have been demanding more water for more food production, fibre and energy. The emergence of the global middle class has prompted an unsustainable increase in water use, especially in regions already characterised by water stress. Over the past decades the rate of demand for water has doubled the rate of population growth.

[239] STEFFEN, Will et al. (2015): The trajectory of the Anthropocene: The Great Acceleration, *The Anthropocene Review* 2(1), pp. 81–98, p. 83-87.
[240] ZALASIEWICZ, Jan et al. (2010): The New World of the Anthropocene, *Environ. Sci. Technol.* 44, pp. 2228-2231, p. 2229.
[241] ROCKSTRÖM, Johan et al. (2009): Planetary Boundaries: Exploring the Safe Operating Space for Humanity, *Ecology and Society* 14(2), pp. 32-65, p. 47.

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Demand for water is expected to further increase in all sectors of production. By 2030, the world is projected to face a 40% *global water deficit* (*i.e.* demand for freshwater will outreach supply by 40%), if current trajectories remain unchanged[242]. The ensuing urbanisation gives rise to special water challenges. Already, more than 50% of the world's population lives in cities where 30% of all city-dwellers reside in slums without proper access to water and sanitation. 40% of all urban expansion in developing countries is made up by slums[243].

Broken down by sector, the impacts of energy production and agriculture on water clearly stand out. Fossil, nuclear, hydro-power generation and mining are major users of water. *Energy production* accounts for 15% of water consumption today, but it is expected to rise to 20% by 2035. Globally, however, it is *agriculture* that is already the biggest water consumer, singlehandedly responsible for 70% of all freshwater withdrawals. Unless major improvements take place in water use efficiency, the water footprint of agriculture is likely to increase due to population pressure and the extension of irrigation necessitated by declining river runoffs[244]. The regional and global water of impact of agriculture is also strongly influenced by the import or export of water in raw or processed foods. While such "virtual *water*" usually fails to feature in the water balance of either the exporting or the importing country, it does have a significant overall effect on national water supply and demand[245].

Given the increased competition for water among human and economic needs *water quality* and *ecosystem integrity* is often overlooked. In most parts of the developing world population and economic growth leads to uncontrolled surface and groundwater pollution. *Groundwater*, the most widely used source of drinking water all over the world, is not only threated by such unabated pollution, but also by over-abstraction[246].

Out of the various drivers and impacts of the Anthropocene *climate change* bears special relevance as its impacts are mainly expressed through changes to hydrology. The 5th Assessment Report of the Intergovernmental Panel on Climate Change summarises the major freshwater-related risks of climate change as follows:

[242] WWAP (United Nations World Water Assessment Programme) (2015): *The United Nations World Water Development Report 2015: Water for a Sustainable World*, Paris, UNESCO, p. 11.
[243] *Ibid.*
[244] *Ibid.* p. 10-16.
[245] SZILÁGYI (2018) *op. cit.* p. 72-73.
[246] WWAP (2015) *op. cit.* p. 2.

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- dramatic decrease of renewable water resources in large areas of the world that will *intensify competition for water* among agriculture, ecosystems, settlements, industry, and energy production, affecting regional water, energy, and food security,
- *increased* exposure to 20th-century 100-year *river floods*,
- likely *increase in* the frequency of *meteorological droughts* (*i.e.* less rainfall) and *agricultural droughts* (*i.e.* less soil moisture) in presently dry regions, which is likely to result in less surface water and groundwater,
- *negative impacts on* freshwater *ecosystems* by changing stream flow and water quality,
- projected *reduction of* raw *water quality*, posing risks to drinking water quality even with conventional treatment as a result of increased temperature, increases in sediment, nutrient and pollutant loadings due to heavy rainfall, reduced dilution of pollutants during droughts, and disruption of treatment facilities during floods, etc.,
- increasing *alterations of stream flow* in regions with snowfall,
- *decrease in* total *meltwater* yields in the long run in glacierfed rivers. Continued loss of glacier ice resulting in a shift of peak discharge from summer to spring[247].

In summary: all major indicators point to the conclusion that humanity has already entered the era of a water crisis as "[g]lobal manipulations of the freshwater cycle already affect biodiversity, food, and health security and ecological functioning, carbon sequestration, and climate regulation, undermining the resilience of terrestrial and aquatic ecosystems"[248]. According to the above-mentioned "planetary boundaries" metrics while annual planetary freshwater use has not yet reached its upper physical threshold, the unused theoretically available amount may be seen as largely committed already to cover necessary human needs in the future[249].

[247] JIMÉNEZ CISNEROS, Blanca E. et al. (2014): Freshwater resources. In FIELD, C.B. et al. (Eds.): *Climate Change: Impacts, Adaptation and Vulnerability*. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge, Cambridge University Press, pp. 229-269, p. 232-234.
[248] ROCKSTRÖM et al. (2009) *op. cit.* p. 15.
[249] *Ibid.* p. 16.

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I.5.3. Political implications of the global water crisis

I.5.3.1. Concepts of water security

The human-induced global water crisis is not only manifested in terms of hydrology, but gives rise to a set of complicated *social, political and economic implications*. These complex phenomena are encapsulated by the various concepts of *water security*.

Water security is a relatively new notion that has gradually evolved from its purely military roots into a more comprehensive concept encompassing all water-related aspects of human security[250]. In view of the concept's inclusive nature the World Economic Forum describes it as the "gossamer that links together the web of food, energy, climate, economic growth, and human security challenges the world economy faces over the next two decades"[251]. Some sources underline the original (national) security aspects of the term[252]. Others, on the other hand, focus on the economic aspects of water security[253]. The most commonly used formulation of water security, however, remains the one developed by UN-Water that reads as follows:

> "[Water security is t]he capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality of water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and stability"[254].

I.5.3.2. Assessments of global water security

When it comes to the assessment of water security, the starting point is the *water endowment* of a country (basin, region, etc.). This comprises the absolute level of its freshwater availability, the fragility and strength of its freshwater ecosystems and the variability of its hydrology[255].

[250] NEWTON (2014) *op. cit.* p. 180.
[251] WORLD ECONOMIC FORUM (2011): *Water Security: The Water-Food-Energy-Climate Nexus*, Washington D.C., Island Press, p. 1.
[252] NEWTON (2014) *op. cit.* p. 182.
[253] SADOFF et al. (2015) *op. cit.* p. 16.
[254] UN-WATER (2013): *Water Security and the Global Water Agenda: A UN-Water Analytical Brief*, Hamilton, Ontario, UNU, p. 1.
[255] UN-WATER (2013) *op. cit.* p. 39-40.

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Large natural hydrological variations (droughts, floods, inter-annual and intra-annual rainfall) – that characterise *e.g.* monsoonal river basins – require major investments in physical infrastructure and complex governance regimes and mechanisms. On the other hand, a more "simple" hydrology – *i.e.* lower rainfall/river flow variability typical of temperate river basins – usually requires proportionately less efforts to secure the management of water domestically and internationally[256]. Besides natural hydrological conditions the actual availability of water is influenced by *human interventions* in equal measure. These interventions include not only water use and pollution in a given basin, but the export and import of water as a commodity or in contained other commodities (virtual water)[257]. In fact, the empirics of water management worldwide show that far too often water insecurity is caused not by the lack of water, but the political or economic capacity of a country to sustainably use its available resources[258].

Despite the vagueness of the concept and ensuing methodological challenges water security assessments are regularly carried out by international organisations, policy institutions, governments etc. at various scales. A comprehensive global picture is provided by the *World Water Development Reports*, the annual publications of the UN World Water Assessment Programme administered by UNESCO. Such reports paint a picture of growing water insecurity worldwide. The 2012 report describes in great detail the growing uncertainties with regards to the natural hydrological cycle and the concomitant management difficulties[259]. These findings are reinstated in subsequent thematic reports in the context of water and energy (2014)[260], water and sustainable development (2015)[261], water and employment (2016)[262] etc.

An assessment published by the researchers of the International Institute of Advanced Systems Analysis in 2015 provides a numerical water security scoreboard for each country. Based on their institutional coping capacities (economic power) and hydrological complexities countries have been clustered into four large water security chapters (Figure 5 below).

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[256] *See* section I.1.4. above.
[257] SZILÁGYI (2018) *op. cit.* p. 72-73.
[258] FISCHER, Günther et al. (2015): *Towards indicators for water security – A global hydro-economic classification of water challenges*, IIASA Interim Report, Laxenburg, International Institute of Applied Systems Analyis, p. 2.
[259] WWAP (United Nations World Water Assessment Programme) (2012): *The United Nations World Water Development Report 4: Managing Water under Uncertainty and Risk*, Paris, UNESCO, Volume 1, p. 77-215.
[260] WWAP (United Nations World Water Assessment Programme) (2014): *The United Nations World Water Development Report 2014: Water and Energy*, Paris, UNESCO.
[261] WWAP (2015) *op. cit.*
[262] WWAP (United Nations World Water Assessment Programme) (2016): *The United Nations World Water Development Report 2016: Water and Jobs*, Paris, UNESCO.

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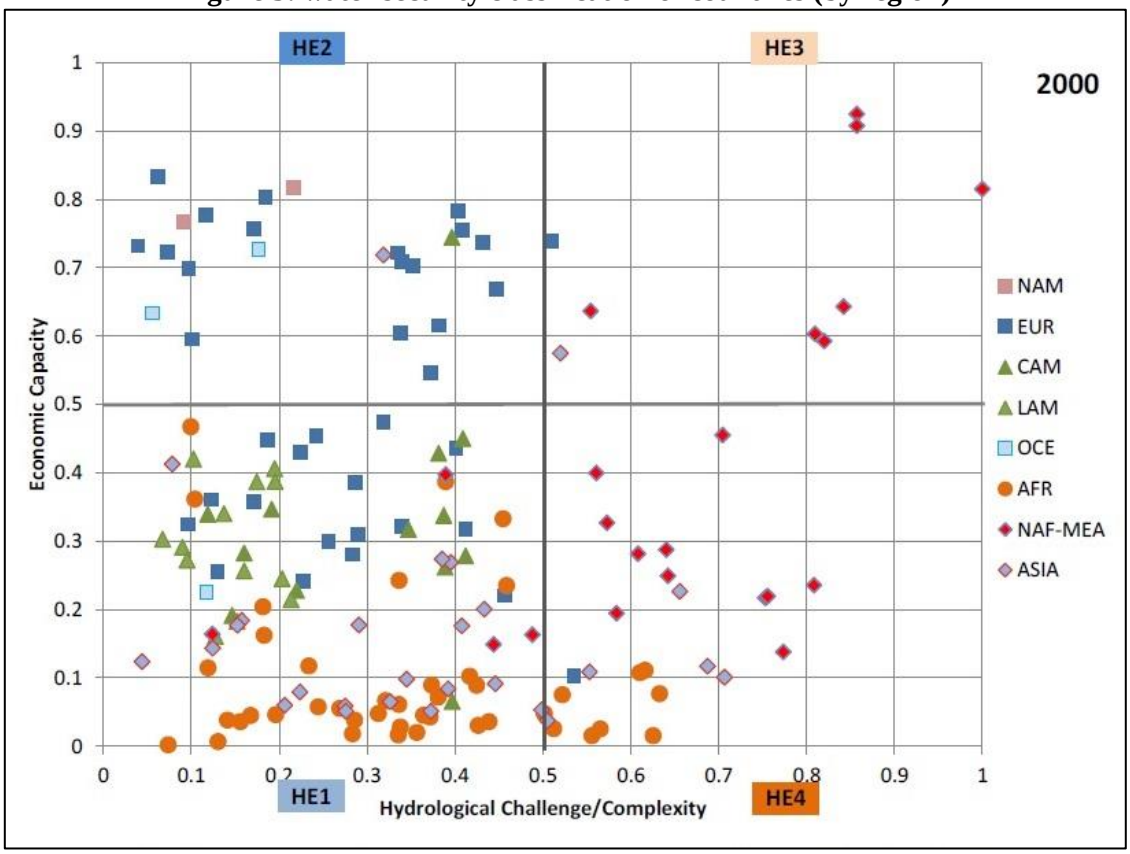
Figure 5: water security classification of countries (by region)



Legend: NAM: North America, EUR: Europe, CAM: Central America, LAM: Latin America, OCE: Oceania, AFR: Africa, NAF-MEA: North Africa – Middle East, ASIA: Asia.
Source: FISCHER et al. (2015) *op. cit.* p. 14.

Countries that are characterised both with complex hydrology and low institutional coping capacity display the highest degree of water insecurity. These include several states in northern Africa (Egypt, Algeria), the Middle East (Iraq, Syria, Yemen, Jordan), Sub-Saharan Africa (Niger, Somalia, Sudan) and Asia (India, Pakistan). These countries account for 27% of the world's population (HE4). The largest group of countries, hosting over half of the global population, is made up by states with relatively low capacity to address water challenges. At the same time, however, the hydrological challenges they face appear less complicated too. This group of states comprises large and populous countries from all over the world including China, Indonesia, Russia, Brazil, Mexico, Nigeria, Turkey, Thailand or Vietnam (HE1). A small number of countries are characterised with high water complexities but also with considerable economic and institutional coping capacities to address even massive water security challenges. These include South Korea, Belgium, Saudi Arabia, Israel and the United Arab Emirates, accounting for less 2% of the world's population (HE3). Finally, most countries of the global west, such the United States, Japan, Germany, France, Canada display relatively low exposure

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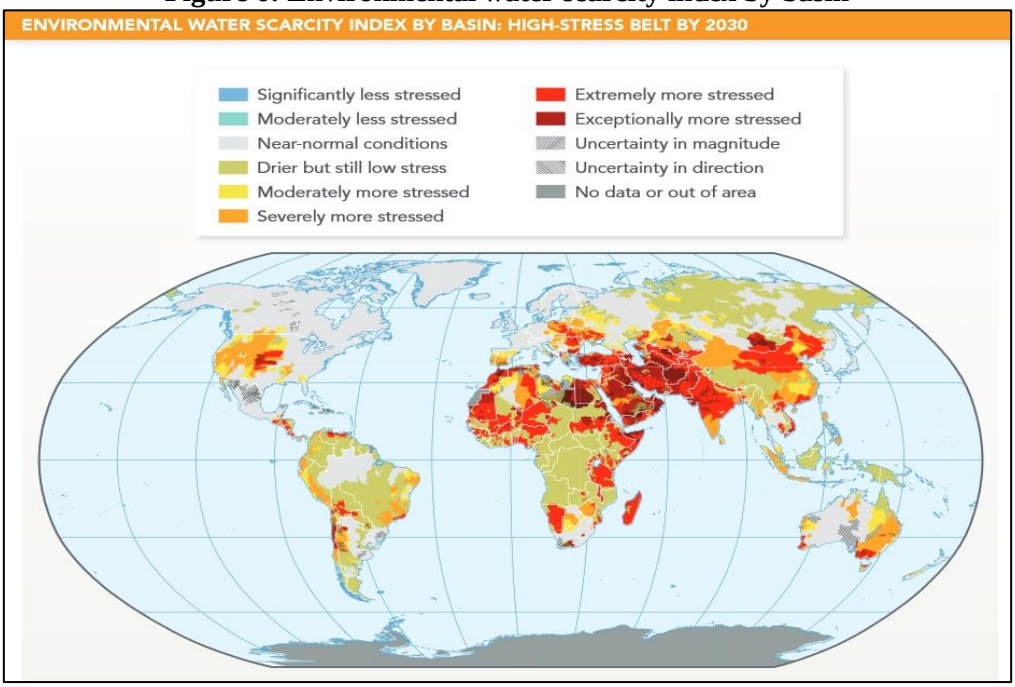
to water-related risks in view of their modest hydrological complexities and high coping capacities (HE2)[263].

Other dedicated assessments on water security arrive at similar conclusions. The GWP/OECD Task Force on Water Security and Sustainable Growth – measuring water insecurity with reference to droughts and scarcity, floods, inadequate water supply and sanitation, ecosystem degradation and pollution – concluded in 2015 that aggregate water security risks (including access to water and sanitation) were highest in China, India and Pakistan. In terms of economic impact the African continent is likely to be hit hardest, with Central and Eastern Africa displaying the highest degree of water insecurity[264]. The risks of real water scarcity are the most severe in south Asia and northern China. India and Pakistan are particularly exposed in view of their ever-growing demand for irrigation water. Hydroclimatic variability will have a particularly high impact on the stability of crop production in Africa, South America, central Asia and some parts of Europe will also be severely affected[265].

Figure 6: Environmental water scarcity index by basin



Source: US NATIONAL INTELLIGENCE COUNCIL (2012b): *Global Water Security*, Intelligence Community Assessment, Washington D.C., p. 69

As regards ecosystem degradation and pollution most indicators show high risks in all populated areas of the world. For aggregated pollution hazards the eastern United States, the whole of Europe, the Indian sub-continent, China and the Mekong basin are at the highest risk

[263] FISCHER et al. (2015) *op. cit.* p. 14, 16.
[264] SADOFF at al. (2015) *op. cit.* p. 105-107, Figures 35-36, Tables 4-5.
[265] *Ibid* p. 77.

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category. As regards environmental flow requirements the hotspots are slightly different. All arid and semiarid regions of the world are experiencing serious violations of environmental flow requirements, including the western United States, the Iberian Peninsula, central Asia, South Africa, the Tigris-Euphrates basin, much of the Indian subcontinent, China's main river basins or eastern Australia[266] (Figure 6).

I.5.3.3. Political implications of the global water crisis and the growing water insecurity

The potential gravity of the effects of the global water crisis on global political security is such that it has prompted some commentators to describe the present situation as a "hydro-climatic time bomb"[267]. A 2012 publication of the *US National Intelligence Council* identifies four megatrends that will critically shape our world by 2030. Three of these megatrends are social-political in nature (individual empowerment, diffusion of power, demographic patterns), only one relates to the physical environment: the growing *food, water and energy nexus*[268]. In view of the projected 40% increase in demand for water and the intensification of severe weather patterns described above, many countries probably will not be able to avoid water and food shortages without massive external help. The fact that nearly half of the world's population will live in areas experiencing severe water stress (Figure 5) will affect not only already fragile states in Africa and the Middle East, but China and India will also turn vulnerable. As a result, concludes the study, "water may become a more significant source of contention than energy or minerals out to 2030 at both the intrastate and interstate levels". The fact that the highest degree of water stress is expected to emerge in shared river basins raises the potential of interstate conflict, despite the fact that historically water tensions have led to more water-sharing agreements than violent conflicts[269].

While water-related state-to-state conflicts are unlikely to erupt in the next decade, water will be increasingly used as leverage and to obtain/increase regional influence by states in regions of difficult hydrology[270]. This can take several shapes, but constructing or halting major water

[266] VÖRÖSMARTY, Charles et al. (2000): Global Water Resources: Vulnerability from Climate Change and Population Growth, *Science* 289, pp. 284-288, p. 285.
[267] BIGAS, Harriet (Ed.) (2012): *The Global Water Crisis: Addressing an Urgent Security Issue*, Papers for the InterAction Council, 2011-2012, Hamilton, Ontario, UNU, p. 15.
[268] US NATIONAL INTELLIGENCE COUNCIL (2012a): *Global Trends 2030: Alternative Worlds*, Washington D.C., p. iv-v.
[269] *Ibid* p. 66-67.
[270] US NATIONAL INTELLIGENCE COUNCIL (2012b): *Global Water Security*, Intelligence Community Assessment, Washington D.C., p. 3.

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infrastructure projects that manipulate transboundary water flows are expected to continue as a major tool of intra-basin politics[271]. In terms of domestic politics water can be a powerful precursor to national instability. Water problems, when combined with poverty, social tensions, environmental degradation, weak political institutions, etc. contribute to social disruptions that can result in state failure. Consequently, growing water insecurity will be a destabilising factor in many countries that, in turn, is likely to spill over to inter-state relations[272].

In view of the above it is not surprising that the 2015 Global Risks Report of the *World Economic Forum* ranked water crisis as the number one global risk in terms of impact and number eight in terms of likelihood[273], highlighting its potential to trigger major interstate challenges such as large scale involuntary migrations. Similarly, in the 2016, 2016 and 2018 reports water crisis featured top ten in terms of likelihood together with the failure to mitigate and adapt to climate change[274].

I.5.4. The global water crisis in a transboundary context: hydropolitical resilience or vulnerability?

I.5.4.1. Concepts of hydropolitical resilience and vulnerability

Transboundary water governance is one of the most complicated and delicate challenges of interstate relations even at best of times. However, the scientific findings cited above suggest that altered precipitation patterns and other human interventions will render future river flow variability outside the bounds of previously observed events. This may seriously test the balance of co-riparian relations all over the world as most of the world's technical and political instruments to govern/manage shared basins have been based on the historic experience that river runoffs fluctuate within predictable ranges of variability. With hydro-climatic *stationarity* declared *dead*, the question arises whether and how countries will be able to cope with the new dynamics that the various impacts of the Antrophocene inject into transboundary water relations[275].

[271] *Ibid* p. 4.
[272] *Ibid* p. 3.
[273] WORLD ECONOMIC FORUM (2015): *Global Risks 2015*, 10th Edition, Geneva, Table 1.
[274] WORLD ECONOMIC FORUM (2016): *Global Risks 2016*, 11th Edition, Geneva, Figure 1, WORLD ECONOMIC FORUM (2017): *Global Risks 2017*, 12th Edition, Geneva, Figure 1, WORLD ECONOMIC FORUM (2018): *Global Risks 2018*, 13th Edition, Geneva, Figure 1.
[275] MILLY, Paul C. D. et al. (2008): Stationarity is Dead: Whiter Water Management? *Science* 319 pp. 573-579, p. 573.

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The ability of a basin or a region to cope with emerging water-related political challenges has been expressed through the notion of *hydropolitical resilience* and *vulnerability*, a concept developed by scholars of hydropolitics[276]. The point of departure of the hydopolitical resilience thinking – formulated most clearly by the Oregon School under the leadership of Aaron Wolf – is the contention that a basin's capacity to absorb stress can be best expressed in terms of its *institutional capacity*[277]. Where the rate of change within the basin exceeds the institutional capacity to absorb that change the likelihood of conflict rises. Importantly, such changes can be linked to a wide range of physical or political stress indicators: environmental change, asymmetric economic growth, unilateral implementation of major projects or decline of political relations. In other words, while certain phenomena are more likely to trigger conflict than others (almost 90% of all conflicts on record relate to water quantity and infrastructure), there is no single precursor (*e.g.* scarcity) that mechanically creates disputes among riparian states. Instead, it is "very rapid changes, either on the institutional side or in the physical system, that outpace the institutional capacity to absorb those changes [that] are at the root of most water conflict"[278].

Thus, *hydropolitical vulnerability* can be defined as the risk of political disputes over shared water resources. *Hydropolitical resilience*, conversely, denotes the ability of the same basin's human-environmental system to adapt to changes within that system[279]. In other words, a capacity to withstand and recover from stresses so as to continue its function to prevent or resolve political disputes in a given shared basin[280].

I.5.4.2. Building blocks of hydropolitical resilience and vulnerability

If we accept that institutions or "regimes" (*i.e.* the collection of norms, formal institutions and mechanisms) constitute the backbone of the resilience of co-riparian relations, the question arises whether such resilience can be measured and, if so, through which indicators.

[276] *See* section I.2.2.3. b) above.
[277] TURTON (2008) *op. cit.* p. 24.
[278] WOLF (2009) *op. cit.* p. 12.
[279] *Ibid* p. 4.
[280] *See* section III.1.2.1. below.

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The various *hydropolitical schools* use diverse assessment matrixes composed of certain formal/normative elements that, based on empirical evidence, are supposed to point to the presence or the lack of basin-wide political resilience.

Ken Conca from the so-called Maryland School identifies the following core normative elements for the empirical analysis of transboundary governance regimes:

- the equitable use principle,
- the no-harm principle,
- sovereign equality and territorial integrity,
- information exchange,
- consultation with other riparian states,
- prior notification,
- environmental protection,
- peaceful resolution of disputes[281].

The Mumbai-based *Strategic Foresight Group*, an international think-tank, carries out a systematic global assessment of river basin cooperation, using the following indicators:

- formal agreement,
- river basin commission,
- ministerial meetings,
- technical projects,
- joint monitoring of water flows,
- floods, dams and reservoirs,
- high political commitment,
- integration into economic cooperation,
- actual functioning[282].

Others also include various political aspects (political stability, transparency and accountability, diplomatic relations), sociological factors (epistemic communities) or geo-physical parameters (external water dependency, ratio of external to total renewable water)[283].

[281] CONCA (2006) *op. cit.* p. 110-111.
[282] STRATEGIC FORESIGHT GROUP (2015) *op. cit.* p. 12-14.
[283] MILMAN, Anita et al. (2012): *Adaptive Capacity of Transboundary Basins in the Mediterranean, the Middle East and the Sahel,* Tyndall Working Paper 151, Norwich, University of East Anglia, p. 8, Table 8.

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The *Oregon School* uses similar indicators to map the potential political vulnerability of transboundary river basins. De Stefano et al. identified the following *minimum core normative elements* of multi- or bilateral water cooperation mechanisms that seem necessary to provide sufficient flexibility for riparians to manage changing hydro-political conditions[284]:

- *presence of a water treaty:* any formal agreement among sovereign states that substantively covers water management issues. These may be basin treaties, frontier water treaties, bilateral cooperation treaties that cover substantial water issues, etc.[285],
- *mechanisms for water allocation:* treaty stipulations on methods and/or processes for the allocation of river flow quantities between riparians. These can be direct allocation rules (*i.e.* an amount of water fixed) as well as indirect allocation methods (principles of water sharing, prioritisation of uses) and procedures[286],
- *mechanisms for variability management:* mechanisms designed to deal with climatic extremes, such as droughts, floods or other specific variations. Variability management can include substantive obligations and procedures alike. The former includes water allocation adjustments, stricter irrigation procedures, specific reservoir releases, etc. The related procedures include immediate consultations, data sharing, transboundary warning systems, risk management planning, etc.[287],
- *conflict resolution mechanisms:* mechanisms to address disagreements among signatories, including consultations, engagement of third parties, compliance mechanisms, arbitration or the acceptance of the jurisdiction of the International Court of Justice, etc.[288],
- *presence of a river basin organisation:* these include joint commissions, governing councils, directorates, joint basin authorities, etc., *i.e.* any bilateral or multilateral body comprised by the representatives of riparian governments with a competence over basin issues[289].

Thus, according to this matrix, institutional resilience is determined in a significant way by *treaty design*. If a given treaty framework is sufficiently robust, yet flexible enough to

[284] DE STEFANO et al. (2012) *op. cit.* p. 199, Table I.
[285] Under the system of SDG 6 (*see* section I.4.3.1. above) these are summarised as "an arrangement for water cooperation [in the form of] a bilateral or multilateral treaty, convention, agreement or other formal arrangement between riparian countries that provides a framework for cooperation". Source: http://www.sdg6monitoring.org/indicators/target-65/indicators652/ (accessed 12 February 2019).
[286] *See* section III.2.1.1. below.
[287] *See* section III.2.4.1. below.
[288] *See* section III.2.5.1. below.
[289] *See* section I.4.2. above.

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accommodate changing hydro-climatic realities, it is likely to ensure resilience even in the face of increased water variability[290]. Naturally, no assessment based exclusively on such normative indicators can provide a nuanced picture of the resilience of a particular cooperation regime without an in-depth analysis of its *actual operation*[291]. Recent mathematical analyses carried out by Shlomi Dinar and colleagues found that, for example, that the lack of an allocation mechanism does not automatically bode lower hydropolitical resilience as it may also reflect the fact that the basin is sufficiently and evenly watered (*i.e.* the need for allocation mechanisms does not even arise). In contrast, allocation mechanisms that are either too rigid or too vague may actually increase vulnerability as they fail to adequately respond to the very challenge they were designed to solve[292]. Consequently, in order to draw robust conclusions on hydropolitical resilience and vulnerability based on the raw indicators of treaty design the initial findings must always be embedded in the concrete hydrological and geo-political context of the international river basin at issue.

Yet, the high degree of convergence among the findings of the various hydropolitical assessments summarised below suggests that irrespective of these limitations the use of formal indicators is a suitable instrument to map out *fundamental vulnerabilities* in co-riparian relations.

I.5.4.3. Mapping hydropolitical resilience and vulnerability

The most comprehensive and detailed global mapping of hydropolitical vulnerability thus far has been carried out by the *United Nations Environment Programme* (UNEP) that, together with the Oregon State University and the University of Dundee, undertook, between 2005 and 2009, an extensive analysis of the hydro-political risks in Africa, Latin America, North America, the Caribbean, Asia and Europe[293]. Similarly, a comprehensive analysis of the risks of transboundary water governance has also been commissioned by the *World Bank*. The study, published in 2010, aimed at drawing a global picture of hydropolitical risks[294]. In the years to

[290] DINAR et al. (2014) *op. cit.* p. 5.
[291] *See* section III.1.2.2. below.
[292] DINAR et al. (2014) *op. cit.* p. 20-23.
[293] *See* section I.4.3.1. above.
[294] DE STEFANO, Lucia et al. (2010): *Mapping the Resilience of International River Basins to Future Climate Change-Induced Water Variability,* World Bank Water Sector Board Discussion Paper Series, Paper No. 15., Washington D.C., The World Bank.

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follow the findings of these studies have been further refined by a series of publications on global hydropolitical resilience[295].

A thorough multiannual assessment of global hydro-political stability has also been carried out by the Mumbai-based *Strategic Foresight Group* using a slightly different methodology. Their results are broken down to individual river basins and countries and can be easily accessed through an interactive *global water cooperation map*[296]. In addition, numerous assessments have been made with regard to specific regions and individual basins that already are or may turn into political hotspots (European Union[297], Middle East, Sahel[298], the Himalayas[299], etc.).

The main findings of the above hydropolitical surveys can be broken down to two fundamental conclusions:

- cooperation, rather than conflict, is the dominant feature of co-riparian relations,
- risks to transboundary water cooperation are growing in most parts of the world.

First, statistical evidence confirms that differences over transboundary waters are more likely to result in cooperation than conflict[300]. On record, the number of acute conflicts over water has been significantly lower than instances of cooperation. The extensive qualitative research by Aaron Wolf and colleagues reveals that the period between 1960 and 2010 saw only 37 acute disputes (involving violence); of those 30 were between Israel and one or another of its neighbours and the violence ended in 1970. Non-Middle East cases accounted for five acute events only. Almost 90% of all conflicts on record relate to water quantity and infrastructure. The 507 conflict-related events identified are grossly outnumbered by the nearly 1300 cooperative events (treaties, projects, institutions, joint initiatives, etc.) accounted for during the same period[301]. The *high rate of cooperation* is also eloquently illustrated by the constantly growing number of bilateral or basin treaties and basin institutions. As outlined above, the past 50 years shows that about 30 new water agreements are signed every decade that results in a

[295] *E.g.* DE STEFANO et al. (2012) *op.cit.*; DINAR et al. (2014) *op.cit.*
[296] STRATEGIC FORESIGHT GROUP (2015) *op. cit.* For the visual illustration *see:* http://strategicforesight.com/water-cooperation-map/ (accessed 12 February 2019).
[297] WRC plc (2012): International Coordination (Part V). In WRC plc: *Comparative Study of Pressures and Measures in the Major River Basin Management Plans*, pp. 145-176.
[298] MILMAN et al. (2012) *op. cit.*
[299] STRATEGIC FORESIGHT GROUP (2011): *Himalayan Solutions Co-operation and Security in River Basins*, Mumbai.
[300] WOLF (2009) *op. cit.* p. 7.
[301] *Ibid*.

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high treaty coverage todays (70% of the world's transboundary areas, 80% of the people living in those regions)[302]. A similar token of the cooperative behaviour of riparian states is the steady increase in the number of river basin organisations worldwide[303].

Yet, the application of the various resilience indicators to emerging hydro-climatic challenges also shows that *hydropolitical vulnerabilities* exist in all regions of the world and they are likely to increase. Based on the five above-mentioned vulnerability indicators De Stefano et al. identified 24 transboundary basins with high potential risk for interstate tensions associated with water variability. These are mainly concentrated in northern and sub-Saharan Africa. The basins displaying the lowest levels of risks are primarily found in western and central Europe, along the USA–Canada border and in Southeast Asia (Figure 7). Yet, even the (supposedly) more resilient regions of the world face significant challenges today. *E.g.* one third of European population lives in basins that are covered only by very basic treaties whose ability to handle complex changes in the watershed remains limited[304].

Figure 7: Distribution of treaties and river basin organisation components by continent (%)

Individual treaty and RBO components	Continent				
	Africa	Asia	Europe	N. America	S. America
At least one water treaty	50	40	69	64	32
Allocation	25	25	33	42	14
Variability mgmt.	20	18	34	15	6
Conflict resolution	35	25	49	44	15
At least one RBO	40	19	32	56	22

Source: DE STEFANO et al. (2012) *op. cit.* p. 200, Table II.

By 2050 high risks of conflict will be spatially more dispersed, extending to 61 international basins (instead of 24 today). Importantly, many future high impact areas will be outside today's hydropolitical hotspots. Thus, in 2050 only half of high risk basins will be in Africa, the rest being distributed between Latin America, Europe and Western Asia. In fact, seven European basins, mostly in the central and eastern part of the continent, will also be characterised by the highest level of political risk by 2050[305].

[302] *See* section I.3.2.4. above.
[303] *See* section I.4.2.2. above.
[304] DE STEFANO et al. (2012) *op. cit.* p. 200.
[305] *Ibid* p. 202.

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The findings of the above assessment concur with those of other global surveys on the subject. *E.g.* a research paper issued in 2012 by the US National Intelligence Council singles out the following international basins that are likely to post the greatest transboundary security challenges up to 2040: the Indus, the Jordan, the Mekong, the Nile, the Tigris-Euphrates, the Amu Darya and the Brahmaputra[306]. All of these basins are expected to witness degraded food security, reduced resilience to floods and droughts and continuing regional tensions. Importantly, the institutional capacity of these basins can be judged as moderate at best, but mainly limited or inadequate[307]. A 2014 study by Adelphi, a consultancy, commissioned by the German Federal Foreign Office also identified the same hotspots of potential transboundary conflicts[308]. The Strategic Foresight Group goes further in its analysis in so far as it tries to predict the risk and the direction of armed conflict over shared water resources around the world. Based on their assessment the following countries may be inclined to engage in combat for water: (Middle East) Turkey→Syria, Iraq; Syria→Israel, Turkey, Jordan; Israel→Palestine, Lebanon, Syria; Jordan→Syria; Palestine→Israel; Iraq→Turkey; (Asia) Afghanistan→Pakistan; Pakistan→Afghanistan, India; India→Pakistan, China; China→India, Vietnam; Vietnam→China; North Korea→South Korea; South Korea→North Korea; (Africa) Algeria→Morocco; Morocco→Algeria; Sudan→South Sudan; South Sudan→Sudan; Eritrea→Ethiopia, Djibouti; Ethiopia→Eritrea, Somalia; Djibouti→Ereitrea, Somalia; Somalia→Ethiopia[309].

[306] US NATIONAL INTELLIGENCE COUNCIL (2012a) *op. cit.* p. v.
[307] *Ibid*.
[308] ADELPHI (2014): *The Rise of Hydro-Diplomacy - Strengthening foreign policy for transboundary waters,* Climate Diplomacy Report, Berlin, p. 8.
[309] STRATEGIC FORESIGHT GROUP (2015) *op. cit.* p. 27-33.

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PART II
TRANSBOUNDARY WATER GOVERNANCE IN THE EUROPEAN UNION: AN OVERVIEW

Chapter 1
Transboundary river basins in the European Union and the impacts of the Anthropocene

II.1.1. Transboundary river basins in the European Union

Despite its relatively small size, the European continent has the *highest number of international river basins* among all UN regions in the world. The Transboundary Freshwater Dispute Database accounts for 69 transboundary basins[310], while a 2012 study commissioned by the European Commission on the subject identifies 75 international river basins in Europe[311].

Although the European continent itself is much larger than the European Union, the concentration of international basins within the EU still remains very high in global comparison. This is due to the fact that – apart from the three large rivers of the eastern European plains (Volga, Dniester, Don) and four Caucasian basins (three of which are very small) – the majority of Europe's international basins are in fact found (at least partly) within the boundaries of EU member states (Figure 8). These international basins cover around 60% of EU territory, expanding to about 3.3 million km^2. Out of the continent's 75 basins 24 (30%) are shared by EU member states only[312].

Naturally, these basins vary greatly in terms of size, hydrological conditions and political complexity. *E.g.* the Danube catchment area (with over 800 000 km^2) alone makes up 25% of the total EU international basin area, while another five rivers (Rhine, Vistula, Elbe, Oder, Nemunas) cover another 25%[313]. The Danube basin has 19 riparian states, with 14 countries actually having more than 2000 km^2 of the entire catchment area. The Danube is followed by

[310] *See* section I.I.3. above.
[311] WRC (2012) *op. cit.* p. 155. Importantly, this study was not conceived as a complete register of international river basins, but as a compilation of "representative set of international European river basins" for the analysis of international coordination mechanisms in Europe (*Ibid* p. 148). Consequently, international river basins where the relative share of the smaller riparian was considered insignificant, were omitted altogether, except the Swedish-Norwegian basins that all pertain to a comprehensive bilateral governance regime.
[312] *Ibid* p. 154.
[313] *Ibid* p. 173.

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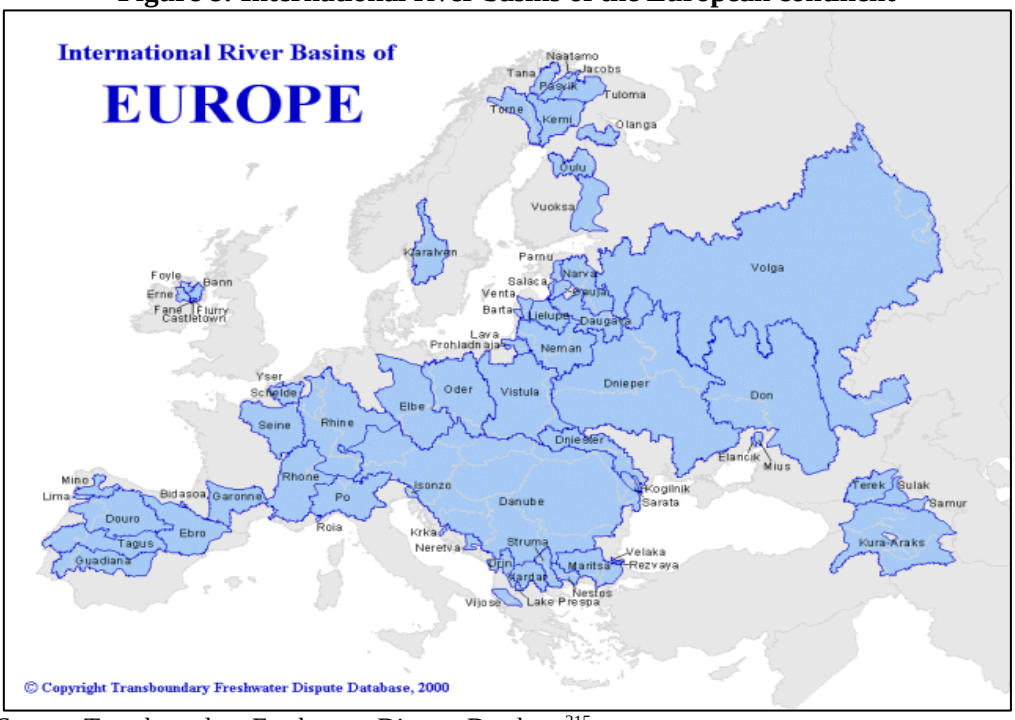
the Rhine (9 riparian states), the Meuse (5 riparian states), the Ems, the Daugava, the Nemunas and the Struma (each shared by 4 countries). The remainder of the (partly) EU river basins are shared by two or three countries only[314].

Figure 8: International river basins of the European continent



Source: Transboundary Freshwater Dispute Database[315]

The hydro-geological diversity of the continent results in a very high transboundary exposure in most parts of the EU. Germany, Greece, Luxembourg and Portugal receive 40% of their surface waters from abroad, the Netherlands and Slovakia 80% while Hungary 95%! In 16 EU member states more than 90% of the territory is located in an international river basin[316].

II.1.2. The state of freshwaters in the European Union: a snapshot

Thanks to the EU's extensive monitoring mechanisms the European Commission and the European Environment Agency ("EEA") produce detailed regular analyses on the state of freshwater resources in the Union. Below is a brief summary of the main recent reports, broken down by *water availability and water use*, *water quality* and *hydro-morphological status*.

[314] *Ibid* p. 158.
[315] Product of the Transboundary Freshwater Dispute Database, College of Earth, Ocean, and Atmospheric Sciences, Oregon State University. Additional information about the TFDD can be found at: http://transboundarywaters.science.oregonstate.edu.
[316] RIEU-CLARKE, Alistair (2009): Challenges to Europe's Water Resources. In UNEP: *Hydropolitical Vulnerability and Resilience along International Waters – Europe*, Nairobi, pp. 17-28, p. 17-19, p. 18.

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II.1.2.1. Water availability and water use

The European continent is generally considered a water abundant region, with 3,200 m^3 of water available annually for every European citizen[317]. However, as any other average figure of its kind, this number hides large differences between regions, basins and users. How much water is actually available in the EU's various regions is defined by the combined effect of precipitation, river flow and storage.

Precipitation varies widely in the EU, ranging from less than 400 mm/year in parts of the Mediterranean region and the central plains of Europe to more than 1 000 mm/year along the Atlantic shores from Spain to Norway, the Alps and their eastern extension. Precipitation in Europe has generally increased during the 20th century, rising by 6-8 % on average between 1901 and 2005. During the same period, however, some areas – notably the Mediterranean and eastern Europe – have witnessed a loss of rain and snowfall[318].

Variations in *river flow – i.e.* the quantity of freshwater resources within a basin – are determined mainly by precipitation and temperature, as well as by catchment characteristics such as geology, soils and land cover. Average river flow across Europe is about 450 mm/year but this varies significantly, ranging from less than 50 mm/year in southern Spain to more than 1500 mm/year in parts of the Atlantic coast and the Alps. Annual flows have risen in the northern parts of Europe, with increases mainly in winter, but have shown a decreasing trend in the southern regions of Europe. In most parts of the EU river basins have been subject to significant human alterations with a lasting impact on flows[319]. The natural water storage or *retention capacity* of the various regions of the EU is changing considerably too. *E.g.* the Alps, that singlehandedly provides 40% of Europe's fresh surface water, have experienced temperature increases twice the global average (1.48 °C) in the last hundred years. Glaciers are melting, the snowline is rising and the mountain range is gradually changing the way it collects and stores water in winter and distributes it in the summer months[320].

[317] RIEU-CLARKE (2009) *op. cit.* p. 19.
[318] EUROPEAN ENVIRONMENT AGENCY (2009): *Water resources across Europe – confronting water scarcity and drought*, EEA Report No. 2/2009, Copenhagen, p. 11.
[319] *Ibid* p. 13.
[320] *Ibid* p. 14.

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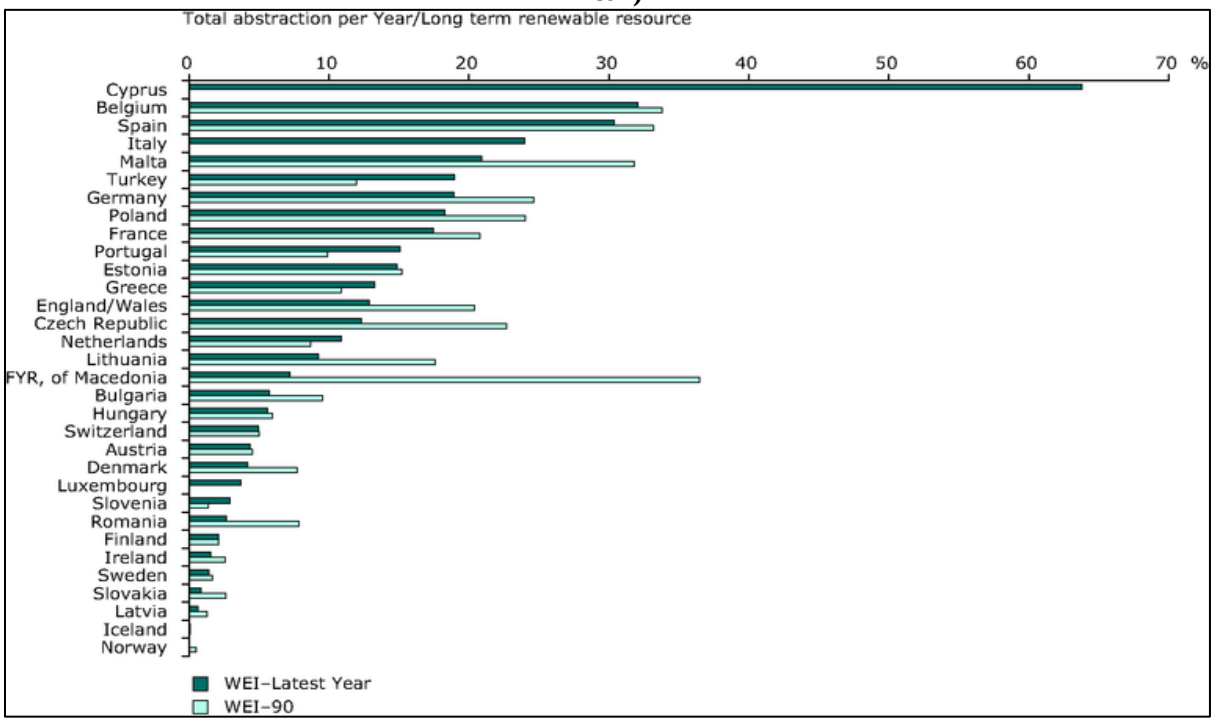
The largest share – 44% – of the water abstracted in the EU is used for *energy production* and is mostly returned to the original water body. The second biggest water consuming sector is *agriculture* responsible for 24% of the water (here, the water is mostly consumed). 21% is used for *public water supply* and 11% is used by *industry*. Naturally, these general figures obscure gross geographical disparities. In central and western Europe energy production is the largest user of water (over 50%), followed by public water supply and industry. In southern Europe, however, agriculture is by far the biggest consumer, responsible for over 60% of all abstractions. The EU's main source of water is *surface water*, accounting for 80% of the total amount used. Energy production relies on surface water almost exclusively. More than 75% of the water used in industry and agriculture comes from surface sources too. On the other hand, *groundwater* remains the predominant source of public water supply (55%)[321].

Figure 9: Annual total water abstraction as a percentage of available long-term freshwater resources around 1990 (WEI-90) compared to latest year available (1998–2007) (WEI-Latest Year)



Source: http://www.eea.europa.eu/data-and-maps/figures/water-exploitation-index-wei-3 (accessed 2 May 2018)

In view of the above figures the question arises whether Europe actually faces a water crisis. This can, among others, be assessed through the so-called *water exploitation index* ("WEI"), a commonly used measure of pressures on freshwater resources, calculated as the ratio of total

[321] *Ibid.*

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freshwater abstraction to the total renewable resource. WEI figures above 20% indicate water stress while values above 40% show severe water stress. The EEA's relevant summary shows that Cyprus has the highest WEI (over 60%), followed by Belgium, Spain and Italy (Figure 9). Importantly, WEIs have been developed for individual river basins too. According to the 2007 data of the EEA all major southern European basins have a WEI over 40% (some reaching a staggering 160%!), and several western European basins, including the Rhine, Meuse, Rhone, Elbe, Seine, Oder are above the warning threshold of 20%[322].

II.1.2.2. Water quality

Tackling Europe's *persistent water pollutions* problems has been in the forefront of the EU's water policy in the past four decades. Pollutants arise from a wide range of sources, including agriculture, industry, households and the transport sector. During the last 25 years, however, *significant progress* has been made in reducing the pollution of numerous European water bodies. This progress is due to improved wastewater treatment, reduced volumes of industrial effluents, decrease in the use of fertilisers, reduced or banned phosphate content in detergents, as well as declining atmospheric emissions[323]. The successful implementation of the EU's water legislation, especially the *Urban Waste Water Directive*[324], has resulted in reduced point discharges of nutrients and organic pollution into freshwaters[325]. Nevertheless, discharges from wastewater treatment plants and industries and the overflow of wastewater from sewage systems still cause significant pollution: 22% of water bodies are still exposed to high *point sources pollution*. Despite some progress in reducing agricultural inputs of pollutants, *diffuse pollution* from agriculture is a major pressure in more than 40% of the EU's rivers and coastal waters as well as in 30% of in lakes and transitional waters[326].

This means that more than half of the EU's *surface water* bodies are reported to be *below* good ecological status or good ecological potential (for heavily modified or artificial water bodies) under the Water Framework Directive, the EU's comprehensive water legislation[327]. Rivers are generally in a worse ecological status than lakes. The most polluted water bodies can be found

[322] *Ibid* p. 18.
[323] EUROPEAN ENVIRONMENT AGENCY (2012a): *European waters – assessment of status and pressures*, EEA Report No. 8/2012, Copenhagen, p. 8.
[324] *See* section II.2.3.3. below.
[325] EUROPEAN ENVIRONMENT AGENCY (2012a) *op. cit.* p. 8.
[326] *Ibid* p. 8-9.
[327] *See* section II.2.3.3. below.

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in central and north-western Europe, corresponding to high population densities and intensive agricultural practices with high fertiliser input and nitrate concentration[328]. As for groundwater, despite important improvements with regards to some major sources of pollution, around 25% of Europe's *groundwater* bodies are still of poor chemical status according to the Water Framework Directive. Excessive levels of nitrates are the most frequent cause of poor groundwater status across much of the European Union[329].

II.1.2.3. Hydromorphology

European water bodies have been modified for centuries for a variety of objectives such as *irrigation, hydropower, navigation, flood protection* or *urban development*. Such modifications can take a multitude of forms such as straightening and canalisation, disconnection of floodplains, land reclamation, dams, reservoirs, bank reinforcement, etc. All of them, however, result in some sort of damage to the natural morphology and hydrology of the water bodies concerned. The extent of such damage has been such that today *hydromorphological changes* and altered habitats constitute the most commonly occurring pressures in EU surface waters, affecting around 40% of rivers and 30% of lakes[330].

Particularly significant are the interventions that regulate water flow or water level. The seasonal or daily *flow regimes* of a large number of European rivers have been altered in a major way. Most common modifications have taken place through impoundments (there are several hundreds of thousands of barriers and transverse structures in European rivers), abstractions, drainage return flows, etc.[331] The various artificial morphological changes in natural surface water bodies result in altered sediment movements that, again, affect their ecological status as well as impair critical human uses (*e.g.* siltation of reservoirs and navigable waterways)[332]. Given the expanse of morphological interventions a high number of EU freshwater bodies have been classified as *heavily modified* or *artificial* under the Water Framework Directive (Figure 10).

[328] EUROPEAN ENVIRONMENT AGENCY (2012a) *op. cit.* p. 9
[329] *Ibid.*
[330] *Ibid* p. 15.
[331] *Ibid* p. 34.
[332] *Ibid* p. 35.

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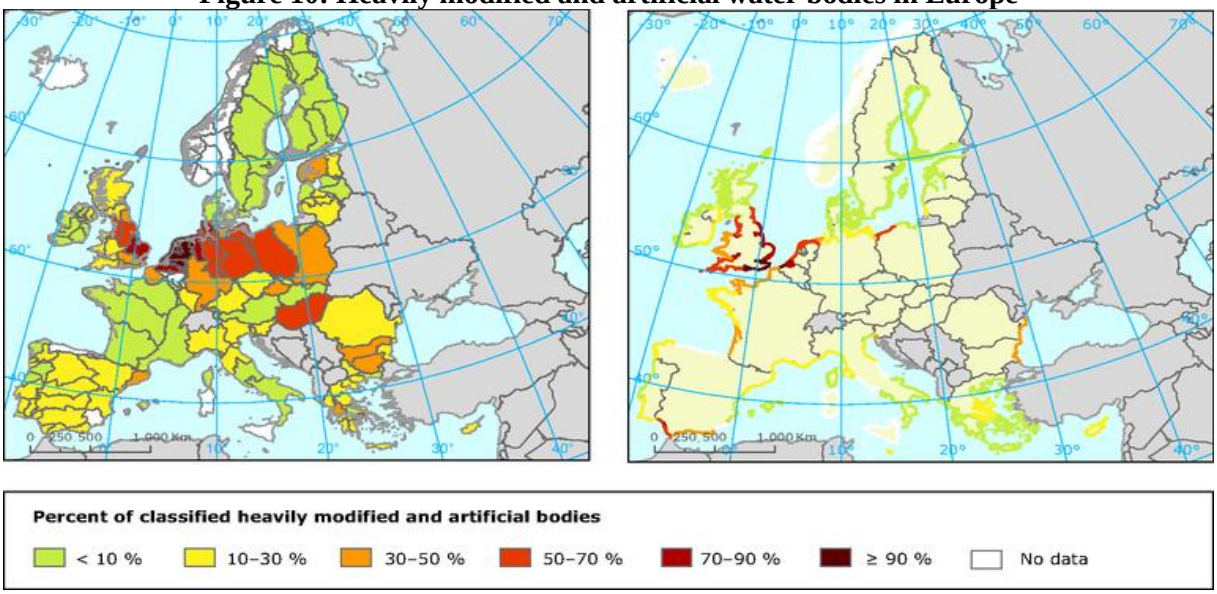
Figure 10: Heavily modified and artificial water bodies in Europe



Source: http://www.eea.europa.eu/data-and-maps/figures/percentage-of-natural-heavily-modified-1/proportion-of-heavily-modified-and/image_large (accessed 12 February 2019)

II.1.3. European water future: the impacts of the Anthropocene

The freshwater resources of the European Union are – just as elsewhere – one of the prime victims of the Anthropocene. In a 2012 report the European Environmental Agency identified the most important drivers of water vulnerability as follows: the variation of the *hydrological cycle*, *land use and land use change*, *water abstraction* and *climate change*[333]. While other pressures – most notably pollution – also remain of critical importance, the former factors nonetheless stand out in view of their capacity to irreversibly change the prevailing hydrological conditions.

In the context of climate the EEA concluded that the most important effect will be changes in the *availability of freshwater*, *i.e.* higher variability of river flows[334]. For northern Europe projections suggest less snow, lake and river ice cover, increased winter and spring river flows in some parts (*e.g.* Norway) and decreases in other parts (*e.g.* Finland) as well as greater damage by winter storms. For north-western Europe higher winter precipitation is expected to increase the intensity and frequency of winter and spring river flooding. The most severe effects will be felt in central and eastern Europe where river flow droughts are already widespread and

[333] EUROPEAN ENVIRONMENT AGENCY (2012b): *Water resources in Europe in the context of vulnerability*, EEA Report No. 11/2012, Copenhagen, p. 5.
[334] EUROPEAN ENVIRONMENT AGENCY (2012c): *Climate change, impacts and vulnerability in Europe 2012 – An indicator-based report*, EEA Report No. 12/2012, Copenhagen.

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projected to further increase with prolonged and more extreme dry periods. Decreasing water availability is projected to exacerbate water stress, especially in southern Europe. Moreover, climate change has already increased water temperatures of rivers and lakes, and has decreased ice cover (changes in stream flow and water temperature have important impacts on water quality and on freshwater ecosystems)[335].

Figure 11: Impacts of climate change on freshwater quantity and quality in Europe

Variable	What is already happening	What could happen
River flow	River flows during winter and lower river flows during summer have been recorded since the 1960s in large parts of Europe	Climate change is projected to result in strong changes in the seasonality of river flows across Europe. Summer flows are projected to decrease in most of Europe, including in regions where annual flows are projected to increase.
River floods	More than 325 major river floods have been reported for Europe since 1980, of which more than 200 have been reported since 2000.	Global warming is projected to increase the occurrence and frequency of flood events in large parts of Europe. Pluvial floods and in particular flash floods, which are triggered by local intense precipitation events, are also likely to become more frequent throughout Europe. In regions where snow accumulation during winter is projected to decrease (e.g. north-eastern Europe), the risk of early spring flooding could decrease.
Droughts	Europe has been affected by several major droughts in recent decades, such as the catastrophic drought associated with the 2003 summer heat wave in central parts of the continent and the 2005 drought in the Iberian Peninsula. Severity and frequency of droughts appear to have increased in certain areas, in particular in southern Europe.	Regions most prone to an increase in drought hazard are southern and south-eastern Europe, but minimum river flows are also projected to decrease significantly in many other parts of the continent, especially in summer.
Water temperature	Water temperature in major European rivers and lakes has increased by 1-3 °C over the last century.	Lake and river surface water temperatures are projected to increase following further increases in air temperature.
Lake and river ice cover	The duration of ice cover on European lakes and rivers has shortened at a mean rate of 12 days per century over the last 150-200 years.	A further decrease in the duration of lake ice cover is projected.
Freshwater ecosystems and water quality	Cold-water species have been observed to move northwards or to higher altitudes. Changes in life cycle events have been observed. Phytoplankton and zooplankton blooms in several European lakes are now occurring one month earlier than 30–40 years ago. Biological invasions of species (including toxic species) that originate in warmer regions have been observed.	The observed changes are projected to continue with the progress of climate change. Increases in nutrient and dissolved organic carbon concentrations in lakes and rivers may occur, but management changes can have much larger effects than climate change.

Source: EUROPEAN ENVIRONMENT AGENCY (2012c): *Climate change, impacts and vulnerability in Europe 2012 – An indicator-based report*, EEA Report No. 12/2012, Copenhagen, on the basis of p. 112-127 and 213-216.

[335] *Ibid* p. 114-116.

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In summary: *water stress* will emerge as a *widespread phenomenon* and, where it already exists, is projected to worsen. Importantly, while such negative effects can partly be reduced by water use efficiency gains (*e.g.* in the field of irrigation, industry, etc.) or trade (*e.g.* import of agricultural produce), these measures will not be sufficient to compensate for climate-induced increases in water stress[336]. At the same time, floods and the concomitant economic loss are projected to significantly increase in large parts of Europe in the future (Figure 11). In other words, while the EU as a whole is not threatened by an immediate water crisis, the *risk of severe water shortages* and other crisis phenomena is increasing even in those parts of the Union that are generally characterised by balanced hydrology.

[336] *Ibid* p. 167.

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Chapter 2
Transboundary water governance in the European Union

II.2.1. A distinct European model of transboundary water governance

II.2.1.1. Drivers of water cooperation

The normative and institutional features of transboundary water governance in the EU are determined by a number of specific hydrological and political conditions that result in a *sui generis* governance model. First of all, as shown in the previous section, the natural hydro-geographical circumstances prevailing in the EU render most of its members heavily exposed to the challenges of transboundary water management[337]. Such *high political complexity* is, however, compensated by relatively *low hydrological complexity*, *i.e.* most of Europe's international rivers – apart from the largely arid transboundary basins of the Iberian Peninsula – are relatively well-watered. Moreover, co-riparian relations within the EU have lately been largely spared from the dominant drivers of water conflicts elsewhere, such as dramatic increase in national water use, excessive manipulation of river flow, sky-rocketing urbanisation, large-scale unilateral infrastructure development or runaway climate change.

The strong intra-basin interdependencies and the relatively benign nature of the collective action problems have created a *positive political constellation* that supports bilateral and basin-wide cooperation. As a result, the European Union has become the cradle and the *global laboratory of institutionalised cross-border water management*. On top, the EU is the most elaborate supranational political-economic association in the world. Member states' sovereignty is significantly constrained by the EU's founding treaties and the jurisprudence of the European Court of Justice. Consequently, member states cooperate routinely on a multitude of issues through established multilateral channels. Such close and *highly institutionalised horizontal collaboration* creates complex interlinkages among issues and countries that act as a natural break against the emergence of exceedingly conflictual interstate disputes in general. Finally, EU member states are *highly industrialised, high income countries*, with no apparent political or economic hegemon in the bloc. The outstanding level of economic development,

[337] *See* section II.1.1. above.

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environmental consciousness as well as the relative abundance of aquatic resources in the bloc therefore limits the potential pool of transboundary water problems.

II.2.1.2. Normative features of transboundary water governance in the European Union

The distinctive normative characteristics of EU transboundary water governance stem from the *unique constitutional construction* of the European Union. Under its founding treaties, notably the Treaty on the European Union (TEU) and the Treaty on the Functioning of the European Union (TFEU), the EU disposes of *autonomous supranational legal system* that – in case of a conflict – supersedes national law[338].

In most policy fields – such as water – the EU and its member states share responsibilities. In such *shared competence areas*, the EU (typically the Council of Ministers and the European Parliament) adopts legislation that is binding on member states. Moreover, the EU also concludes international agreements that apply automatically to EU institutions and member states alike (irrespective of national ratification)[339]. While the existence of EU legislation does not automatically pre-empt national measures in areas of shared competences, member state autonomy is, nonetheless, seriously constrained by three layers of EU law:

- the founding treaties and the jurisdiction of the Court of Justice of the European Union (*primary law*),
- *international treaties* ratified by the EU, as well as
- legislation adopted by EU institutions (*secondary law*)[340].

Importantly, through the prism of the EU legal system, any other legal norm, such as intra-member state treaties, are basically considered as national law and remain subject to the supremacy of EU law. In other words, EU law limits member states legislative powers not only internally, but also in the international arena[341].

[338] CRAIG, Paul and DE BÚRCA, Gráinne (2003): *EU Law, Text, Cases, and Materials*, Oxford, Oxford University Press, p. 275.
[339] Article 216.1., TFEU
[340] KUIJPER, Peter Jan (2013): "It Shall Contribute to … the Strict Observance and Development of International Law…" In COURT OF JUSTICE OF THE EUROPEAN UNION (2013): *The Court of Justice and the Construction of Europe: Analyses and Perspectives on Sixty Years of Case-law*, The Hague, TCM Asser Press, pp. 589-612, p. 597-601.
[341] KUIJPER (2013) *op. cit.* p. 591.

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From this follows the fact that transboundary water governance in the EU is regulated by no less than four (!) levels of supranational law:

- *EU primary law* defines the distribution of powers in the field of water policy between the EU and its member states. It also establishes horizontal institutional requirements – on *e.g.* enforcement and dispute settlement – that apply to water issues regardless of the provisions of multi- or bilateral treaties;
- *international water treaties ratified by the EU:* the EU is an active player in the international water policy arena. Any treaty to which the EU accedes becomes automatically binding on EU institutions and member states, even if some member states choose not to become a party on their own right;
- *EU secondary law*: the bulk of EU water law is adopted as so-called secondary legislation, mostly in the form of directives. Any such legislation has to conform to primary EU law as well as to international treaties approved by the EU;
- *bilateral, regional, basin, etc. treaties concluded by EU member states:* the daily practice of cross-border water management takes place through bilateral water treaties and basin agreements. These treaties not only have to comply with all three layers of EU law, but – under the "doctrine of harmonious interpretation" – member states also have to interpret them in light of the letter and spirit of the relevant EU norms[342]. It means that two (or more) member states cannot make agreements to deviate from general EU or specific water law.

The above legal structure is mirrored by the unique *institutional set-up of* the EU that has considerable implications for transboundary water governance inside the bloc[343].

II.2.2. International water law in the European Union

II.2.2.1. Evolution of international water law in the European continent

The evolution of modern international water law predates the establishment of the European Union and its predecessors. In fact, the EU as a supranational political body has played a very limited role in the development of international water law. On other hand, some member states

[342] KUIJPER (2013) *op. cit.* p. 601.
[343] *See* section II.2.3.4. below.

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of the EU have been the unquestionable driving force behind many of the achievements the of today's transboundary water governance.

The evolution of today's vast body of water treaties in Europe was neither linear, nor free of controversies. In fact, as Götz Reichert, a monographer of EU water law, underlines early water treaties grew out of *conflict-driven partial approaches*[344]. Collaboration after World War II was not only impeded by strong sovereignty concepts, but also by the stark political division of the European continent. The mid1980s, however, brought about major improvements. In 1985 eight Danube riparian states – overcoming the east-west political divide – signed the *Bucharest Declaration on the Cooperation of the Danube Countries on Problems of the Danube Water Management*. The Declaration acknowledged the pressing environmental problems in the Danube basin and committed the countries to integrated water resources management[345]. A similarly important trigger was the 1986 *Sandoz accident* in Switzerland on the Rhine whose devastating ecological impacts led to a paradigm shift towards ecosystem-oriented, holistic governance approaches all over Europe[346].

The *fall of the Iron Curtain* in 1989-1990 injected fresh impetus into the institutionalisation of transboundary cooperation. The first example of the ensuing treaty-making was the adoption of Elbe Convention[347] by Germany, Czech Republic and the European Economic Community as early as in 1990. The year 1992 marked the adoption of the UNECE Water Convention[348] that not only provided a solid and durable legal framework for transboundary cooperation for the European continent and beyond, but also required the conclusion of specific basin agreements by parties. This resulted in a new wave of regional treaty-making since the mid1990s. The most notable examples include the Danube Convention (1994)[349], the Scheldt Agreement[350], the Meuse Agreement[351] and the Oder Convention[352] (1996), the Spanish-Portuguese Basins

[344] REICHERT, Götz (2016): *Transboundary Water Cooperation in Europe: A Successful Multidimensional Regime?* Leiden, Boston, Brill Nijhoff, p. 8-14.
[345] MOYNIHAN, Ruby (2015): The Contribution of the UNECE Water Regime to Transboundary Cooperation in the Danube River Basin. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 296-307, p.302.
[346] REICHERT (2016) *op. cit.* p. 12.
[347] Convention on the International Commission for the Protection of the Elbe, Magdeburg, 8 October 1990.
[348] *See* section II.2.2.2. below.
[349] Convention on Cooperation for the Protection and Sustainable Use of the Danube, Sofia, 29 June 1994.
[350] Agreement on the Protection of the River Scheldt, Charleville Mezieres, 26 April 1994.
[351] Agreement on the Protection of the River Meuse, Charleville Mezieres, 26 April 1994.
[352] Convention on the International Commission for the Protection of the Oder, Wroclaw, 11 April 1996.

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Convention[353] (Albufeira Convention, 1998), the new Rhine Convention[354] (1999), the Sava Framework Agreement[355] (2002) or the Lake Ohrid Agreement[356] (2004). Most recently, treaty-making (or revision) at basin level has been influenced by the EU's Water Framework Directive whose planning and monitoring requirements have been incorporated into the text or work programme of the relevant international agreements and basin organisations[357]. This evolutionary curve, largely determined by the persistent pollution problems of the 1970s and 1980s, has left a lasting impact on water law within the European Union, resulting in a strong ecological/qualitative focus with water quantity-related or economic issues playing only a marginal role.

Naturally, below basin or sub-basin level riparian states had engaged in formal transboundary water cooperation well before the emergence of the above major basin treaties or the UNECE Water Convention. *Bilateral instruments* comprise of (comprehensive or partial) water frontier treaties , joint water infrastructure and development treaties, agreements on special water uses, etc.[358] Remarkably, such treaties were concluded in large numbers by parties on opposite sides of the Iron Curtain.

Today, EU countries and their neighbours are interconnected by an *extensive web of multi- and bilateral treaties*. On top of European system of international water law sits the UNECE Water Convention. This is supplemented by basin treaties, sub-basin treaties, comprehensive bilateral water treaties, as well as bilateral treaties covering single transboundary water bodies or particular issues. As Figure 12 show this adds up to an *almost seamless treaty coverage* of all international river basins situated within or shared by the EU.

[353] Convention on the Co-operation for the Protection and the Sustainable Use of the Waters of the Luso-Spanish River Basins, Albufeira, 30 November 1998 (Convenio sobre cooperación para la protección y el aprovechamiento sostenible de las aguas de las cuencas hidrográficas hispanoportuguesas)
[354] Convention on the Protection of the Rhine, Bern, 12 April 1999.
[355] Framework Agreement on the Sava River Basin, Kranjska Gora, 3 December 2002.
[356]Agreement between the Council of Ministers of the Republic of Albania and the Government of the Republic of Macedonia for the protection and sustainable development of Lake Ohrid and its watershed, Skopje, 17 June 2004.
[357] REICHERT (2016) *op. cit.* p. 91.
[358] *See* section II.2.2.4. below.

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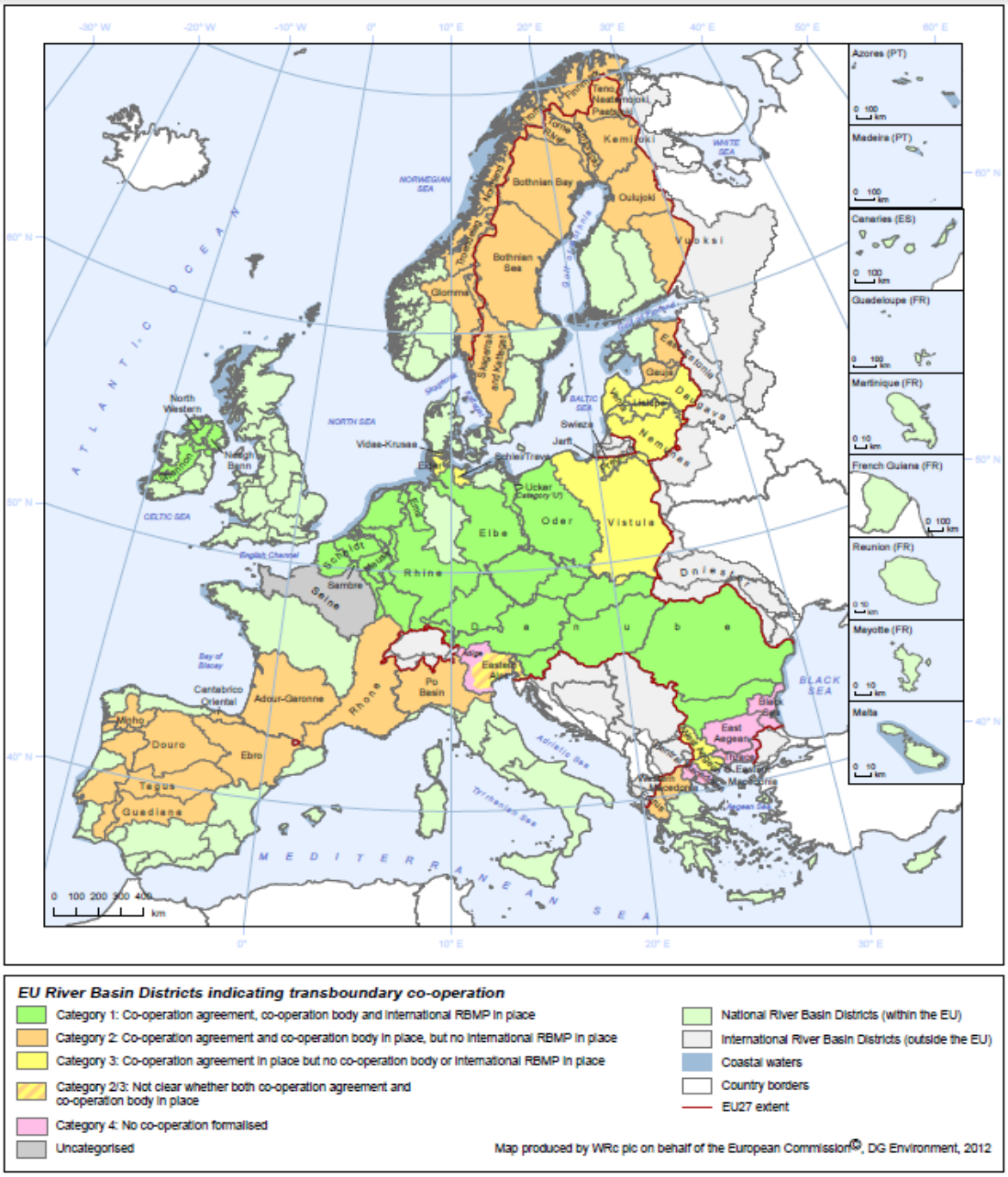
Figure 12: Map of EU river basin districts indicating transboundary cooperation



Source: http://ec.europa.eu/environment/water/water-framework/facts_figures/pdf/Transboundary-cooperation-%202012.pdf (accessed 12 February 2019)

II.2.2.2. The UNECE Water Convention

a) History

The overarching institutional framework for pan-European transboundary water cooperation has been created by the *United Nations Economic Commission for Europe* (UNECE), the UN's

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regional body. Importantly, the UNECE region is not limited to the European continent as it also includes countries that emerged from the disintegration of the Soviet Union as well as the United States and Canada. Today, the UNECE has 56 member states[359].

The UNECE has been active in the field of environmental policy since the 1960s. The current overarching political framework, the *Environment for Europe* process was launched in 1991 following the collapse of communism in Central and Eastern Europe. This process paved the way for the adoption of a range of landmark environmental conventions throughout the 1990s, such the 1991 (Espoo) Convention on Environmental Impact Assessment in a Transboundary Context, the 1992 (Helsinki) Convention on the Transboundary Effects of Industrial Accidents, the 1998 (Aarhus) Convention on Access to Information, Public Participation in Decision-making and Access to Justice on Environmental Matters or, indeed, the UNECE Water Convention itself[360].

UNECE started to address selected water related problems as early as in the 1950s. Throughout the 1960s, 1970s and 1980s it has adopted a large number of recommendations, declarations and decisions addressing a range of water-related questions such as drinking water abstraction, water pollution, economic instruments of water governance, etc. As Alistair Rieu-Clarke, a monographer of UNECE water law, concludes this early body of non-binding instruments reflects "an evolution and consolidation of shared understanding […] on transboundary water challenges" that laid the foundations for the eventual adoption of the Water Convention itself[361].

The *UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes* ("Water Convention") was adopted in 1992 and entered into force in 1996. It has two protocols – the 1999 Protocol on Water and Health and the 2003 Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters – of which the latter is not yet in force. The Convention was amended in 2003 (effective as of 2013) to allow the accession thereto by any member states of the United Nations outside the UNECE region[362].

[359] https://www.unece.org/oes/nutshell/member_states_representatives.html (accessed 12 February 2019).
[360] Also *see* section I.4.3.2. above.
[361] RIEU-CLARKE, Alistair (2015): Remarks on the Drafting History of the Convention. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 3-15, p. 5.
[362] Amendment to Articles 25 and 26 of the Convention, ECE/MP.WAT/14.

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b) Objectives

The Convention is based on a *holistic approach* towards transboundary waters. Thus, it requires parties to consider the broader implications of transboundary waters on human health, the environment and their economic and development policies in an integrated fashion[363]. Its main objectives comprise:

- the protection of transboundary waters (both surface and groundwater) by preventing, controlling and reducing transboundary impacts, including impacts on human health and safety, flora, fauna, soil, climate, landscape and historical monuments or other physical structures as well as impacts on the cultural heritage or socio-economic conditions;
- the ecologically sound and rational management of transboundary waters;
- the reasonable and equitable use of transboundary waters and therefore prevention of conflicts;
- conservation and restoration of ecosystems[364].

In the pursuit of these objectives the Convention explicitly recognises the legal relevance of a number of basic environmental law principles such as the precautionary principle, the polluter-pays-principle and the principle of sustainable management of water resources[365].

c) Core obligations

The Convention contains two major categories of obligations:

- *general obligations:* the first, more general, group of obligations apply to all parties and include such requirements as the authorisation and monitoring of wastewater discharges[366]; setting emission limits for discharges from point sources based on the best available technology[367]; the application of best environmental practices to reduce inputs of nutrients and hazardous substances from agriculture and other diffuse

[363] Article, 1.2, UNECE Water Convention; BERNARDINI, Francesca (2015): The Normative and Institutional Evolution of the Convention. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 32-48, p. 32.
[364] Articles 2, 3, UNECE Water Convention.
[365] Article 2.5, *ibid.*
[366] Article 3.1.b), Article 4, *ibid.*
[367] Article 3.1.c), f), *ibid.*

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sources[368]; environmental impact assessment[369]; development of contingency plans[370]; setting of water-quality objectives[371], and minimization of the risk of accidental water pollution[372],

- *obligations of riparian states:* the second category of obligations is more specific and must be implemented by parties sharing transboundary waters. Thus, riparian states are obliged to conclude specific bilateral or multilateral agreements that create joint bodies[373], to hold consultations concerning the shared watercourse[374], to exchange information on the state of water bodies[375], to provide mutual assistance in critical situations[376], etc.

d) Operation and institutions

The framework nature and the flexible institutional set-up of the Convention permitted the parties to adopt *comprehensive work programmes* and a wide range of supporting instruments and mechanisms over the years. This has greatly contributed to the further development of the original principles and requirements of the Convention[377]. Thus, today, the Convention's activities extend to such novel issues of water management as climate change or payment for ecosystem services, etc. To facilitate implementation strategic and technical guidelines have been developed under the Convention on specific issues such as monitoring, flood control or groundwater[378]. The UNECE Water Convention is supported by a *robust institutional framework*, including the regular meetings of the parties, an implementation (compliance) mechanism, various working and expert groups and a highly active secretariat[379].

e) Evaluation

Following its entry into force, the Convention has quickly evolved into a *full-fledged model platform for transboundary water cooperation* that has pioneered on such critical areas as

[368] Article 3.1.g), *ibid.*
[369] Article 3.1.h), *ibid.*
[370] Article 3.1.j), *ibid.*
[371] Article 3.2, *ibid.*
[372] Article 3.1. l), *ibid.*
[373] Article 9.1-2, *ibid.*
[374] Article 10, *ibid.*
[375] Article 13, *ibid.*
[376] Article 15, *ibid.*
[377] BERNARDINI (2015) *op. cit.* p. 33.
[378] *Ibid*.
[379] MCCAFFREY (2016) *op. cit.* p. 35-36.

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transboundary groundwater management, climate adaptation or monitoring, water allocation, etc., receiving critical acclaim worldwide[380]. It is also widely recognised for its *substantial contribution to the development of international water law*[381]. Due to its compatible and complementary character vis-à-vis the UN Watercourses Convention the Convention today represents one of the fundamental building blocks of water governance not only within the European Union, but also on a global scale[382].

II.2.2.3. Basin treaties within the European Union

Most river basins in the EU are subject to formalised governance schemes. A 2012 survey, commissioned by the European Commission[383], identified only three international basins with no formal cooperation agreement in place: the Marica-Evros/Meric between Greece, Bulgaria and Turkey, the Axios/Vardar between Greece, Macedonia, Serbia and the Adige/Etsch basin between Italy and Switzerland. All other transboundary watercourses and lakes are subject to at least one dedicated treaty (Figure 12). The majority of such treaties also established river basin organisations or some kind of formal cooperation bodies (in the case of basins shared by two states only typically the frontier water commission).

As mentioned above, the most important European basin treaties include the Danube Convention, the Rhine Convention, the Sava Framework Agreement, the Conventions for the Elbe and the Oder rivers, the Meuse Agreement and the Spanish-Portuguese Basins Convention (Albufeira Convention)[384]. These basin treaties cover the critical bulk of the international watersheds in the EU.

[380] In his address to the sixth session of the Meeting of the Parties on 28 November 2012, UN Secretary-General Ban Ki-moon had stated: "Since its launch twenty years ago, this Convention has significantly enhanced the integrated norms and standard for cooperation, which makes it a best practice model at the international level." http://www.unece.org/?id=32154&type=111 (accessed 12 February 2019).
[381] TANZI Attila, MCINTYRE, Owen and KOLLIOPOULOS, Alexandros (2015): The Contribution of the UNECE Water Convention to International Water Law. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 533-540, p. 533.
[382] MCCAFFREY (2016) *op. cit.* p. 39.
[383] WRC (2012) *op. cit.* p. 279-290.
[384] *See* section II.2.2.1. above.

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a) The Danube Convention[385]

The Danube is the second largest river of the European continent: its basin area covers more than 800,000 square kilometres or 10% of Europe's surface. With 19 riparian countries, out of which 14 has more than 2000 square kilometres of the basin, it is considered as the world's most international river[386].

Formalised basin-wide cooperation over the Danube goes back to the mid-19th century when, in 1856, the European Commission of the Danube was established to oversee navigation[387]. However, substantial basin-wide cooperation on non-navigational uses started to take shape only in the mid1980s amidst the quick erosion of the bipolar political system that cut the basin into two[388]. Today's framework instrument: the *Convention on Cooperation for the Protection and Sustainable Use of the River Danube* ("Danube Convention") was signed in Sofia, Bulgaria in 1994 and came into force in 1998. Parties to this convention include all major riparian states, *i.e.* Austria, Bulgaria, Croatia, the Czech Republic, Germany, Hungary, Moldova, Romania, Serbia, Slovakia, Slovenia, Ukraine and the European Union. The elaboration of the Convention was heavily influenced by the UNECE Water Convention, even though the latter was not yet in force at the time[389].

Given that *water pollution* was the dominant problem in the basin at the time of its drafting, the Convention itself has a predominantly ecological focus[390]. The main objectives of the Convention are thus sustainable and equitable water management, including the conservation, improvement and rational use of surface and groundwater in the Danube river basin as well as the reduction of the pollution of the Black Sea. Water quantity issues come under the remit of the Convention "only incidentally" as was interpreted by the European Court of Justice[391]. To achieve the above objectives, parties pledged to cooperate so as to maintain and/or improve the

[385] Although the Convention is commonly called as the Danube Protection or the Danube River Protection Convention (to distinguish it from the Convention regarding the regime of navigation on the Danube, Belgrade, 18 August 1948), for sake of brevity this study will refer to all basin treaties by the name of the respective river only.
[386] http://www.icpdr.org/main/danube-basin (accessed 12 February 2018).
[387] BOISSON DE CHAZOURNES (2013a) *op. cit.* p. 177.
[388] KITTINGER, Wilhelm (1997): *The Danube River Protection Convention.* In LYONS MURHY, Irene (Ed.): *Protecting Danube Basin Resources*, NATO ASI series (Series 2: Environment) Dordrecht, Springer, pp. 43-47, p. 44.
[389] MOYNIHAN (2015) *op. cit.* p. 304.
[390] SCHMEIER (2013) *op. cit.* p. 175.
[391] C-36/98, Spain v. Council, ECR 2001, I-00779, para 63.

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environmental and water quality conditions of the basin. For all such measures the precautionary principle and the polluter-pays principle constitute a common starting point[392].

The implementation of the Convention is supported and coordinated by the *International Commission for the Protection of the River Danube* (ICPDR). The ICPDR operates the decision-making system of the Convention, carries out projects specifying measures to be taken to achieve the objectives of the convention, etc. Importantly, the ICPDR has been chosen by the relevant basin states to coordinate the implementation of the EU's Water Framework Directive which non-EU riparian states also undertook to implement on a voluntary basis. The ICPDR is considered as one the highly effective model RBO in wider international comparison[393].

b) The Rhine Convention

The River Rhine flows from its source in Switzerland through Germany, France and the Netherlands to the North Sea. The Rhine basin also includes Austria, Liechtenstein, Italy and Belgium. It is the third largest river of Europe, with a total length of 1,320 km and a catchment area of 185 000 square kilometres[394].

The Rhine was the first international river to be made subject to a formal governance arrangement: the Central Commission for the Navigation of the Rhine in 1815[395]. The current institutional setting for cooperation – the *International Commission for the Protection of the Rhine* ("ICPR") – was established in 1963. Today's regulatory framework, the *Convention on the Protection of the Rhine* ("Rhine Convention"), signed in 1999, replaced two earlier international instruments[396] that, according to critics, proved to be a "regulatory failure"[397].

The Rhine Convention has been ratified by Germany, France, Luxembourg and the Netherlands (EU member states), Switzerland (a non-Member State) and the European Union. Its main objectives include the sustainable development of the Rhine ecosystem, the production of

[392] Article 2.
[393] SCHMEIER (2013) *op. cit.* p. 183.
[394] https://www.iksr.org/en/rhine/ (accessed 12 February 2019).
[395] BOISSON DE CHAZOURNES (2013a) *op. cit.* p. 177.
[396] Agreement concerning the International Commission for the Protection of the Rhine against Pollution, Bern, 29 April 1963; Convention for the protection of the Rhine against chemical pollution, Bonn, 3 December 1976.
[397] REICHERT (2016) *op. cit.* p. 11.

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drinking water from the waters of the Rhine, the improvement of the sediment quality and general flood prevention and protection[398]. The Convention is based on a number of international water law and environmental law principles, such as the "no harm" rule, the precautionary principle, the polluter-pays principle, etc.[399] Given its broad ecological focus, the Convention hardly makes mention of any other aspects of water management than quality improvement.

Implementation of the Convention is coordinated by the ICPR. The ICPR is endowed with broad powers to prepare and propose programmes, measures, studies, etc. with a view to improving or evaluating the effectiveness of implementation. In particular, the ICPR is tasked to carry out studies and programmes on the Rhine ecosystem, to make proposals for actions, to evaluate the effectiveness of the actions carried out, to coordinate warnings and alerts, to inform the public of the state of the Rhine and the results of its activities[400]. The impact of the ICPR is generally evaluated as highly positive (*e.g.* the return of the salmon to the river is often cited as an emblematic achievement) so it has served as a model for the development of other basin commissions[401].

c) The Elbe Convention

The River Elbe has a total length of 1091 km and a catchment area of 148 268 square kilometres (almost the size of the Rhine!). The Elbe basin is shared by four countries, the Czech Republic, Poland, Austria and Germany, although 99% of the draining area belongs to the Czech Republic and Germany only[402].

While formalised water cooperation in the basin goes back to 1811, during the Cold War, the Elbe symbolised the separation between the two German states as well as the entire European continent[403]. By the end of the 1980s the Elbe has become one of the most polluted rivers in Europe, causing considerable tension between West Germany and the upstream communist

[398] Article 3.
[399] Article 4.
[400] Article 8.
[401] MOELLENKAMP (2007) *op. cit.* p. 1413.
[402] http://www.ikse-mkol.org/en/themen/die-elbe/ (accessed 12 February 2019).
[403] DOMBROWSKY, Ines (2008): Institutional design and regime effectiveness in transboundary river management? The Elbe water quality regime, *Hydrology and Earth System Sciences Discussions*, European Geosciences Union 12(1), pp. 223-238, p. 226; MOELLENKAMP (2007) *op. cit.* p. 1412.

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neighbours (then Czechoslovakia and East Germany). Consequently, following the fall of the Iron Curtain cooperation in the Elbe basin become a high political priority not only for Germany, but also for the (then) European Communities. Thus a new legal framework was agreed upon as early as 1990 in the form of a basin agreement entitled *Convention on the International Commission for the Protection of the Elbe*. Parties to the original Convention were Germany, the Czech and Slovak Republic and the European Communities[404].

The objectives of the Elbe cooperation relate predominantly to pollution prevention and control. Cooperation among the riparian countries takes place through the *International Commission of the Protection of the Elbe* ("ICPE") whose main goals include:

- to facilitate water usage, primarily to provide drinking water from riverbank infiltration and water and sediments for agricultural usage,
- to restore the ecosystem to a healthy abundance of species, and
- to incrementally decrease pollution of the North Sea from the Elbe basin area[405].

To that end the focus of the activities of ICPE is the improvement of the status of the Elbe and its tributaries from the physical, chemical and biological point of view with respect to water, suspended matter, sediments and organisms and the enhancement of the ecological value of the Elbe river valley. Despite the rather sketchy regulatory framework, the Elbe cooperation is perceived as generally effective which is illustrated by a relatively high achievement of the goals established by the ICPE in its various action programmes[406].

d) The Oder Convention

The Oder (Odra) River is 840 km long and has a catchment area of 124 000 square kilometres, shared by the Czech Republic, Poland and the Germany. The river constitutes the border between Germany and Poland over a 170 km long stretch. Its geopolitical function as well as its hydro-geographical conditions qualify the Oder as one of the principal transboundary rivers in Europe[407].

[404] When the Czech Republic became member of the European Union, the EU formally withdrew from the Elbe Convention.
[405] Article 2, Elbe Convention.
[406] DOMBROWSKY (2008) *op. cit.* p. 235.
[407] http://www.mkoo.pl/index.php?mid=2&lang=EN (accessed 12 February 2019).

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The existing basin-wide cooperation framework is based the 1996 *Convention on the International Commission for the Protection of the Oder* which is modelled very closely on the Elbe Convention. As in the case of the Elbe, the objectives and main measures of the Convention are formulated with reference to the responsibilities of the implementing basin organisation: the International Commission for the Protection of the Oder ("ICPO"). The principal objectives of the ICPO's work are:

- to prevent and reduce the pollution of the Oder,
- to restore water and riparian ecosystems to a near-natural condition with a characteristic diversity of species,
- to facilitate the primary use of the Oder as a source of drinking water by bank filtration, for fishing and tourism,
- to implement the EU Water Framework Directive,
- to co-ordinate integrated flood protection,
- to collect and provide Oder-related information (studies, projects, maps, reports, literature) for information exchange[408].

e) The Sava Framework Agreement

The Sava River is about 950 km long with a basin area of 97,700 square kilometres covering significant parts of Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro and a small part of Albania. It is the third longest tributary of the Danube and the largest by discharge[409].

The Sava River represents a unique case in the recent history of international water governance. The river became international only in the early 1990s following the disintegration of the former *Socialist Federal Republic of Yugoslavia*. The Sava – as a major tributary of the Danube – is already covered by the cooperation framework of the Danube Protection Convention and the work of the ICPDR. Yet, following the establishment in 1999 the Stability Pact for South-Eastern Europe strong international pressure and the recognised mutual interest of the riparian states – Croatia, Bosnia and Herzegovina, Slovenia and (then) the Federal Republic of Yugoslavia – led to the relatively quick elaboration and adoption of the *Framework Agreement*

[408] Article 2, Oder Convention.
[409] http://www.savacommission.org/basin_about (accessed 2 May 2018)

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on the Sava River Basin in 2002[410]. (In fact, it was the first international treaty the successor states adopted in the wake of the demise of Yugoslavia).

The Agreement has been strongly influenced by the *UN Watercourses Convention*[411]. It represents a new generation of water agreements in Europe in so far as it goes beyond the limited environmental focus of its counterparts for it aims to integrate all aspects of water resources management in the basin. The objectives of the Agreement are threefold: navigation, sustainable water management, water-related hazard prevention and mitigation[412]. These objectives must be achieved in accordance with the three core principles of the UN Watercourses Convention: equitable and reasonable utilisation, the prevention of significant harm and the cooperation on any significant transboundary matter[413]. Importantly, the Agreement is based on the notion of "water regime", *i.e.* the unity of the qualitative and quantitative conditions of the river[414]. Sustainable water management thus implies the integrated management of all surface and groundwater bodies with a view to ensuring sufficient water quantity and quality for all ecological functions and major human uses[415]. The Agreement also calls for the adoption of an integrated Sava River Basin Management Plan, to be developed in coordination with the ICPRD and in line with the EU Water Framework Directive[416].

The Agreement also established a dedicated river basin organisation: the *International Sava River Basin Commission*, operational since 2005. The Commission follows the integrated approach of the Agreement and, as such, it has the broadest formal mandate among all European basin organisations. Its responsibilities go beyond the traditional RBO activities (navigation, pollution prevention and control, monitoring) to encompass such activities as the coordination of the preparation and implementation of joint plans for the basin, the preparation of

[410] MATIC, Jasnica Klara (2011): The Framework Agreement on the Sava River Basin (FASRB). In MONTINI, Massimiliano and BOGDANOVIC, Slavko (Eds.): *Environmental Security in South-Eastern Europe*, NATO Science for Peace and Security Series C: Environmental Security, Dordrecht, Springer, pp. 229-241, p. 229.
[411] RIEU-CLARKE, Alistair (2007): The Role and Relevance of the UN Convention of the Non-Navigational Uses of International Watercourses to the EU and its Member States, *British Yearbook of International* Law 78(1) pp. 389-428, p. 389.
[412] Article 1, Sava Framework Agreement.
[413] Articles 3, 4, 7-9, *ibid.*
[414] Article 1.3, *ibid.*
[415] Article 11, *ibid.*
[416] Articles 3.2 and 12, *ibid.*

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development programmes, even, the harmonisation of national legislation with relevant EU law[417].

f) The Meuse Agreement

The River Meuse (Maas) rises in France and flows through Belgium and the Netherlands for 900 kilometres. Its catchment area covers approximately 36,000 square kilometres that also includes Germany and Luxembourg. While it is commonly treated as a distinct river basin, in hydro-geographical terms it forms part of the larger Rhine river system for its connection to the same estuary system[418].

The main instrument governing basin-wide cooperation of riparian states is the 2002 *International Agreement on the River Meuse* (Accord international sur la Meuse), replacing a 1994 agreement on the same subject. Contracting parties to the Agreement are France, Germany, Luxembourg, the Netherlands, Belgium and the three affected Belgian regions (Wallonia, Flanders, Brussels Capital).

The Agreement is conceived as a regional implementation tool for the UNECE Water Convention, the Convention for the Protection of the Marine Environment of the North-East Atlantic and, first and foremost, the EU Water Framework Directive[419]. While the Agreement aims to achieve sustainable water management based on an integrated approach, its focus and provisions are largely concerned with environmental quality and, to a lesser extent, with flood protection and drought management[420]. It establishes a governance mechanism for the joint implementation of the WFD in the Meuse basin through the development and execution of a single river basin management plan[421].

The institutional framework of the Agreement is provided by the *International Meuse Commission*. The Commission can adopt opinions and recommendations, but cannot take

[417] KOMATINA, Dejan and GROŠELJ, Samo (2014): Transboundary Water Cooperation for Sustainable Development of the Sava River Basin. In MILAČIČ, Radmila, SCANCAR, Janez and PAUNOVIĆ, Momir (Eds.): *The Sava River*, Berlin, Heidelberg, Springer, pp. 1-25, p. 11.
[418] *See* section I.1.2. above.
[419] Preamble, Accord international sur la Meuse, Gent, 3 December 2002.
[420] Article 2, *ibid.*
[421] Article 1, *ibid.*

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decisions binding on the parties[422]. According to some commentators the Commission has not proved as successful as the ICPR for the Rhine, mainly because of the lack of competence to establish decisive programmes of measures[423].

II.2.2.4. Bilateral cooperation agreements

a) Typology and distribution

Bilateral water treaties provide the most important operational framework for daily cross-border water cooperation, complementing and adjusting the (occasionally) somewhat vague principles and requirements of general international water law and basin treaties[424].

Most cooperation agreements under basin or sub-basin level have been adopted in the form of so-called *frontier or boundary water treaties* regulating transboundary issues between two particular basin states. These treaties have no uniform content, format, structure, etc. Even, they often do not even constitute stand-along legal instruments as they are embedded into general frontier treaties. Early examples of post Word Water II frontier water treaties – such as the 1956 Austria-Hungary frontier water treaty[425] or the 1964 Soviet Union-Poland agreement[426] – applied only to the actual border-creating river or lake, and to water bodies situated in a narrow stretch beyond the borders. Typically, these agreements constrained riparians' rights to *unilateral interventions* (mainly hydraulic structures) in the relevant zones, often establishing a co-authorisation procedure. Usually, frontier water treaties call for cooperation on *flood protection, joint monitoring, exchange of information* and establish formalised cooperation bodies (*frontier water committees*). They do not, however, address transboundary water management in a comprehensive matter.

[422] Articles 4-5, *ibid.*
[423] VAN RIJSWICK, Marleen, GILISSEN, Herman K. and VAN KEMPEN, Jasper (2010): The need for international and regional transboundary cooperation in European river basin management as a result of new approaches in EC water law, *ERA Forum* 11, pp. 129–157, p. 144.
[424] BOISSON DE CHAZOURNES (2013a) *op. cit.* p. 53.
[425] Treaty between the Hungarian People's Republic and the Republic of Austria Concerning the Regulation of Water Economy Questions in the Frontier Region, Vienna, 9 April 1956.
[426] Agreement between the Government of the Polish People's Republic and the Government of the Union of the Soviet Socialist Republics Concerning the Use of the Water Resources in Frontier Waters, Warsaw, 17 July 1964.

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Beyond the agreements covering all (or most) joint water bodies, there exist a number of bilateral treaties covering just a single water body[427] or a particular water issue[428] or development project[429]. Several bilateral treaties involve (or sometimes exclusively concluded between) the constituent units of federal countries or regions[430]. In line with the UNECE Water Convention's call for the revision of frontier water treaties and the new requirements of the Water Framework Directive the trend, however, is clearly moving towards comprehensive, all-inclusive bilateral water treaties and replacing fragmented, historic, single issue agreements.

b) Examples of major bilateral water agreements

The body of contemporary EU bilateral water treaties is thoroughly documented. As a part of the above-mentioned survey of transboundary water governance in the European Union and its immediate neighbourhood, the European Commission compiled a comprehensive catalogue of bilateral water treaties[431]. From this compilation it appears that most EU members and their riparian neighbours have concluded bilateral water cooperation agreements (there are 20 such agreements just among the Danube riparian states)[432].

Some of these agreements have gained a reputation beyond their own constituencies for their success in managing co-riparian relations in complicated hydrological or political circumstances. One notable example is the *1964 Finnish-Soviet frontier water agreement*[433] that created a model for transboundary water cooperation in the darkest era of the Cold War with lasting positive impacts not only on bilateral relations, but also on the development of UNECE water law[434]. Another European bilateral arrangement whose development and implementation was followed beyond the immediate basin is the *1970 Agreement between the*

[427] *E.g.* the Convention between the Swiss Federal Council and the Government of the French Republic on the Protection of Geneva Lake Against Pollution, 16 November 1962.
[428] *E.g.* the Agreement between France and Switzerland concerning the Intervention of Bodies in charge Fighting against Accidental Water Pollution by Hydrocarbons or Other Substances Capable of Altering the Water, Geneva, 17 December 1977.
[429] Treaty between Czechoslovakia and Hungary concerning the construction and operation of the Gabčíkovo-Nagymaros System of Locks, Budapest, 16 September 1977.
[430] Arrangement between the State Council of the Republic and Canton of Geneva and the Prefect of Haute-Savoie on the Protection and Recharge of the Franco-Swiss Genevois Aquifers, Geneva, 9 June 1978.
[431] WRC (2012) *op. cit.*
[432] WRC (2012) *op. cit.* p. 11-12.
[433] Agreement between the Republic of Finland and the Union of Soviet Socialist Republics Concerning Frontier Watercourses, Helsinki, 24 April 1964.
[434] BELINSKIJ, Antti (2015): Cooperation between Finland and the Russian Federation. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 310-318, p. 310.

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Government of the French Republic and the Spanish Government relating to Lake Lanoux that finally settled decades of water allocation disputes between France and Spain concerning the Lake Lanoux and Carol river[435].

The best-known bilateral water agreement between two EU member states, however, is undoubtedly the 1998 Convention on Cooperation for the Protection and Sustainable Use of the Waters of Luso-Spanish River Basins[436] (the *Albufeira Convention*) between Spain and Portugal. While there exist a number of other bilateral treaties that established effective governance mechanisms for transboundary watercourses, the Albufeira Convention deserves special attention for the novelty of its approach as well as its propensity to become a European model for water management in semi-arid climatic conditions[437].

The Albufeira Convention follows the basic building blocks of international and EU water law, such equitable and reasonable utilisation, the no-harm rule, sustainable water use or the river-basin approach. The Convention covers all *five joint basins* and, in a comprehensive and progressive manner, all major water-related issues such as water quality and associated ecosystems, river flows (quantity), physical interventions, data collection, monitoring and dissemination of information, emergency communication, etc. Importantly, the Convention specifically addresses *extreme hydrological situations* both in terms of substance and procedure[438]. The Convention establishes a two-tier system of decision-making: the conference of the parties as the main political forum and the International Rivers Commission, a technical regulatory body. An additional Protocol to the Convention prescribes a precise *water flow regime* for individual river basins, including minimum flow requirements that can only be ignored in the case of extreme droughts[439].

[435] Agreement between the Government of the French Republic and the Spanish Government relating to Lake Lanoux, Madrid, 12 July 1958.
[436] Convention on the Co-operation for the Protection and the Sustainable Use of the Waters of the Luso-Spanish River Basins, Albufeira, 30 November 1998.
[437] CANELAS DE CASTRO, Paulo (2009): *Luso-Spanish Cooperation on the Management of the Waters of the Shared Rivers - A Model within the European Model?* Conference Paper, http://umir.umac.mo/jspui/bitstream/123456789/15128/1/4446_0_MEDITERRANEAN%20CONF%20-%20Luso-Spanish%20wATERManagement%20-MODEL%20within%20the%20Model-%2002022009.doc (accessed 12 February 2018), p. 1.
[438] CANELAS DE CASTRO (2009) *op. cit.* p. 14.
[439] Protocol amending the Convention on Cooperation for the Protection and Sustainable Use of the Waters of Luso-Spanish River Basins signed 30 November 1998, 4 April 2008.

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The Convention is generally regarded as one of the most complex and progressive (multi-) basin agreement in the world. In particular, the river-flow and variability management clauses stand out not only in European comparison, but in the broader international context[440]. Critics note, however, that the implementation of the Convention has lately lacked political impetus and the operation of the International Rivers Commission – that has no international legal status and an autonomous budget – fails to meet expectations of efficiency and competence[441]. Practical experience also suggests that the dominant supply-management logic of the Convention – tailored to the operation of large hydropower and irrigation structures in both countries – leads to poor resource conservation[442].

II.2.3. The water law and policy of the European Union

II.2.3.1. The broader context: EU environmental law and policy

Water issues in the European Union fall into the broader category of environmental policy under one of the EU's founding treaties, the *Treaty on the Functioning of the European Union* (TFEU). This fact has fundamental repercussions on the nature and extent of EU water law and policy. First, EU water policy remains subject to the *general objectives and principles* of environmental law[443] that creates an evident imbalance between the ecological and non-ecological aspects of water management. Second, environmental policy is one of those *shared areas of competence* where both the EU and its member states exercise legislative power. Thus, as noted above, the more the EU legislate on water issues, the less powers do member states retain to do the same[444]. The TFEU also defines the *decision-making and enforcement structure* of environmental policy that can constitute important political hurdles in the future development of transboundary water governance within the bloc.

[440] SERENO, Amparo (2014): *Climate Change in Albufeira Convention*, http://www.academia.edu/9031808/CC_in_Albufeira_Convention (accessed 12 February 2019), p. 8.
[441] *Ibid* p. 6.
[442] COSTA, Leonardo, VERGÉS, Josep and BARRAQUÉ, Bernard (2008): *Shaping a new Luso-Spanish Convention*, Economics Working Papers 082008, Católica Porto Business School, Universidade Católica Portuguesa.
[443] BÁNDI, Gyula (2011): *Környezetjog* [Environmental Law], Budapest, Szent István Társulat, p. 115.
[444] *See* section II.2.1.2. above.

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a) Objectives and principles of EU environmental policy

The objectives of EU environmental policy are defined by the TFEU as follows: the preservation, protection and the improvement of the quality of the environment, the protection of human health, the prudent and rational utilisation of natural resources, and the promotion of measures at international level dealing with regional or worldwide environmental problems[445]. The objectives of EU environmental policy must be pursued in accordance with a number of statutory principles, notably the principle of high level of protection, the precautionary principle, the principle of preventive action, the principle that environmental problems as a priority should be rectified at source and that the polluter should pay[446]. The "classic" objectives of water management, such as security of water supply, protection against water-related hazards (floods, droughts, etc.) do not feature in EU primary law.

b) Institutional constrains

As in the case of other shared competences, the EU adopts its own environmental legislation through the so-called ordinary legislative procedure, *i.e.* by the joint legislative act of the Council of ministers (voting by qualified majority) and the European Parliament (voting by simple majority)[447]. In the context of water policy, however, there is one major exception to this rule: "measures affecting the *quantitative management* of water resources or affecting, directly or indirectly, the availability of those resources" can only be adopted through a special legislative procedure, where the Council acts with unanimity and the European Parliament is only consulted (*i.e.* cannot block or amend the legislation as under the ordinary legislative procedure)[448]. Arguably, this exception is designed to safeguard member states' sovereignty to regulate the flow of water by way of granting veto power to each of them and by excluding the European Parliament, generally seen as an activist, green force in the joint decision-making process[449].

[445] Article 191.1, TFEU. Also *see* BÁNDI (2011) *op. cit.* p. 115-117.
[446] Article 191.2, *ibid.*
[447] Article 192.1, *ibid.*
[448] Article 192.2, *ibid.* (emphasis added).
[449] BARANYAI, Gábor (2015): The Water Convention and the European Union: The Benefits of the Convention for EU Member States. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 88-100, p. 90.

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To achieve its environmental policy objectives the EU and its member states cooperate with third countries and international organisations and may conclude *international agreements*[450]. Importantly, agreements that are ratified by the EU itself form an integral part of the EU's legal system and, as such, are binding on the EU institutions and its member states[451].

II.2.3.2. The evolution of EU water law and policy

The *European Economic Community* (EEC) – the predecessor of today's European Union – started to regulate water-related matters in the 1970s. The first wave of legislation took place between 1975 and 1980. This period that has resulted in a large number of EEC directives and decisions which laid down selected environmental quality standards for specific types of water bodies (*e.g.* fish water, surface water, bathing water, drinking water) or established emission control and discharge limit values for specific water uses (*e.g.* various industrial activities using hazardous substances)[452]. The 1980s and 1990s saw the adoption of some highly costly water infrastructure-related legislation, such as the directives concerning nitrates pollution from agricultural sources or the collection and treatment of urban waste water. By the mid1990s EU water law accumulated over 20 legislative acts covering not only specific water uses, quality objectives and discharge limits, but also product standards and procedural requirements[453].

This extensive, yet patchy legislative arrangement did not, however, prove capable of reversing the continuous deterioration of water quality in Europe. Such relative failure can be attributed to several overlapping causes. First, the incomprehensive nature of EU water law created major lacunas, leaving significant water issues unattended. Thus, the benefits of relative progress with regards to one area (*e.g.* phasing out the discharge of certain hazardous substances) could have easily been cancelled out by the lack of progression in other fields (*e.g.* diffuse pollution). Second, implementation by member states was less than satisfactory. As Reichert euphemistically notes: "member states treated EU water directives more as recommendations rather than legally binding obligations"[454]. Finally, it must also be mentioned that many of the

[450] Article 191.4, TFEU.
[451] Article 216.2, *ibid.*
[452] EUROPEAN ENVIRONMENTAL BUREAU (2005): *EU Environmental Policy Handbook*, Brussels, http://www.wecf.eu/cms/download/2004-2005/EEB_Book.pdf (accessed 12 February 2019), p. 129.
[453] MACRORY, Richard (1993): European Community Water Law, *Ecology L.Q.* 20, pp. 119-139, p. 119.
[454] REICHERT (2016) *op. cit.* p. 48.

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politically motivated early water legislation simply failed the minimum tests of scientific robustness or regulatory clarity[455].

Following lengthy technical and political preparations a new policy framework was agreed in the form of the so-called *Water Framework Directive* ("WFD") in 2000[456]. The bulk of EU legislation adopted ever since has focused on the implementation of the WFD.

Mention also must be made of the general or specific policy documents of the EU that address water in a significant manner. The most important such instruments are the EU's regular *environmental action programmes,* developed by the European Commission and endorsed by the European Parliament and the Council. The current such action programme – the 7th since the first one in 1973 – was adopted in 2013 under the title of "Living well, within the limits of our planet"[457]. Recently, and thus far uniquely in the history of EU environmental policy, the European Commission also issued a stand-alone water policy document entitled "*A Blueprint to Safeguard Europe's Water Resources*"[458] that sets topical water-related objectives and measures so as to complement the Water Framework Directive and fill its implementation gaps[459].

[455] For example, the first bathing water directive (Directive 76/160/EEC) – adopted in 1976 – required compliance with 19 (!) quality parameters, ranging from microbiological pollutants to heavy metals. No wonder that by the time the proposal for a new directive was tabled by the Commission in 2003 practically all member states were condemned by the European Court of Justice for non-compliance. Subsequent research on the health impacts of bathing waters revealed that most of the original parameters were indeed irrelevant for bathers' health. As a result, the current bathing water directive (2006/7/EC) calls for the observance of only two microbiological parameters.
[456] 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.
[457] Decision No. 1386/2013/EU of the European Parliament and of the Council of 20 November 2013 on a General Union Environment Action Programme to 2020 "Living well, within the limits of our planet".
[458] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A Blueprint to Safeguard Europe's Water Resources, COM (2012) 0673 final.
[459] While these documents do not have the legal force to overrule the WFD or other EU directives, they define the broader context and provide additional policy directions as to their implementation. *E.g.* the Environmental Action Programme lays down important resource efficiency goals such as to ensure, by 2020, that water abstraction respects available renewable water resource limits (para 41). Similarly, the Blueprint cautiously introduces the notion of "ecological flows" into EU water policy that is supposed to fill the gap created by the almost complete ignorance of river flow quantity management questions by the system of the WFD, underlying that "there is a need in many EU river basins to put quantitative water management on a much more solid foundation" (section 2.1). Also *see* section: III.2.2.3. a) below.

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II.2.3.3. Overview of contemporary EU water law and policy

The centrepiece of today's EU water law and policy is Directive 2000/60/EC establishing a framework for Community action in the field of water policy, i.e. the *Water Framework Directive*. The WFD represents a *broad overhaul of the previous water policy and regulatory philosophy*: it has either replaced or called for the gradual repeal of 25 years of previous EU water legislation, leaving only a handful of pre-WFD legislation in effect[460]. As mentioned above, the broad framework of the WFD is complemented by two policy documents: the EU's 7th Environment Action Programme and the Blueprint[461].

The WFD lays down a comprehensive framework for the protection and the improvement of the aquatic environment in the Union. Nonetheless, it does not amount to an exhaustive "water code". In fact, the regulatory character of the various provisions of the WFD varies greatly. Some clauses are extremely detailed, while some are programmatic in nature. Moreover, the WFD also points out to other EU legislation in the field of water management and environmental protection.

The WFD has a universal scope covering all inland freshwater (surface and groundwater) bodies within the territory of the EU as well as coastal waters. It also covers wetlands and other terrestrial ecosystems directly dependent on water[462]. Its regulatory approach is based on *the integrated consideration of all impacts* on the aquatic environment, extending the focus from purely chemical to biological, ecosystem, economic and morphological aspects. It establishes *environmental objectives* for *surface waters, groundwater* and so-called *protected areas* (areas designated under other EU legislation for their particular sensitivity for water – *e.g.* nature conservation areas, drinking water resources, etc.)[463]. These objectives are summarised as "*good water status*", described in the Annexes to the Directive by precise ecological and chemical parameters for surface waters, on the one hand, and chemical and quantitative parameters for groundwater, on the other hand[464].

[460] BARANYAI (2015) *op. cit.* p. 90.
[461] *See* section II.2.3.2. above.
[462] Article 1, WFD.
[463] Article 4, *ibid.*
[464] "Good status" for surface waters is described as a "slight deviation" from the aquatic biodiversity found or estimated to exist under conditions where there has been only very minor human impact. For groundwater, "good status" means that groundwater quality and quantity does not negatively impact surface water status or the ecology of terrestrial ecosystems which depend on groundwater (Annex V, WFD).

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Importantly, the WFD considers *quantitative issues* as "ancillary" to water quality, conspicuously leaving surface water quantity to a regulatory grey zone[465]. Member states are obliged to carry out *extensive monitoring* of the quality of the aquatic environment along EU-wide coordinated methodologies[466].

The planning and implementation framework of the WFD is the *river basin*. Member states are obliged to identify river basins in their territory and assign them to river basin districts (formal administrative management units comprising one or more basins). If a river basin is shared by more than one member state, it has to be assigned to an *international river basin district*[467].

The environmental objectives of the WFD have to be achieved through a complex planning and regulatory process that, in the case of international river basin districts, requires the active cooperation of member states[468]. The main administrative tools of member state action are the *river basin management plans* and the *programmes of measures* to be drawn up for each river basin district (or the national segment of an international river basin district). The WFD lays down strict deadlines for the preparation of the management plans and for compliance with the environmental objectives. As a general rule, all water bodies in the EU had to reach good status by the end of 2015. If, objectively, that was not possible and was clearly justified under any of the several statutory exemptions specified under the Directive[469], good water status will have to be ensured by the end of the following planning cycle of 2021, or ultimately, by the final compliance deadline specified by the WFD, that is 2027. It must be underlined that these deadlines are not merely "management-planning objectives", but as the European Court of Justice underlined in a landmark judgement in 2015, legally binding obligations for which member states hold full responsibility under EU law[470].

The WFD, as its name suggests, provides only a framework for water policy. There exists a range of *additional EU legal acts* addressing various specific water-related issues.

[465] In detail *see* section III.2.1.3. a) below.
[466] Article 8, Annex V, WFD.
[467] Article 3, *ibid.*
[468] Articles 3, 13, *ibid.*
[469] Articles 4.4-4.7, *ibid.*
[470] C-461/13, Bund für Umwelt und Naturschutz Deutschland e.V. v. Federal Republic of Germany, ECLI:EU:C:2015:433.

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The first group of such measures is concerned with various sources of pollution or the chemical status of water. The most important such measure is the *urban waste water directive*[471], the single most costly piece of environmental legislation ever to be implemented in EU history[472]. It obliges EU member states to collect and subject to appropriate (*i.e.* at least biological) treatment all urban waste water above 2000 population equivalent and the waste water of certain industrial sectors. Another important source of nutrient input, that is nitrates pollution from agricultural sources, is regulated by the so-called *nitrates directive*[473]. It aims to prevent the nitrates pollution of ground and surface waters from agricultural sources through the promotion of good farming practices. Discharges into surface waters of the most prominent hazardous substances is governed by the *environmental quality standards directive* (or priority substances directive) that sets limit values for 33 priority hazardous substances and 8 other pollutants with a view to their progressive elimination[474]. The *groundwater directive* establishes a regime which defines groundwater quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater[475].

The EU's general industrial pollution legislation, the so-called *industrial emissions directive* lays down an integrated permitting system for the most important industrial installations, with strict conditions relating to surface water, groundwater and soil protection[476]. It subjects all existing and future permits to a periodic review in light of the developments in the best available technique, a set of complex and evolving industry-specific technological and management benchmarks. While less relevant in this context, mention must nevertheless be made of the *drinking water directive*[477], the *bathing water directive*[478], the *flood risk management directive*[479] or the *marine strategy directive*[480], all contributing to the objectives of the WFD.

[471] Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment.
[472] http://ec.europa.eu/environment/water/water-urbanwaste/implementation/factsfigures_en.htm (accessed 12 February 2019).
[473] Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources.
[474] 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.
[475] 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.
[476] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control).
[477] Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption.
[478] Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 concerning the management of bathing water quality.
[479] Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks.
[480] Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy.

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Significantly, other EU environmental measures have important effects on water management. These include horizontal legislation such as the *environmental impact assessment* and the *strategic environmental impact assessment directives*[481], the *directive on the access to environmental information*[482], the *environmental liability directive*[483], EU nature conservation measures, especially the *habitats directive*[484].

II.2.3.4. Transboundary cooperation under EU water law and policy

As mentioned above, the WFD follows a basin approach. Consequently, the directive foresees close cooperation among member states sharing international river basins, projecting such cooperation as the quintessential element of the European model of water governance[485]. The basin approach is, however, manifested mainly through certain *procedural and planning requirements and mechanisms* member states must follow, rather than hard and fast substantive rules.

First of all, member states are required to coordinate their efforts aimed at meeting the environmental objectives of the Directive for the entire river basin or river basin district[486]. This implies that where a river basin is covered by the territory of more than one member state, it must be assigned to a so-called *international river basin*. When no agreement is reached on the designation of such international basin by the riparians concerned, any member state may request the European Commission to facilitate the process[487]. Shared river basins must be subjected to the same administrative and institutional regimes as purely national basins, irrespective of their international character[488].

[481] Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment; Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment.
[482] Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information.
[483] Directive 2003/35/EC of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage.
[484] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna.
[485] Recital (14), Preamble, WFD.
[486] Recital (35), *ibid.*
[487] Article 3.3, *ibid.*
[488] *Ibid.*

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Second, member states must *coordinate the management* of their sections of the international river basin from the start of the planning phase all the way through the implementation process, in particular in the preparation and execution of river basin management plans and programmes of measures[489]. As a priority, the member states concerned are called upon to produce a *single management plan* for the entire river basin. This is, however, not an obligation of result. Should the coordinative efforts of member states fail to produce a comprehensive international river basin management plan, riparian governments are merely required to adopt uncoordinated national plans and measures for their respective parts of the international basin[490]. To settle the differences that may emerge in this process among member states the Commission may, again, be invited to facilitate[491].

Third, where an international river basin districts falls partly outside the territory of the EU, the member states concerned are called upon to establish "appropriate *coordination" with the non-EU riparian countries* with a view to achieving the environmental objectives of the WFD for the entire basin[492]. This implies the rather soft requirement to "endeavour" to produce a single river basin management plan in cooperation with the relevant non-EU riparians[493].

Member states can fulfil the above coordination requirements through existing international mechanisms, basin organisations, bilateral water committees, etc.[494]. As shown above, most *European basin commissions* have indeed been mandated by their members to ensure the coordination of the implementation of the WFD in their respective basins. In some cases, like the Meuse, a new basin commission has even been set up with the specific objective to create a framework for WFD implementation[495]. The expansion foreseen by the Directive beyond the territory of the EU also proved successful as all non-EU riparian states in the Rhine, Danube and Sava agreed to implement the WFD in their respective shares of the basin[496].

Finally, the WFD introduces a modest quasi *dispute resolution* mechanism to facilitate inter-state differences in the above processes. As already mentioned, any member state whose water

[489] Article 3.4, WFD.
[490] Article 13.2, *ibid.*
[491] Article 3.4, *ibid.*
[492] Article 3.5, *ibid.*
[493] Article 13.3, *ibid.*
[494] Article 3.4, *ibid.*
[495] *See* section II.2.2.3. above.
[496] *Ibid*.

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management has been impacted by another member state may "report" the problem to the affected riparian and/or the *European Commission*, together with its own recommendations to solve the problem. All the Commission is required to do, however, is to "respond" to the recommendation of the concerned party within a period of six months[497].

Other pieces of water-related EU legislation also impose certain interstate cooperation obligations. The most notable is the *Floods Directive* that requires riparian states to assess and map flood risks as well as to develop flood risk management plans[498]. It foresees the same type of (rather weak) coordination mechanism as the WFD, urging member state to exchange data and produce a single risk management plan for international river basins[499]. This directive, however, also contains an important substantive obligation – a rare, but explicit transposition of the "no-harm" rule into EU law – that prohibits member states to adopt such flood management measures in international river basins that may significantly increase flood risks downstream or upstream[500].

In addition, some of the *pollution-related water directives* also regulate certain aspects of co-riparian relations. *E.g.* the priority substances directive addresses the issue of cross-border pollution in so far as it exempts downstream member states from their responsibility to meet EU environmental quality standards to the extent non-compliance is caused by upstream member states[501]. In a less explicit way, the urban waste water directive, too, recognises upstream-downstream interdependence. Under a rarely applied clause, if a member state is affected by sewage pollution from another member state, it may notify its problem to the relevant upstream state and the Commission. In such cases the parties are required to hold consultations so as to "ensure conformity with the directive"[502].

General *EU environmental law* also creates important obligations for Member States in their cross-border water relations, most notably the directives relating to environmental impact assessment, industrial emissions and environmental liability[503]. They all establish specific notification and consultation procedures with a view to assessing, preventing or mitigating

[497] Article 12, WFD.
[498] Directive 2007/60/EC.
[499] Articles 4.3, 8.2, *ibid.*
[500] Article 7.4, *ibid.*
[501] Article 6, Directive 2008/105/EC.
[502] Article 9, Directive 91/271/EEC.
[503] *See* section II.2.2.3. above.

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transboundary freshwater impacts. These procedures – that are largely modelled on the applicable UNECE conventions[504] – constitute the framework for the implementation of the "prior notification of planned measures" principle of international water law within the EU[505].

II.2.3.5. Institutional background

a) European Commission

The European Union does not have specific administrative bodies (agencies) dedicated solely to the questions of water management. Nevertheless, as in the case of most EU policy areas, the *European Commission* exercises multiple powers with in the field of water too.

In its role as the "guardian of the treaties" the Commission has universal competence to *supervise* the *compliance* of member states with EU water law[506]. The Commission receives and checks implementation reports submitted by member states regularly in accordance with the various EU directives. The Commission also accepts *complaints* by natural or legal persons that have information on any infringement of EU law. Once the Commission detects any instance of non-compliance, it may investigate the case through the so-called *infringement procedure* and may eventually refer the case to the European Court of Justice[507]. Indeed, the Commission has an impressive record in relation to water-related infractions: in 2017 a quarter of all investigations undertaken in the field of environment were connected to water[508].

The Commission does not only check the implementation of adopted water legislation, but also very much *determines the priorities and measures of water poli*cy on its own right. Most importantly, under the TFEU the Commission has the exclusive right of initiative, *i.e.* tabling legislative proposals to the Council of Ministers and the European Parliament[509]. The latter have no formal powers to call for the initiation of draft legislation or other policy documents (although they may exert a degree of political pressure on the Commission to do so), they can

[504] *See* section II.2.2.2. a) above.
[505] *See* section III.2.3.3. below.
[506] CRAIG and DE BÚRCA (2003) *op. cit.* p. 61.
[507] On the infringement procedure *see* section III.2.5.3. below.
[508] http://ec.europa.eu/environment/legal/law/statistics.htm (accessed 12 February 2018).
[509] CRAIG and DE BÚRCA (2003) *op. cit.* p. 60.

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only amend what the Commission had already proposed. Thus, the development of European water law and policy very much depends on the political agenda of the Commission.
The Commission also plays an important *coordinative, facilitating role* when it comes to the implementation of EU water law. In response to the complexity and demanding timetable of the WFD it has set up an informal coordination forum of high-ranking civil servants ("*water directors*") from member states' (plus Norway's) national water administrations. By today, EU water directors' meetings have grown into a key operative platform to discuss EU-wide water issues. This platform adopts the non-binding implementation programmes and guidance materials of EU water law such as the Common Implementation Strategy, work programmes, various guidance documents and other resource materials[510].

Finally, as mentioned above, the European Commission has been allocated a somewhat unusual *mediation* role under the Water Framework Directive. However, as it will be discussed below, this mediatory position is truly alien to the Commission's usual working methods and, thus far, has served very little practical purpose in the reconciliation of co-riparian differences[511].

b) European Court of Justice

The EU's highest court of law, the Court of Justice of the European Union or as commonly called: the *European Court of Justice* ("ECJ") is a crucial player in the enforcement of the Union's water policy. Under the TFEU it has the exclusive competence, in the framework of the *infringement procedure* initiated by the Commission, to establish weather a member state has complied with its legal obligations or not[512]. If non-compliance is established, yet the member state concerned fails to live up to the judgement, the Commission may initiate a second court procedure as a result of which the ECJ may impose a significant financial penalty on the erring state[513]. Under a separate mechanism – the *so-called preliminary ruling procedure* – national courts may also seize the ECJ, asking it to provide binding interpretations on abstract questions of EU law[514]. Finally, the European Court of Justice has exclusive jurisdiction to

[510] The Common Implementation Strategy (CIS) is essentially the combination of a guidance toolbox, a continuously updated work programme and an information exchange platform, maintained by the Commission together with the network of member states' water directors. The main products of the CIS process have been more than thirty guidance documents and almost two dozen thematic and technical reports. The CIS is supported by a specific electronic water information database (Water Information System for Europe – WISE).
[511] *See* section III.2.5.3. below.
[512] Article 258, TFEU.
[513] Article 260, TFEU. Also *see* section III.2.5.3. below.
[514] Article 267.2, TFEU.

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adjudicate *bilateral disputes among member states* concerning the application of EU law[515]. As it will be discussed in detail later, actions before the ECJ initiated by member states against each other are extremely rare and it is unlikely that this avenue will ever become an effective mechanism for the settlement of co-riparian conflicts[516].

Given the prominence of water issues in EU law and the complexity and costs of European water law, the ECJ hears a relatively large number of water-related cases. Since the elapse of the transposition deadline of the WFD in 2002, it has adjudicated over 20 cases that were connected to this single directive[517]. Official statistics show that most of such procedures concern pollution issues only (typically due to the lack of adequate waste water treatment or diffuse nitrates pollution). These judgements hardly go beyond the establishment of the facts and the condemnation of the erring member state[518]. Far less is the number of the cases launched by national courts seeking the interpretation of actual regulatory provisions (*e.g.* out of the 20+ judgements relating to WFD only 7 were preliminary rulings)[519]. There have been, however, a small number of cases where the ECJ did make a critical impact on water policy. Examples include the interpretation of the EU's powers to regulate water quantity issues in the context of the Danube Convention[520] or the legal force of the environmental objectives of the Water Framework Directive[521].

c) European Environment Agency

While not formally engaged in policy supervision and enforcement, the European Environment Agency ("EEA") – a sublet of the European Commission headquartered in Copenhagen, Denmark – nonetheless plays an important role shaping EU water policy by way of providing a robust monitoring data and analyses. The EEA collects and evaluates information on a very wide range of water-related subjects, such water quality, water quantity, water stress indicators, etc. not only for EU member states, but also for neighbouring and candidate countries[522].

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[515] Article 259, TFEU.
[516] S*ee* section III.2.5.3. below.
[517] http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32000L0060 (accessed 12 February 2019).
[518] http://ec.europa.eu/environment/legal/law/pdf/statistics_sector.pdf (accessed 12 February 2019).
[519] http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32000L0060 (accessed 12 February 2019).
[520] C-36/98, Spain v. Council, ECR 2001, I-00779. Also *see* section III.2.1.3. a) above.
[521] C-461/13, Bund für Umwelt und Naturschutz Deutschland e.V. v. Federal Republic of Germany, ECLI:EU:C:2015:433. Also *see* section II.2.3.3. above.
[522] http://www.eea.europa.eu/themes/water/dm#c1=Data&c1=Graph&c1=Indicator&c1=Interactive+data&c1=Interactive+map&c1=Map&c0=10&b_start=0 (accessed 12 February 2019).

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II.2.3.6. Evaluation

The European model of transboundary water governance, especially the Water Framework Directive, has been universally praised as the most sophisticated and progressive transnational water regime. For its courageous innovations with respect to river basin planning, holistic coverage of all waters and uses, internalisation of economic considerations, public participation, etc. the WFD unquestionably represents a very high level of political and policy ambition that can serve as a model for the rest of the world[523].

Yet, a closer look at some of the constituent features of the EU's water transboundary cooperation regime reveals a number of important *shortcomings*. First, most of the relevant requirements are purely *procedural* in nature. This reflects a widely shared regulatory philosophy in EU bureaucracy that assumes that the right procedures lead to good decisions[524]. Yet, the procedures that are supposed to provide the backbone of basin cooperation cover only a small segment of possible interactions among riparian states. *E.g.* while EU countries are required to develop joint river basin management plans and programmes of measures, this obligation does not extend to the joint implementation of the plans. Where, exceptionally, EU water law imposes substantive obligations on fellow basin states these do not go beyond a context-specific adaptation of the "no-harm" rule laid down by the UNECE Water Convention and the UN Watercourses Convention[525].

Besides, not only is cooperation reduced mainly to procedures, compliance with such cooperation procedures is not supported by robust *sanctions*. In fact, as described above, if member states fail to come to terms in the preparation of joint international river basin or flood risk management plans, their failure to cooperate triggers no legal consequences whatsoever[526]. Similarly, the basic cooperation procedures are not broken down to distinct *procedural steps* (timetables, milestones), nor are they supported by established platforms for consultation (although the European Commission may be invited to help). While basin organisations play an important role in coordinating the planning processes of riparian states, they have neither the

[523] DELLAPENNA, Joseph. W. and GUPTA, Joyeeta (2008): The Evolution of Global Water Law. In DELLAPENNA, Joseph. W. and GUPTA, Joyeeta (Eds): *The Evolution of the Law and Politics of Water*, Dordrecht, Springer, pp. 3-20, p. 10.
[524] KRÄMER, Ludwig (2002): Thirty Years of EC Environmental Law: Perspectives and Prospectives, *Yearbook of European Environmental Law* 2, pp. 155-182.
[525] *See* section II.2.3.4. above.
[526] *Ibid.*

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powers, nor the ambition to vigorously coordinate or to compel countries to participate in the process. Not surprisingly, in view of the lack of common procedural guidelines and the absence of sanctions the coordination of transboundary river basin management plans shows a very mixed picture[527].

Besides reducing cooperation to certain weak procedures, an additional shortcoming of EU transboundary water law is the fact that it has long been dominated by *quality (pollution) and ecological considerations*. At the outset, this one-sided focus could have been justified by the abundance of freshwater in north-western European countries – the core states of European integration – as well as by the dominance of cross-border pollution issues in the first decades of EU water policy. The fact, however, that this approach was subsequently ossified in the EU's founding treaty seems to create the single biggest drag on adaptation to changing hydrological conditions in Europe, which will likely to be dominated by sharp fluctuations in river flow rather than intense point source pollution[528]. Some critics also underline that even where the EU fixes ecological objectives, these are not as progressive as they appear to outside observers as their implementation can be deferred almost *ad infinitum*[529].

II.2.4. The interplay among the various layers of European transboundary water governance: cross-fertilisation or cannibalisation?

The remarkable intensity of actual transboundary water cooperation, colourfully illustrated in Figure 12, as well as the recent lack of noisy inter-state water disputes indeed suggest that the European Union and its member states have managed to develop a *stable legal and institutional framework* to manage cross-border hydrological issues. This conclusion has, indeed, been repeatedly confirmed by various comparative studies that place Europe among the best performing regions when it comes to hydropolitical resilience worldwide[530]. This – as Reichert rightly concludes – "is itself a major achievement not to be underestimated in a conflict-ridden world"[531]. Some even argue that the common planning requirements imposed collectively on basin states may help balance the fundamental upstream-downstream dichotomy as the WFD

[527] BARANYAI, Gábor (2016): Managing Upstream-Downstream Dichotomy in European Rivers: A Critical Analysis of the Law and Politics of Transboundary Water Cooperation in the European Union. In EDSI: *The Water Footprint in Decision Sciences*, Proceedings of the 7th EDSI Conference, Helsinki, Finland, pp. 318-330, p. 326.
[528] In detail *see* section III.2.1.4. below.
[529] VAN RIJSWICK et al. (2010) *op. cit.* p. 134.
[530] *See* section I.5.4.3. above.
[531] REICHERT (2016) *op. cit.* p. 102.

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lifts downstream states onto the same level as other basin states[532]. Such shift of positions is expected to materialise not only out of the community spirit of riparian states envisaged by the Directive, but also by upstream dependence on the benefits of downstream action, such as improved fish migration or flood prevention[533].

While such jubilation is certainly not without foundations, one should not forget about some important shortcomings, especially when it comes to EU's *sui generis* water law and the interaction of the three regimes[534].

The evolution of transboundary water governance in the EU – viewed from a historic perspective – shows at least three distinct phases of development. The first (post-World War II) phase was characterised by bilateral issues and regimes that did not aim to cover large and complex international river basins in a comprehensive manner. The second phase, triggered by the collapse of the Berlin Wall, witnessed the emergence of complex multilateral basin treaties and organisations as well as the birth of the UNECE Water Convention. Since the entry into force of the EU's Water Framework Directive in 2000, the focus of political attention and member state action has shifted towards the implementation of the gargantuan ecological improvement project envisaged by the WFD.

Against this background the question of the *efficiency* of EU transboundary water governance characterised by multiple and overlapping layers naturally arises. Do these regimes compete, cooperate or helpfully complement one another? Is there a dominant regime with hegemonic ambitions? In other words: does *the nature of the interplay* among the various layers of transboundary water governance display signs of positive cross-fertilisation or deadly cannibalisation by the dominant regime?

The question whether or not one particular regime plays dominates transboundary water governance among EU member states seems relatively easy to answer. Yes, the EU's relevant legal instruments, in particular *the Water Framework Directive,* clearly *dominate* contemporary co-riparian relations in the Union. Indeed, the regulatory philosophy of the WFD and the close practical cooperation its implementation requires created a new cohesion and dynamics among

[532] MOELLENKAMP (2007) *op. cit.* p. 1414.
[533] *Ibid* p. 1419.
[534] *See* section II.2.3.6. above.

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EU member states that is probably unique in its kind all over the world[535]. This shift of trend and focus is eloquently illustrated by the WFD's growing influence on international water agreements and river basin organisations within the EU. As shown above, by now all basin commissions in Europe placed the basin-wide planning, coordination and monitoring tasks flowing from the WFD at the core of their work programme[536]. In the case of the river Meuse even a new basin treaty was adopted for the implementation of the Water Framework Directive, practically side-lining all other transboundary issues[537]. In a probably less conspicuous fashion the UNECE Water Convention has also extensively drawn on the WFD. As Francesca Bernardini notes: "many of the soft-law instruments, guidelines and recommendations developed under the Convention were inspired by the Directive and based on the experience of the EU parties with its implementation"[538].

More difficult is to answer the question whether the dominance of EU directives in the European transboundary governance scene leads to *a mutually beneficial reinforcement* of all affected regimes *or* to the *gradual erosion of the weaker ones*. Indeed, in the context of bilateral water treaties the WFD did bring new focus and impetus. As noted above, many such bilateral treaties have been revised as a result of the new obligations introduced by the WFD. Even, the WFD was often used as a pretext to revisit old and outdated water agreements whose long overdue revision was systematically blocked by a complacent (typically: upstream) riparian state[539].

Less positive is the picture when it comes to the *relationship between* the *EU's own regime and the UNECE Water Convention* despite the fact that the constitutional hierarchy between the two regimes is crystal clear. Not only does the Water Convention sit higher on the EU's legal order that the directive, the preamble to the WFD explicitly defines the Directive as one of the implementing measures of the Convention[540]. The approach of the European Commission, however, suggests that it largely ignores or downplays the importance of the UNECE Water Convention as an instrument whose practical value has, supposedly, been superseded by the Water Framework Directive. This is somewhat surprising in view of the fact that EU member

[535] MOELLENKAMP (2007), p. 1414.
[536] *See* section II.2.2.3. above.
[537] *See* section II.2.2.3.f) above.
[538] BERNARDINI (2015) *op. cit.* p. 36.
[539] *See* section II.2.2.4. above.
[540] Recitals (23) and (35), Preamble, WFD.

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states can greatly benefit from the Convention, regardless of the extensive, environmentally progressive and technically detailed internal water legislation of the EU[541].

As, however, the Convention was opened for accession by countries outside the UNECE region in 2013, global interest has risen steadily, not least because of the dedicated campaigning by UN leaders and institutions[542]. Given that the EU is the single biggest bloc of parties in the Convention's system, a more active presence of the European Commission in the Convention's activities and bodies could multiply the global impact of the EU's own internal water policy. If nothing else, the potential of global political benefits is likely to trigger a more substantial engagement of EU institutions in the implementation of the UNECE Water Convention.

[541] BARANYAI (2015) *op. cit.* p. 100.
[542] *See* e.g. opening remarks of Ban Ki-moon, UN Secretary-General at the 2013 Budapest Water Summit, urging non-UNECE countries to join the Convention. https://www.un.org/sg/en/content/sg/statement/2013-10-08/secretary-generals-opening-remarks-budapest-water-summit-prepared (accessed 12 February 2019).

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PART III
THE RESILIENCE OF TRANSBOUNDARY WATER GOVERNANCE IN THE EUROPEAN UNION: A CRITICAL ASSESSMENT

Chapter 1
Why, what, how? – The assessment framework

III.1.1. The need for an assessment of the stability of co-riparian relations in the European Union

The need for a critical review of the legal, institutional and political stability of co-riparian relations within the European Union is underpinned by a series of overlapping factors.

Given the historic dependence of water governance on the reliability of historic data and rigid sovereignty concepts, changing hydrological conditions should warrant for a regular review even at the best of times[543]. It is true that the European Union boasts one of the most elaborate and extensive transboundary water governance regimes in the world[544]. At the same, however, it also suffers from a series of *structural deficiencies* such as the uneven interaction among the various layers of governance (UNECE, EU, basin, bilateral), the purely procedural nature of the cooperation requirements under EU law, the dominance of water pollution and ecological questions, etc.[545] Consequently, the European model of transboundary water governance well deserves a *comprehensive fitness check*, regardless of its relative success vis-à-vis other regional regimes in the world.

The necessity of review becomes even more compelling, if the above problem-setting is put into a *historic context*. It is common knowledge that the creation of new water cooperation treaties and institutions usually takes very long periods of time[546]. As a result, it often happens that by the time a new (or modified) water governance schemes is finally put in place it no longer caters for newly emerging hydrological realities[547]. The evolution of the contemporary

[543] COSENS, Barbara (2010): Transboundary River Governance in the Face of Uncertainty: Resilience Theory and the Columbia River Treaty, *Journal of Land, Resources & Environmental Law* 30 pp. 229-265, p. 230.
[544] *See* section II.2.3. above.
[545] *See* section II.2.3.6. and II.2.4. above.
[546] WOLF (2009) *op. cit.* p. 8.
[547] *See* section I.3.2.4. above.

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European transboundary cooperation framework is a case in point. Today's basin treaties have evolved in response to the unfettered pollution and morphological alteration of transboundary freshwaters on either side of the Iron Curtain until the late 1980s. The backbone of the EU's internal regime, the Water Framework Directive, also reflects the water quality challenges core EU member states were facing in the final decades of the past millennium. In other words, even the most recent transboundary water governance innovations in Europe are almost two decades old. Yet, the unfolding new hydrological phenomena – such as the growing variability of flow volumes and the continuous degradation of the aquatic environment – raise serious questions about the adequacy of existing transboundary arrangements within the European Union already today. As these negatives tendencies are only likely to intensify, they will further accentuate the mismatch between the original design parameters of the contemporary governance system and the unfolding hydropolitical future that will be characterised by competing water interests and a greater need to cooperate across the borders[548].

III.1.2. The subject of assessment: hydropolitical resilience and vulnerability in the European Union

III.1.2.1. Hydropolitical resilience and vulnerability revisited

The ultimate objective of this study is to map out the potential political risks and challenges affecting the joint management of shared surface waters within the European Union. Such risks and challenges will be assessed against the ability of the EU's transboundary water governance system "to absorb disturbance and reorganise so as to retain essentially the same function, structure and identity"[549]. Such capacity "to withstand and recover from stresses", – drawing on the terminology of general resilience science – will be referred to *resilience*[550].

Challenges to the resilience of transboundary water governance may emerge not only as a result of the *actual misfit* between the regime in place and the hydrological phenomena they are supposed to handle. They may also develop as a result of the *inability* of the governance system *to adapt to new circumstances*. These represent two interconnected, yet autonomous aspects of the resilience that can be formulated along the following questions:

[548] COSENS (2010) *op. cit.* p. 229.
[549] *Ibid* p. 231.
[550] *Ibid* p. 237.

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- is the existing regime fit to *handle current and emerging hydrological and political challenges* in a transboundary context?
- is the existing regime *capable to dynamically adapt* to new hydrological and the ensuing political challenges or its evolution is blocked by systemic legal, institutional or political obstacles?

The first question represents the *static dimension* of the issue. In this narrower sense the resilience of transboundary water governance is understood as the presence (or the lack) of risks of political dispute over shared water systems within the European Union. This condition can be best analysed through the various indicators developed by various scholars of hydropolitics[551]. The second question relates to the *dynamic dimension* of resilience that can be evaluated through various indicators relating to the adaptive capacity of socio-economic systems[552].

In order to expand the existing research base that mainly focuses on the first dimension of resilience, this study carries out both a formal (static) hydropolitical assessment as well as an evaluation of adaptive capacity of transboundary water governance in the EU.

III.1.2.2. The indicators applied

As outlined in Part I, the various schools of hydropolitics have developed a range of indicators to measure the stability of co-riparian relations in particular river basins. These indicators are based on the assumption that the resilience of transboundary governance can be best assessed with reference to a number of formal institutional constituents. The most commonly used indicators comprise

a) the presence of a water treaty,
b) mechanisms for water allocation,
c) water quality protection,
d) variability management,
e) the presence of formal cooperation institutions[553].

[551] DELLI PRISCOLI and WOLF (2009) *op. cit.* p. 22-23.
[552] GARMESTANI, Ahjond S. and BENSON, Melinda H. (2013): A framework for resilience-based governance of social-ecological systems, *Ecology and Society* 18(1), pp. 9-20, p. 12.
[553] *See* section I.5.4.2. below.

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Admittedly, these indicators provide only a raw picture of hydropolitical resilience as they largely omit the political-economic circumstances prevailing among riparian states or the hydrological conditions of the basin. Another limitation is that such indicators offer only a snapshot in a given moment in time, irrespective of the potential of the given system for evolution. Thus, an important factor of resilience: the capacity to adapt and learn remains completely outside their scope. Notwithstanding all these constraints, however, the simple and unambiguous nature of the formal hydropolitical indicator set makes it possible to apply them across a very wide range governance schemes and to arrive at easily comparable results.

In order to overcome the above shortcomings, the usual set of hydropolitical *indicators* have been *refined and expanded* so as to encapsulate not only the actual resilience of transboundary water governance in the EU, but also the ability of the system to adapt to changing hydrological and political conditions. As a result, the following indicators will be used for the purposes of the subsequent analysis:

a) water quantity management and water allocation;
b) water quality protection;
c) cooperation over planned measures;
d) management of hydrological variability;
e) conflict resolution mechanisms;
f) adaptive capacity of the institutions of transboundary water governance within the EU expressed through the following issues:
   fa) coordination among the different levels and actors;
   fb) transfer of information and feedback; and
   fc) authority and flexibility in decision-making and problem-solving

The above list of indicators differs on three instances from the raw hydropolitical matrix described in Part I.

First, no further inquiry will be carried out concerning the presence of a legal framework to govern co-riparian relations in the European Union as this issue has been comprehensively exhausted in Part II. While this regulatory framework may suffer from significant shortcomings, it nonetheless amounts to a robust legal structure that – through substantive obligations,

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procedures and institutions – serves as an undisputed basis for the interaction of basin states within the EU[554].

Second, an additional indicator is included on the cooperation between riparian states over planned interventions into shared waters. This indicator informs about the implementation of the legal principle of "notification concerning planned measures with possible adverse effects" outlined in detail by the UN Watercourses Convention[555].

Finally, the existence and the contemporary operation of formal water cooperation institutions within the EU has already been discussed in Part II extensively, so there is no need for further elaboration on that subject[556]. Such static description will, however, be supplemented by a *qualitative analysis of the dynamic aspect of resilience*, notably the adaptive capacity of these institutions to adjust to new hydrological and political challenges along three sub-indicators:

- coordination among the different levels and actors;
- transfer of information and feedback; and
- authority and flexibility in decision-making and problem-solving.

Given the distinct character of the analysis of institutional adaptive capacity, its findings will be summarised in a chapter separate from the formal legal-institutional assessment of EU transboundary water governance[557].

[554] *See* sections II.2.2.2. and II.2.2.3. above.
[555] *See* section I.3.2.3. above.
[556] *See* section II.2.3.5. above.
[557] *See* chapter III.2. below.

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Chapter 2
The resilience of transboundary water governance within the European Union: a legal and institutional analysis

III.2.1. Water quantity management and water allocation

III.2.1.1. The role of water quantity management and water allocation in the context of hydro-political resilience

Water quantity management in a transboundary context has several dimensions. The most apparent facet is the distribution of flow volumes among riparian states in regular conditions, including natural variations. Another dimension is the control of stream flow in extreme situations, *i.e.* where volumes exceed the regular ranges of fluctuation for reasons of natural character (floods, droughts) or of human origin (accidental releases). Finally, water quantity management includes deliberate human interventions to control river flow (volumes, timing) by way of water infrastructure (*e.g.* reservoirs) and other management measures (*e.g.* the reduction of upstream water abstraction in times of drought). A critical, albeit not quintessential element of quantity management is the deliberate partition of volumes of water among riparian states: *water allocation*. (Although much of the relevant literature refers to "quantity management" and "allocation" as interchangeable terms, this study refers to allocation as a subset of the broader category of water quantity management).

Mechanisms to allocate water between riparian states can take several shapes. In their comprehensive analysis of the subject Drieschova et al. classify the patterns of water allocation as follows[558]:

- *direct allocation mechanisms:* these clearly stipulate how water is to be divided between the parties. Direct allocation mechanisms can be *flexible* that distribute the resource by percentages or set quantities according to water availability. On the other hand, direct *fixed* mechanisms divide water by absolute volumes,
- *indirect allocation mechanisms:* indirect allocation mechanisms establish *processes* through which actual allocations are to be determined, but without codifying the specific quantities or proportions to be shared. These include:

[558] DRIESCHOVA, Alena, GIORDANO, Mark and FISCHHENDLER, Itay (2008): Governance Mechanisms to address flow variability in water treaties, *Global Environmental Change* 18 pp. 285-295.

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  - consultations between parties,
  - an obligation to notify when water need arise,
  - a requirement for co-riparians to consent to any increased water use,
  - prioritisation of uses, etc.
- *allocation principles and guidelines:* these are broader ideas or concepts for determining how water should be allocated now or in the future. Such principles include:
  - equitable and reasonable utilisation,
  - rational use,
  - sustainable use,
  - no harm,
  - protection of existing uses[559].

Each mechanism has its benefits and drawbacks. Direct allocation mechanisms provide clarity, but it can be difficult to reach agreement on actual quantities of water. Direct fixed mechanisms may effectively ignore natural fluctuations in water quantity, let alone out-of-range variations triggered by climate change. If the allocation mechanism is rigid and inflexible, the parties are less able to honour their commitments once water availability changes[560]. Indirect mechanisms are flexible, but at the same time they are open-ended which may turn problematic when clearer direction is needed. Such ambiguity may allow parties to reach an agreement relatively easily, but may also lead to controversy later, especially when the availability of water does not satisfy all parties' needs[561]. This applies particularly to the broad legal principles of water sharing that – as Meredith Giordano and Aaron Wolf have demonstrated – have very little practical impact on the actual practice of water allocation[562].

Conventional wisdom suggests that the allocation of water among riparian states is one of the most frequent and powerful driver of water-related inter-state disputes[563]. In other words, the relative importance of allocation questions in co-riparian relation correlates with the hydropolitical complexity of a given basin. In fact, as Aaron Wolf contends, it is the "question of equitable allocations" that lies "at the heart of most international water conflicts"[564]. It is

[559] *Ibid* p. 286.
[560] DINAR et al. (2014) *op. cit.* p. 5.
[561] *Ibid.* p. 5-6.
[562] GIORDANO (2002) *op. cit.* p. 24-25.
[563] *See* Figure 3 above.
[564] WOLF, Aaron T. (1999): Criteria for equitable allocations: The heart of international water conflict, *Natural Resources Forum* 23 pp. 3-30, p. 3.

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therefore not surprising that much of the world's water-related legal apparatus is primarily concerned with water sharing, since the presence of allocation mechanisms may confer resilience to any given transboundary governance scheme[565].

Recently, the impact of water allocation mechanisms on the stability of co-riparian relations was tested through quantitative mathematical modelling by Dinar et al. The research aimed to measure, on the basis of a large number of institutional and economic-political variables, the degree to which given allocation mechanisms influence hydro-political resilience. The conclusions of the study contributed significantly to the refinement of one of the established premises of hydropolitics, notably, that allocation mechanisms are the institutional cornerstones of hydropeace. In fact, it was found that water allocation *per se* is no panacea. There are several transboundary basins (even regions) of the world that display a high degree of hydropolitical stability despite the absence of allocation mechanisms in their governance arrangements. This – conclude the authors – flows from an endogeneity issue: in basins where no hard allocation problems are likely to arise riparian states tend not to negotiate and institutionalise water sharing mechanisms. Equally, certain allocation mechanisms do more harm than good to hydro-political stability. As mentioned, rigid and inflexible water sharing arrangements that ignore actual or future hydrological variations are more likely to contribute to the rise of co-riparian tensions rather than to alleviate them. In a similar fashion, ambiguity and vagueness in water allocation may negatively affect hydro-political relations among states. In conclusion: the mere presence of an allocation mechanism does not necessarily increase resilience. On the other hand, allocation mechanisms that are both flexible and specific tend to increase the likelihood of cooperative behaviour among riparian states[566].

In summary, *sufficiently precise and flexible allocation arrangements* contribute positively to hydro-political stability. Too rigid or too vague water sharing mechanism may actually exacerbate political tensions, depending on the gravity of the underlying allocation problem. The absence of allocation mechanism only bodes for hydro-political vulnerability, if there is acute competition over the use of shared water resources or such competition is likely to arise in the future in view of changing hydrological conditions.

III.2.1.2. Water allocation mechanisms in international water law

[565] DINAR et al. (2014) *op. cit.* p. 2.
[566] *Ibid* p. 19-20.

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Historically, water allocation has been a dominant feature of international water treaties. Water sharing schemes have been the primary focus of almost 40% of all transboundary water agreements concluded during the 20th century, only to be surpassed slightly by hydroelectricity[567]. Allocation schemes feature equally high in contemporary water treaties. On the basis of the detailed comparative analysis of international basin specific agreements concluded between 1980 and 2002 Dreischova et al. found that 60% of such agreements included one of the three allocation mechanism referred to above, while 26% included one or more direct allocation mechanisms. Indirect allocation is used in about half of the treaties, often complimenting a direct mechanism. Principles of allocation are rarely employed independently[568].

Yet, the most authentic codification of contemporary international water law, the *UN Watercourses Convention,* does not define water allocation mechanisms, it merely lays down the principle of *equitable and reasonable utilisation* that is meant to provide key guidance for all allocation questions[569]. Importantly, however, no hard and fast rules can be derived from the equitable and reasonable utilisation imperative, nor is it supported by robust international judicial practice[570]. In fact, the weak guidance given by the principle does not even amount to a common frame for reference[571]. Therefore, its success largely depends on the effectiveness of their administration and enforcement[572]. As a result, the equity concept has very little practical impact on actual water sharing mechanisms[573].

At regional and basin level, however, a significant number of agreements actually do address allocation in a more elaborate fashion. *E.g.* the *SADC Revised Protocol on Shared Watercourses* specifically covers certain critical uses riparian states may rightfully pursue (agricultural, domestic, environmental and industrial use) and the relevant flow regulation measures[574]. Importantly, the southern African region has a large number of international rivers that are subject to specific basin agreements and commissions that lay down precise allocation rules or

[567] RIEU-CLARK et al. (2012) *op.cit.* p. 93.
[568] DRIESCHOVA et al (2008) *op.cit.* p. 289.
[569] RIEU-CLARK et al. (2012) *op.cit.* p. 100. Also *see* section I.3.2.3. above.
[570] BARANYAI and BARTUS (2016) *op. cit.* p. 45.
[571] WOLF (1999) *op. cit.* p. 10.
[572] RAI, Subash P., SHARMA, Nayan and LOHANI A.K. (2016): Transboundary Water Sharing: Issues Involved, *Environmental Policy and Law* 46/1 pp. 62-68, p. 65.
[573] GIORDANO (2002) op. cit. p. 24-25.
[574] Article 3.2 and 1.1, SADC Revised Protocol. Also *see* section I.3.2.4. above.

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define mechanisms for water allocation on the basis of the Revised Protocol (*e.g.* the 2002 Incomaputo Agreement concerning the Incomati and Maputo rivers[575]).

Several *multilateral basin treaties* also contain some kind of allocation mechanisms. For example the 1995 Agreement on the Sustainable Development of the Mekong River Basin sets minimum and maximum flow requirements for the mainstream for the dry season, the wet season as well as defines acceptable minimum monthly natural flows[576]. It also lays down mechanisms and institutions for the determination of actual flow quantities in the lower Mekong basin[577]. Similarly, the 2002 Charter of Waters of the Senegal River lays down a list of principles and priorities as to how to apportion water among different uses and sectors in the entire basin. Actual transboundary allocations are to be determined by the Permanent Water Commission according to the principles and the modalities set out in the Annexes to the Charter[578]. Another well-known water sharing mechanism has been instituted among the central-Asian republics of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan[579]. In this case, the water resources of the Aral Sea basin are allocated among the riparian states by the Interstate Commission on an annual basis in accordance with a series of agreements.

Even more prominent is the presence of allocation principles, rules and mechanisms in general or issue-specific *bilateral water treaties*. Examples include the 1909 Boundary Waters Treaty between the US and Canada[580], the 1944 treaty between the US and Mexico on the Colorado, Tijuana and Rio Grande rivers[581], the 1996 Indian-Bangladeshi Ganges treaty[582], the 1960 Indus

[575] Article 7 and Annex I, Tripartite Interim Agreement between the Republic of Mozambique and the Republic of South Africa and the Kingdom of Swaziland for Co-Operation on the Protection and Sustainable Utilisation of the Water Resources of the Incomati and Maputo Watercourses, Johannesburg, 29 August 2002.
[576] Articles 5 and 6, Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin, Chieng Rai, 5 April 1995.
[577] Article 26, *ibid.*
[578] Article 19, Charte des eaux du fleuve Sénégal, 28 May 2002.
[579] Agreement between the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan, Turkmenistan and the Republic of Uzbekistan on Cooperation in the Field of Joint Management on Utilization and Protection of Water Resources from Interstate Sources, Statute of the Interstate Commission for Water Coordination of Central Asia, Alma-Ata, 18 February 1992.
[580] Treaty between the United States and Great Britain relating to Boundary Waters, and Questions Arising between the United States and Canada, Washington, 11 January 1909.
[581] Treaty between the United States of America and Mexico relating to the utilization of the Waters of the Colorado and Tijuana Rivers and of the Rio Grande, Washington, 2 March 1944.
[582] Treaty between the Government of the Republic of India and the Government of the People's Republic of Bangladesh on sharing of the Ganga/Ganges water at Fakarra, New Delhi, 12 December 1996.

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Waters Treaty between Pakistan and India[583], etc. These agreements contain a large variety of allocation mechanisms referred to above[584].

III.2.1.3. Water allocation in the European Union

As outlined in Part II, the evolution European water governance has been mainly driven by water quality and ecological considerations[585]. This is not at all surprising in view of the fact that these instruments were originally conceived by economically developed, environmentally conscious countries with abundant water resources[586]. In other words: the collective action problems behind transboundary water cooperation in Europe were relatively benign, with the major international basins displaying relatively low hydro-political complexity[587]. As a result, the three multilateral layers of the body European water law: EU law, the UNECE framework and the major basin treaties *almost comprehensively ignore water quantity issues*, let alone allocation. Importantly, a number of bilateral treaties do contain certain allocation mechanisms. These individual arrangements, however, – apart from the Albufeira Convention – usually do not amount to comprehensive and sophisticated water sharing regimes.

a) EU law

The point of departure as regards water quantity management under EU law is Article 192.2, point (b) of the Treaty on the Functioning of the European Union (TFEU) which subjects the adoption of "measures affecting the quantitative management of water resources or affecting, directly or indirectly, the availability of those resources" to the so-called *consultation procedure*. As outlined above this, on the one hand, implies an unfettered veto-power by any member state and, on the other, excludes any meaningful participation of the European Parliament from the legislative process. Although the said article of the TFEU permits member states to deviate from the unanimity rule so that they adopt legal acts on water quantity

[583] Indus Waters Treaty, Karachi, 19 September 1960.
[584] For a comprehensive list of multi- and bilateral agreements concerning water sharing *see* WOLF (1999) *op. cit.* p. 16-29 and Appendix A.
[585] *See* section II.2.1.1. above.
[586] MCINTYRE, Owen (2015): The Principle of Equitable and Reasonable Utilisation. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 146-159, p. 146.
[587] *See* Figure 3 above.

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management by qualified majority (the so-called "passerelle"), but arriving at such a decision requires unanimity among member states in the first place too[588].

Importantly, the current formulation of the quantity management clause is relatively new as it was incorporated into the predecessor of the TFEU in reflection to a judgement of the *European Court of Justice* in a case launched by Spain against the Council of the European Community for the ratification of the 1994 Danube Convention by the EU[589]. The legal substance of the case concerned the limits of the EU's powers to adopt legislation on water management questions, rather than cooperation in the Danube basin (that lies thousands of kilometres away from Spain). While the judgement usefully clarified the EU's powers to regulate water protection through the ordinary legislative procedure, it nonetheless introduced and ossified a sharp and rather artificial *distinction between water quality* and *water quantity management* that pervades EU water law ever since[590]. As a result, today both the current treaty language and the explicit jurisprudence of the Court refers water quantity measures squarely to the unanimity box, which practically amounts to a natural political break on any significant consideration of transboundary water quantity issues at EU level[591].

Consequently, the quantitative aspects of water management appear in EU water law only sporadically. In fact, the Water Framework Directive itself begins with reinstating the secondary role of water quantity by way of declaring that "[t]his Directive aims at maintaining and improving the aquatic environment in the Community. This purpose is *primarily concerned*

[588] *See* section II.2.3.1. b) above.
[589] C-36/98, Spain v. Council, ECR 2001, I-00779. Also *see* section III.2.1.3. a) above.
[590] When the EU ratified the Danube Convention by Council Decision 97/825/EC, Article 1302(2) of the Treaty establishing the European Community (predecessor of the TFEU) called for unanimity vote for the adoption of any measures "concerning the management of water resources". As the relevant Council decision had been approved by qualified majority Spain brought an action against the ratification before the Court alleging that it was adopted on an inappropriate legal basis. Spain's plea was based on a broad interpretation of "water management" and of the objectives and content of the Convention. Notably: water management is to be construed to encompass all measures that are designed to administer and rationalise the use of water (para 10). As the Convention affects various aspects of water management, it could have only been ratified through unanimity in Council. The European Court of Justice however – in line with the arguments of the Council, the Commission, Portugal and France – concluded that the term "management of water resources" had to be construed narrowly, covering only measures "which regulate the quantitative aspects of the use of those resources […], not those concerning the improvement and the protection of the quality of those resources" (para 52). Thus the adequate procedure for the ratification of the Convention must be determined in view of the primary purpose and the content of the measure (para 58). When water quantity aspects appear only "incidentally" in a complex water-related legislation – such as in the case of the Danube Convention – the measure must be regarded as an "environmental protection" rather than "water management" instrument. Consequently, it can be adopted through the ordinary (co-)decision procedure, rather than by unanimity in Council (para 74).
[591] *See* section II.2.3.6. above.

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with the quality of the waters concerned. *Control of quantity is an ancillary element* in securing good water quality […]" (emphasis added)[592].

In a slightly contradictory manner, however, the WFD makes a modest effort to incorporate certain water quantity considerations with reference to "the need for action to protect Community waters *in qualitative as well as in quantitative terms*"[593], the necessity of "common principles […] to coordinate Member States' efforts to improve the protection of Community waters in terms *of quantity and quality*, to promote sustainable water use"[594] and the "need for a greater *integration of qualitative and quantitative aspects* of both surface waters and groundwaters, taking into account the natural flow conditions of water within the hydrological cycle" (emphasis added)[595].

Against this restrictive and somewhat confusing background EU law nonetheless does regulate certain aspects of water quantity management:

- first and foremost, for *groundwater* bodies the WFD defines good quantitative status as one of the constituent elements of the environmental objectives to be achieved ("good status")[596]. Thus, in the context of subsurface waters the WFD treats the qualitative (chemical) and quantitative dimension on an equal footing. To a much lesser extent quantity aspects are addressed also in relation to *surface waters* in so far as the "quantity and the dynamics of water flow" must be regarded as a "factor of water quality" (*sic*)[597];
- the WFD covers a number of *physical interventions* that affect the availability and quantity of waters. In particular, it calls for the introduction of control measures (*e.g.* authorisation) over the abstraction of surface water and groundwater[598], the impoundment of surface water[599], artificial recharge or augmentation of groundwater[600];
- finally, a complete directive is dedicated to transboundary cooperation over *flood* protection, a *par excellence* quantitative aspect of water management[601].

[592] Recital (19), WFD.
[593] Recital (4), *ibid.*
[594] Recital (23), *ibid.*
[595] Recital (34), *ibid.*
[596] Article 2.26, *ibid.*
[597] Annex V, point 1, *ibid.*
[598] Article 13.3 (e), *ibid.*
[599] *Ibid.*
[600] Article 13.3 (f), *ibid.*
[601] Directive 2007/60/EC. This directive is analysed in the context of variability management below, *see* section III.2.4. below.

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This ambivalence concerning water quantity management transpires through the EU's existing water policy documents too. The current strategic document of the EU, the 2012 *Blueprint* for Europe's Waters, clearly recognises the pivotal interlinkages between quality and quantity, considering the latter as an important factor in the achievement of good water status[602]. Such purely *ecological approach to quantity management* is further elaborated in a guidance document issued by the European Water Directors entitled "Ecological flows in the implementation of the Water Framework Directive"[603]. While the ecological flow concept may seem an important sign of the gradual emancipation of water quantity considerations, in reality its impact remains inherently limited both in terms of legal status (no formal recognition by the WFD) and scope (it ignores the water needs of sectors other than the natural environment).

Against this backdrop it is no surprise that EU law does not in any way address the question of *transboundary water allocation*. At the same time, it creates almost insurmountable legal and political obstacles to address the issue in any substantial manner, let alone on equal footing with water quality management. As a result, all that remains in place to guide member states when it comes to cross-border water sharing are the principles of equitable and reasonable utilisation and the no-harm rule, incorporated into EU law through the backdoor of the UNECE Water Convention[604].

b) UNECE law

The UNECE Water Convention does not explicitly address the transboundary allocation of water resources either. It does, however, contain a number of important provisions that provide useful guidance to riparian states when it comes to water quantity management. Also, in an important region of the UNECE – notably: Central Asia – the Water Convention has played a key role in pacifying co-riparian relations characterised by highly political allocation disputes[605]. Finally, the Convention bodies have lately started to address the quantitative aspects

[602] Section 2.1., Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A Blueprint to Safeguard Europe's Water Resources, COM (2012) 0673 final. *See* section II.2.3.2. above.
[603] EUROPEAN COMMISSION (2015): *Ecological flows in the implementation of the Water Framework Directive*, CIS guidance document No. 31, Luxembourg
[604] Baranyai (2015) *op. cit.* p. 100. Also *see* section III.2.1.3.b) below.
[605] *See* sections I.3.2.4.b) and III.2.2.2. above.

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of transboundary water governance in an open spirit. Consequently, while both EU law and the Water Convention are primarily driven by quality considerations, the UNECE regime seems to go much further in accommodating quantitative aspects of water management, including transboundary allocation.

First and foremost, the Convention requires riparian states to "ensure that transboundary waters are used in *a reasonable and equitable way*, taking into particular account their transboundary character, in the case of activities which cause or likely to cause *transboundary impact*"[606] (emphasis added). The Convention defines "transboundary impact" broadly, *i.e.* covering not only significant ecological impacts, but also "effects on socio-economic conditions" caused by alterations in river flow[607]. The official Guide to the Convention further specifies that "a real impairment of [any] significant use" must be construed to be covered by the Convention definition[608], underlining that such impairment can relate not only to public health or the environment, but also to industry or property, *i.e.* economic uses of water[609]. Importantly, unlike its UN counterpart, the UNECE Water Convention does not specify the conditions that are relevant to equitable and reasonable utilisation. To bridge that gap, however, the Guide refers to Article 6.1. of the UN Watercourses Convention that enlists a range of relevant non-ecological factors, such as the social and economic needs of the watercourse states concerned, the population dependent on the watercourse, and other existing and potential uses as well as establishes the relative precedence of vital human needs in case of conflict among conflicting uses[610]. In summary, *the UNECE Water Convention does cover the quantitative aspects of transboundary water management* under the equitable and reasonable utilisation principle as it is complemented by the "no-harm" rule[611]. Although the Convention does not specify direct *allocation rules or mechanisms*, it nonetheless goes beyond ordinary EU law as it recognises the importance water quantity management *on equal footing* with quality control and constraints basin states' room for manoeuvre for river flow manipulation[612].

The UNECE's own practice also offers important lessons that underline the significance of the Convention in the field of water sharing mechanisms. Most notable is the example of the Aral

[606] Article 2.2.c), UNECE Water Convention.
[607] Article 1.2, *ibid*.
[608] UNECE (2013): *Guide to Implementing the Water Convention*, Geneva, p. 15.
[609] McIntyre (2015) *op. cit.* p. 148.
[610] UNECE (2013) *op. cit.* p. 24. Also *see* section I.3.2.3. above.
[611] Article 2.1, UNECE Water Convention.
[612] Baranyai (2015) *op. cit.* p 97-98, 100.

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Sea basin whose riparian states – Tajikistan, Turkmenistan, Uzbekistan, the Kyrgyzstan and Kazakhstan – were all born following the demise of the Soviet Union. The region is characterised by persistent water allocation disputes among riparian states that emante from the extreme divergence in upstream-downstream supply and demand conditions as well as strategically different flow timing needs. Through its principles, cooperation platforms and mechanism the UNECE Water Convention has contributed considerably to the relative hydropolitical stability of the region[613].

Furthermore, recently the Convention bodies have dedicated greater attention to the political complexities future changes in river flow are likely to give rise to in the implementation of the Convention[614]. The Convention's Task Force on Water and Climate has even acknowledged the evident conflict potential of the issue as well as the necessity to consider allocation questions at transboundary or basin-level[615]. Such potential turn into a real conflict, *i.e.* if any riparian state considers that a particular water sharing scheme or practice runs counter to the relevant principles of the Convention, it may bring the matter to the attention of the Implementation Committee through a simple procedure[616].

c) Multilateral basin treaties

The *Danube Convention* covers several aspects of water quantity management. While its main focus area remains water quality improvement, it is nonetheless based on a broad notion of sustainable water management that incorporates quantitative dimensions too. This is best illustrated by the collective and individual obligation of riparian states to establish basin wide

[613] MOSELLO, Beatrice (2008): Water in Central Asia: a prospect of conflict or cooperation? *Journal of Public and International Affairs* 19 pp. 151-174, p. 161. Also *see* sections I.3.2.4.b) and III.2.2.2. above.

[614] https://www.unece.org/environmental-policy/conventions/water/envwatermeetings/water/workshops-water-convention-and-protocol-on-water-and-health/2017/global-workshop-on-water-allocation/doc.html (accessed 12 February 2019).

[615] „Most significant water allocation decisions may be best considered at the transboundary or basin-wide level — agriculture, energy, ecosystems, infrastructure. Indeed, sustainable water resources management may be claimed by upstream countries but downstream ones may have a different opinion regarding the meaning of "an equitable and reasonable manner," a designation that should take into account a set of relevant factors and circumstances, such as the ones listed in article 5 of the UN Watercourses Convention (United Nations, 1997)", Task Force on Water and Climate, Seventh meeting, Draft Collection of lessons learned and good practices on climate change adaptation in transboundary basins, 2014, section 7.7, p. 30, http://www.unece.org/fileadmin/DAM/env/documents/2014/WAT/10Oct_13-15_Geneva/7th_Task_Force/TFWC_2014_3_Collection_of_lessons_learned_and_good_practices_first_draft_rev.pdf (accessed 12 February 2019).

[616] *See* section III.2.5.3.b) below.

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and national water balances[617]. These water balances are designed to express "the relationship characterising the natural water household of an entire river basin as to its components (precipitation, evaporation, surface and underground runoff)", including "man-made effects originating from water use and influencing water quantity"[618]. Moreover, the Danube Convention requires riparian states to cooperate with regards to existing and planned river flow control measures ("water construction works, in particular regulation as well as runoff and storage level control of watercourses, flood control and ice-hazard abatement") and other water uses (such as water power utilisation, water transfer and withdrawal, etc.) so long as these measures/uses are likely to give rise to transboundary impacts[619]. While water quantity management is expressly covered by the Convention, water allocation is not mentioned in the text even indirectly. Water balances are prepared for monitoring purposes only, rather than to establish water sharing principles, let alone quotas. All that the Convention provides for in this context is the observance of general principles of international water law – sustainable and equitable utilisation of water resources and the prevention of transboundary harm – and a set of notification and consultation procedures[620]. Against this limited consideration of water quantity management by the Convention, it is not surprising that the work programme of the International Commission for the Protection of the River Danube, the implementing basin organisation, reflects very limited political will to address potential water sharing questions in a substantial manner, even though the impacts of climate change and variability is now perceived as one of the top collective action problems in the basin[621].

The *Rhine Convention* focuses almost exclusively on water quantity measures, save a meagre reference to cooperation on flood protection[622]. Thus, the quantitative dimensions of transboundary water management come under the scope of the Convention indirectly, under the broad objectives of "environmentally sound and rational management of water resources" and the "principle of sustainable development"[623]. Despite this relatively narrow focus commentators underline that the Rhine governance regime is indeed based on the broad concept of integrated water resources management[624]. Consequently, in line with this integrated

[617] Article 9.3., Danube Convention.
[618] Article 1.g), *ibid.*
[619] Article 3.2, *ibid.*
[620] Articles 6., 10., 11. and 12., *ibid.*
[621] SCHEIMER (2013) *op. cit.* p. 178.
[622] Article 2.e), Rhine Convention.
[623] Articles 3.1.e), 4.g), Rhine Convention.
[624] JEKEL, Heide (2015): Integrated Water Resources Management as a Tool to Prevent or Mitigate Transboundary Impact. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary*

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approach the implementing body of the Convention, the International Commission for the Protection of the Rhine (ICPR) embraces a range of issues that are not of predominantly ecological character[625]. For example a special expert group has been established to address low water flow, a recent but recurring phenomenon in the Rhine basin (Expert Groups "Niedrigwasser")[626]. Also, a specific technical report was recently commissioned by the ICPR that identifies a 10-30% decrease in summer flow volumes and 5-40% increase in winter flows in the remote future[627]. In summary, the activities of the ICPR confirm the recognition of the growing importance of quantity management, yet there appear to be no immediate plans to systematically address allocation questions, let alone revise the Convention to that effect.

As opposed to the Danube and Rhine Conventions, the *Framework Agreement on the Sava River Basin* follows a different, more comprehensive regulatory approach. Instead of one specific focus area (*e.g.* pollution) or dominant approach (*e.g.* water quality management only) the Sava Framework Agreement is based on a more holistic view, encompassing all major water uses and transboundary impacts, including navigation, water quality, hydropower, etc.[628]. Thus the starting point of the Framework Agreement is the "water regime" that is the "*quantity and quality conditions of the waters* […] in space and time influenced by human activities or natural changes"[629] (emphasis added). The core objective of the cooperation of riparian states is therefore to "regulate all issues" in order to secure the "*integrity of the water regime* in the Sava River Basin"[630] (emphasis added). This requires the handling of water quantity and quality considerations on an equal footing. Consequently, the core obligation of riparian states is to ensure "water in sufficient quantity and of appropriate quality for […] aquatic ecosystems" and "[…] for navigation and other kinds of use/utilization" as well as the "effective control of the

Watercourses and International Lakes – Its Contribution to International Water Cooperation, Leiden, Boston, Brill Nijhoff, pp. 228-248, p. 237.

[625] *Ibid* p. 240.

[626] https://www.iksr.org/en/international-cooperation/about-us/organisation/working-group-floods-and-low-water-wg-h/ (accessed 12 February 2019).

[627] ICPR (2011): *Study of Scenarios for the discharge regime of the Rhine*, Technical Report No. 188, Koblenz.

[628] This broader approach flows from a number of conditions. First, the Sava Framework Agreement was born following the internationalisation of the Sava River due to the disintegration of the Socialist Federal Republic of Yugoslavia (*see* section II.2.2.3.e) above). As a result, all of sudden the new riparian states had to address the totality of transboundary water issues at the same time, rather than selected issues emerging over decades of cooperation. Second, the Agreement was born at a time when the one-sided dominance of chemical pollution issues was gradually superseded by the new paradigm: integrated water resources management. Finally, the Agreement was an important peace-and-stability project with very strong influence by the powers behind the Dayton Peace Agreement. As a consequence, the Sava Agreement was influenced more heavily by the 1997 UN Watercourses Convention than other basin treaties adopted in the preceding decade (*see* section I.3.2.3. above).

[629] Article 1.3., Sava Framework Agreement.

[630] Article 8.1, *ibid.*

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water regime"[631]. Regardless of this progressive regulatory approach, however, the Sava Framework Agreement does not go into details as regards the allocation of water resources among riparian states in case of conflict. It merely reiterates compliance with the equitable and reasonable utilisation principle and the no-harm rule as the fundamental obligation of parties when it comes to sharing the benefits of water use[632]. As in the case of other basins, this limited consideration of allocation questions may turn out to be insufficient in view of the increasing hydrological variability in the region. *E.g.* the Sava Basin Analysis Report, carried out for the International Sava River Basin Commission, forecasts that the expected 15-30%(!) reduction in mean annual runoff in the coming decades will alter water availability conditions significantly in the basin[633].

Unlike the Sava Framework Agreement, the other three major European basin treaties addressed by this study: the *Elbe Convention*, the *Oder Convention* and the *Meuse Agreement* almost completely ignore quantitative issues. In fact, the Elbe and Oder treaties are mainly concerned with institutional questions regarding the establishment and the operation of their respective basin commissions. These commissions are tasked with various programmatic exercises whose main focus is pollution prevention and control, monitoring, planning and early warning systems (although both are also supposed to measure and assess the general hydrological, including, quantitative situation of their respective river basins)[634]. As such, neither of the two Conventions contains rules governing water quantity management, let alone allocation mechanisms. While the primary focus of the Meuse Agreement is also water quality, it nonetheless makes reference to other important aspects of water management such as flood protection and droughts, or water uses relevant for spatial planning, agriculture, forestry. The Agreement also underlines the relevance of such considerations as "sustainable and integrated" water management and the "multi-functionality" of the resources of the river[635]. Beyond these distant references, however, the Meuse Agreement does not in any way address the issues of water quantity management and allocation among its riparians.

[631] Article 11.a), b), e), *ibid.*
[632] Articles 7 and 9, *ibid.*
[633] KOMATINA and GROŠELJ (2014) *op. cit.* p. 13.
[634] Article 2, Elbe Convention; Article 2, Oder Convention.
[635] Article 2, Accord international sur la Meuse.

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d) Bilateral water treaties

As shown above, at UNECE, EU and multilateral basin level water quantity issues are afforded hardly any attention. At bilateral level, however, several treaties contain provisions that address water allocation in a substantive fashion.

Most prominent in this respect is the *Albufeira Convention*, the comprehensive water management treaty between Spain and Portugal. Given the predominantly arid conditions prevailing in most of the Iberian Peninsula as well as the extensive use of storage and other flow manipulation facilities in both countries water sharing agreements are not at all a new feature of the bilateral relations[636]. The Albufeira Convention – as amended in 2008 by the Additional Protocol –, however, goes further than previous allocation schemes. It lays down an elaborate water sharing arrangement for each of the five river basins shared by the two countries both in terms of procedure and substance[637]. It sets precise minimum average volumes that each of the rivers entering the territory of the downstream riparian must carry. These quantities are expressed in cubic hectometre for annual, quarterly and weekly averages[638]. The relevant annexes also determine for each basin the conditions of exceptional circumstances – that is precipitation levels 30-40% below historic averages – when the minimum flow requirements are temporarily suspended. Importantly, these figures have not been derived from the august principles of international water law, but are based on historic uses, actual needs and future water availability projections. Empirical studies suggest that this complex river flow regime has contributed considerably not only to the stability of bilateral political relations, but also benefited both countries (even upstream Spain) in terms of net economic gain[639].

There exist a number of other bilateral treaties between EU member states that contain some kind of general or project (use)-specific water allocation rules. One of the best known of example is the 1958 *French-Spanish Agreement regarding the Lake Lanoux*[640], adopted in the wake of the 1957 Lake Lanoux Arbitral Award[641]. The agreement defines the precise amount

[636] CANELAS DE CASTRO (2009) *op. cit.* p. 5-6.
[637] Article 15-16, Albufeira Convention.
[638] Annex 2 to the Additional Protocol to the Albufeira Convention.
[639] CHATTERJEE, Indrani (2013): *Evaluating International Water Treaty Impacts & Risks: The Albufeira Convention and the Spanish Experience*, University of California at Riverside https://economics.ucr.edu/seminars_colloquia/2013-14/applied_economics/I%20Chatterjee%20paper%20for%2011%206%2013%20seminar.pdf (accessed 12 February 2019), p. 18.
[640] Agreement between the Government of the French Republic and the Spanish Government relating to Lake Lanoux, Madrid, 12 July 1958.
[641] Lake Lanoux Arbitration (France v. Spain) (1957) 12 R.I.A.A. 281; 24 I.L.R. 101.

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of water France must release to the Carol River that outflows to Spain from Lake Lanoux. Another important example of bilateral water sharing arrangement has been developed between Finland and the Russian Federation under the 1964 Finnish-Soviet frontier water agreement for the Vuoksi river basin that also includes the Lake Saimaa in Finland[642]. In accordance with the so-called *Discharge Rule* upstream Finland and downstream Russia cooperate closely on maintaining the flow quantity of the Vuoksi River in a "normal zone", defined by the Rule with reference to historically prevailing natural flow volumes[643]. Should extreme floods or extreme low water levels appear, discharge rates are changed by Finland with a view to minimising adverse effects. Finland monitors the flow conditions continuously and forecasts indicative discharge rates. The discharge programme is negotiated annually by the two riparian states. According to commentators the water sharing scheme under the Discharge Rule has proved highly beneficial for both countries[644].

Less specific is the 1966 Austrian-Swiss-German agreement concerning withdrawals from the Lake Constance that mainly defines principles and procedures that riparian states must follow when planning to abstract water from the lake beyond a certain quantity[645]. Finally, there are a number of bilateral water frontier treaties that reinstate the rights of riparian states for the use of water quantities defined by "existing water rights" or lay down a 50-50% rule for sharing transboundary river flows[646].

III.2.1.4. Evaluation

The main conclusion that can be drawn from the above analysis is that transboundary water *allocation considerations are almost completely absent* from European water law. As such, the European model represents an outlier in the broader global context as, until relatively recently, the evolution of water treaties has been largely shaped by water quantity management issues worldwide[647].

[642] Agreement between the Republic of Finland and the Union of Soviet Socialist Republics Concerning Frontier Watercourses, Helsinki, 24 April 1964.
[643] Vuoksi Agreement on Discharge Rule in Lake Saimaa and the Vuoksi River, 1989.
[644] BELINSKIJ (2015) op. cit. p. 315.
[645] Agreement Regulating the Withdrawal of Water From Lake Constance, Berne, 30 April 1966.
[646] WOLF (1999) *op. cit.* p. 16-30.
[647] GIORDANO et al. (2014) *op. cit.* p. 259.

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The dominance of ecological issues in contemporary European water law could very well be justified by the abundance of freshwater in north-western European countries – the core states of European integration – as well as by the prevalence of cross-border pollution issues in the first decades of the development of UNECE/EU water policy. In other words: *the character of the collective action problems* in co-riparian relations did not raise much attention to the question of water allocation at the time.

The relative recent stability of co-riparian relations in Europe has also given rise to a widely held view that wherever allocation issues nonetheless do arise (mainly in the Iberian Peninsula), they tend to be *bilateral* and/or *use-specific* in nature. Consequently, goes the conventional judgement, they are better left to be resolved by the concerned riparian states themselves. All the more so as this complacent approach is practically ossified in legal terms as the restrictive unanimity requirement under the Treaty on the Functioning of the European Union renders it almost impossible to adopt water sharing rules at EU level. As a result, legal literature and political discourse on European water governance almost completely ignores the issue of transboundary water allocation or downplays its significance. Götz Reichert even sees such "bileteralisation" as a guarantee of (upstream) sovereignty underlining that "it seems appropriate not to allow an affected Member State to be overruled on such a potentially contentious issue" since "with regard to the delicate decision on water apportionment […] it seems more suitable […] to leave it to the regulation of the actually affected riparian states within the domain of international water law"[648].

Such complacency seems to be ill-founded on several grounds.

First, while most regions of the European Union have, thus far, been spared from dramatic water shortages caused by extreme droughts, over-abstraction or flow manipulation, all relevant studies project that *water quantity fluctuations with significant transboundary repercussions* are on the rise[649]. In other words: transboundary water allocation may not have been a contentious issue historically, but it is likely to become so in the foreseeable future. Against this background, the absence of allocation mechanisms in the EU bodes significantly for increased hydropolitical vulnerability.

[648] REICHERT (2016) *op. cit.* p. 40.
[649] *See* Figure 11.

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Second, EU countries and their immediate neighbours share some of the geographically most complicated river basins in the world, characterised by relatively short streams and high numbers of riparian states. As a result, should major changes emerge in flow volumes and/or in the timing of flow release in a given basin, their consequences are likely to cascade through a large number of countries within a short period of time. Thus *water allocation challenges* tend to have a *basin-wide*, rather than bilateral *scope*, multiplying the political complexity of the question.

Third, given the dominance of water quality and ecological requirements at UNECE, EU and basin level, EU states are subject to a *gross regulatory asymmetry*. On the one hand, they have to comply, individually and collectively, with uniform and precise water quality requirements whose implementation cannot be separated from the sufficient availability of water. On the other hand, EU water law, especially the WFD, takes hardly any notice of the growing competition for water resources either internally or in a transboundary context[650]. Consequently, member states are almost completely deprived of legal rights and mechanisms to demand that the necessary amount of water is made available to them. As a result, riparian states with high exposure to exogenous water sources may infringe their EU and international water quality obligations for the lack of sufficient volumes despite their best intentions and efforts.

Finally, the complacent official view of EU institutions and some basin organisations suggest that they grossly ignore or downplay the *highly contentious* nature of water allocation *negotiations*. While Europe has not yet seen the type of colourful, widely mediatised disputes ("water wars") that frequently occur in the western or southern United States or the Aral Sea basin, there are a number of negative examples in the EU, too, that should caution decision-makers. These examples illustrate that the highly sophisticated transboundary governance regime of the EU does not, on its own, increase the cooperative behaviour of an upstream riparian when it comes to releasing more water downstream. Take, for example, the best-known recent international legal conflict, the *Gabčíkovo-Nagymaros case*, which in its current stage is essentially a water allocation dispute. Upstream Slovakia and downstream Hungary have not been able to implement the 1997 judgement of the International Court of Justice that – in view

[650] ZIKOS, Dimitros and HAGEDORN, Konrad (2017): Competition for Water Resources from the European Perspective. In ZIOLKOWSKA, Jadwiga R. and PETERSON, Jeffrey M. (Eds.): *Competition for Water Resources Experiences and Management Approaches in the US and Europe*, Amsterdam, Elsevier, pp. 19-35, p. 20, 32.

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of the equitable and reasonable utilisation principle – unambiguously calls for the release of more water by Slovakia into the joint section of the River Danube[651]. Here, the accession of the two countries to the EU in 2004 and their (unchallenged) compliance with the Water Framework Directive has not moved the parties an inch closer to the resolution of the allocation issue[652].

In summary, the almost complete absence of water quantity and allocation considerations and rules from European water law is likely to become a *critical hydropolitical gap* in the European Union as the effects of climate change with significant impacts on transboundary river flow variations and competition for shared water resources intensify.

III.2.2. Water quality protection

III.2.2.1. The correlation between water quality management and hydro-political resilience

Water quality has become a key feature of transboundary water governance schemes relatively lately, despite its direct correlation with the health and well-being of humans and ecosystems as well as its impact on social and economic development. Yet, in many parts of the world water quality management is still seen as a luxury investment that only comes second to water quantity considerations in co-riparian relations[653]. As such, water pollution or other related ecological problems are considered to be less contentious ("malign") vis-à-vis other pressing questions of transboundary water management, *e.g.* allocation[654]. Accordingly, a great number of hydropolitical assessments do not even consider water quality management in any significant way. This is somewhat surprising in light of the fact that the highly complex political, economic and topographic implications of pollution control elevate the issue among the most difficult transboundary collective action problems worldwide[655].

[651] Case Concerning the Gabčíkovo-Nagymaros Project (Hungary v. Slovakia), Judgement, ICJ Reports 1997, 7, para 140.
[652] BARANYAI and BARTUS (2016) *op. cit.* p. 48.
[653] SCHMEIER (2013) *op. cit.* p. 68.
[654] *Ibid* p. 71.
[655] GIORDANO, Meredith A. (2003), Managing the Quality of International Rivers: Global Principles and Basin Practice, *Natural Resources Journal* 43, pp. 111-136, p. 114.

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Institutionalisation of cross-border water quality management has several stages. In her comprehensive survey of water treaties Meredith Giordano clusters quality control mechanisms into three categories:

- an *indefinite commitment* by riparian states to some aspects of water quality management,
- arrangements that define water quality-related actions but *lack specific standards* or a comprehensive management framework,
- *arrangements with detailed water quality standards*, actions plans and/or comprehensive management frameworks[656].

Importantly, water quality management is not limited to pollution prevention and control. More advanced regimes also address broader environmental and social aspects, going far beyond the actual chemical status of the transboundary water body concerned. In fact, such comprehensive ecological requirements as the consideration of ecosystem services have become standard treaty features in the past decade, displaying an almost exponential expansion in recent water treaties[657]. The spectacular *expansion of water quality management considerations in water treaties* is no doubt a token of the growing importance of pollution control and riverine ecology in the stability of hydropolitical relations.

III.2.2.2. Water quality protection in international water law

Although water quality and the environment have risen to dominance in transboundary water law only relatively lately, water pollution considerations have indeed shaped the evolution of the basic principles of contemporary water law significantly right from the outset[658]. Yet, qualitative requirements in water treaties started to expand drastically only since the 1950s. Ever since the number of agreements addressing water quality issues has multiplied almost tenfold. Even more spectacular is the recent emergence of broader environmental considerations into the forefront of transboundary treaty-making: since 1990 three quarters of all new international agreements contained some reference to the protection of the environment. A recent survey on the key features of water treaties by Mark Giordano et al. found over 160

[656] Ibid, p. 119.
[657] GIORDANO et al. (2014) *op. cit.* p. 259.
[658] GIORDANO (2003) *op. cit.* p. 115.

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existing water agreements that include some language on water quality management and/or environmental services[659].

The general requirements of international law regarding water quality protection in a transboundary context are accurately summarised by the 1997 *UN Watercourses Convention*. The Convention deals with water quality and environmental questions extensively. In the first place, the overarching principles of equitable and reasonable utilisation, the no-harm rule as well as the general cooperation obligation explicitly call for the "adequate protection of the [shared] watercourses"[660]. In that spirit, the Convention dedicates an entire part to the protection and preservation of water quality and the aquatic environment[661]. It stipulates the prevention, reduction and control of pollution of international watercourses as one of the core obligation of riparian states[662]. To that end, the Convention calls on parties to adopt joint measures such as setting joint water quality objectives, to establish techniques and practices to address pollution from point and non-point sources, to draw up lists of hazardous substances whose discharge must be eliminated, limited, monitored, etc.[663]. The Convention also addresses the ecological repercussions of emergency situations[664]. While the Convention provides a basic framework for the adoption of concrete measures by riparian states, it has nonetheless been criticised for its vague language and narrow scope when it comes to environmental protection[665].

Regional and basin treaties also address water quality considerations substantively. The 2000 *SADC Revised Protocol* repeats the relevant sections of the UN Watercourses Convention more or less verbatim[666]. More precise provisions on water quality management are laid down in the numerous basin treaties and actions plans adopted under the Revised Protocol. Some African treaties – like the 2003 Protocol for Sustainable Development of Lake Victoria Basin – also contain quite specific and measurable water quality control and improvement measures[667]. In Asia, the 1995 *Mekong Basin Agreement* provides an example of comprehensive, yet rather general approach to water quality management and environmental protection. The Agreement defines the "[protection] of the environment, natural resources, aquatic life and conditions, and

[659] GIORDANO et al. (2014) *op. cit.* p. 258.
[660] Articles 5, 7 and 8, UN Watercourses Convention.
[661] Part IV, *ibid.*
[662] Article 21.2, *ibid.*
[663] Article 21.3, *ibid.*
[664] Article 27, *ibid.*
[665] GIORDANO (2003) *op. cit.* p. 118.
[666] Article 4.2, SADC Revised Protocol.
[667] Article 6, Protocol for Sustainable Development of Lake Victoria Basin, Arusha, 29 November 2003.

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ecological balance of the Mekong River Basin from pollution and other harmful effects" as one of the core objectives of co-riparian cooperation[668]. The Agreement also calls for the prevention and cessation of harmful effects jeopardising water quality, aquatic ecosystem conditions and the ecological balance of the Mekong system[669].

Finally, there exist a large number of bilateral treaties addressing water quality at various levels of detail. Outside the EU the most advanced and effective such agreements are those concluded in the US-Canada and US-Mexico relations with regards to particular shared water bodies as the Colorado River[670] or the Great Lakes[671].

III.2.2.3. Water quality protection in the European Union

Water quality management and the preservation of riverine ecology take *centre stage* in European Union water law and policy. As outlined earlier, the development of all three layers of multilateral European water management – *i.e.* the UNECE, the EU and basin level – has been shaped by the persistent water pollution problems of the continent more than any other considerations[672]. This somewhat one-sided approach was vigorously reinstated in the EU context in 2000 for three further decades by the Water Framework Directive that placed water quality improvement at the heart of water management all the way through 2027[673].

It must also be underlined that the consistent ecological commitment of the EU and its member states has resulted in some bright examples of freshwater quality improvement worldwide (*e.g.* the return of the salmon to the Rhine[674]). These achievements justify the EU's efforts in this field, even if progress in meeting the ecological and water quality objectives of the WFD is seriously lagging behind the statutory schedule in many parts of the bloc[675].

[668] Article 3, Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin.
[669] Article 7, *ibid.*
[670] International Boundary and Water Commission (IBWC), Minute No. 242, Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River, 30 August 1973.
[671] Agreement on Great Lakes Water Quality, Ottawa, 22 November 1978.
[672] *See* section II.2.2.1. above.
[673] *See* section II.2.3.3. above.
[674] https://www.iksr.org/en/international-cooperation/rhine-2020/salmon-2020/salmon-2000/ (accessed 12 February 2019).
[675] Section 5, Communication from the Commission to the European Parliament and the Council: The Water Framework Directive and the Floods Directive: Actions towards the 'good status' of EU water and to reduce flood risks, COM (2015)0120 final

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a) EU law

The quality-related and ecological obligations of the EU's internal water regime constitute a very high level of policy ambition and regulatory complexity not only in global comparison, but also vis-à-vis other EU environmental legislation[676]. As outlined in Part II EU law defines a sophisticated set of chemical (and in the case of surface waters: ecological) objectives under the notion of "good water status" that are to be achieved through strict pollution prevention and control measures broken down by pollution sources, activities, pollutants, etc.[677] It also requires the protection of terrestrial ecosystems closely linked to water, in line with the EU's internal nature conservation legislation[678]. The regulatory approach of EU water law reflects a number of important *policy innovations* vis-à-vis other contemporary cross-border governance regimes. These include:

- *holistic view:* the Water Framework Directive covers all aspects of water quality and riverine ecology. The WFD goes beyond the traditional chemical pollution-focused regulatory model in so far as it requires the integrated consideration and comprehensive improvement of the biological, hydromorphological and physico-chemical conditions that determine the quality of life in freshwaters[679],
- *uniform ecological classification of all freshwater bodies:* the WFD contains precise normative parameters for the ecological classification of rivers, lakes, transitional and coastal waters[680]. To ensure that the values assigned by member states to the various ecological class boundaries are consistent and comparable, a so-called intercalibration exercise had been carried out by the European Commission before the real implementation of the programmes of measures were to commence[681]. This resulted in a largely uniform water quality snapshot for Europe that helped member states to introduce homogenous (or at least similar) assessment levels and protection measures. Ever since the initial characterisation the comparability of water quality and ecological data has been ensured by the uniform monitoring standards of the WFD,
- *integration into a broader environmental policy framework:* EU water law forms part of the Union's broader environmental policy. Consequently, transboundary water

[676] REICHERT (2016) *op. cit.* p. 50.
[677] *See* section II.2.3.3. above.
[678] Article 4.1.c), WFD.
[679] Annex V, WFD
[680] *Ibid.*
[681] EUROPEAN COMMISSION (2003): *Towards a Guidance on Establishment of the Intercalibration Network and the Process on the Intercalibration Exercise*, CIS Guidance Document No 6, Luxembourg.

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bodies in the EU also benefit from numerous other environmental measures such as the control of diffuse agricultural pollution, nature conservation, industrial emissions, waste management, etc.[682]

In summary, the elaborate water quality objectives, the iterative planning process, the detailed reporting requirements of EU water law and the systematic compliance checks by the European Commission results in a significant reduction in the pollution of transboundary waters in Europe as well as the improvement of the quality of the aquatic environment.

b) UNECE law

The UNECE Water Convention builds on earlier efforts undertaken by UNECE member states for "the prevention, control and reduction of transboundary pollution, sustainable water management, conservation of water resources and environmental protection"[683]. Consequently, the tasks of riparian governments centre around a number of *general environmental requirements* such as pollution prevention and control, ecologically sound water management or the conservation of aquatic resources and ecosystems[684]. The Convention requires the introduction of a range of national legal, administrative, economic, financial and technical measures, including the prior licensing of waste water discharges, various emission limits for the discharge of hazardous substances, the collection and treatment of municipal waste, reduction of nutrient inputs, etc.[685] Not only are riparian states required to control the discharge of pollutants into transboundary waters, they are also obliged to adopt quality objectives that limit the amount of pollutants in the aquatic environment[686]. Examples of such environmental measures include[687]:

- the protection and restoration of a given percentage of surface water bodies with the aim of achieving good surface water status by a certain date,
- the protection and restoration of a given percentage of groundwater bodies, and ensuring a balance between abstraction and recharge of groundwater,

[682] *See* section II.2.3.3. above.
[683] Recital (4), Preamble, UNECE Water Convention.
[684] Article 2.2, *ibid.*
[685] Article 3.1, *ibid.*
[686] Article 3.3, *ibid.*
[687] BUJDOS (2017) *op. cit.* p. 122-123.

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- the provision of access to a given percentage of the population to improved sanitation systems by a certain date,
- the termination of the discharge of untreated urban wastewaters into natural water bodies from a given number of wastewater treatment plants by a certain date,
- the identification of a given percentage of particularly contaminated sites (pesticides, oil products, or certain hazardous chemicals) by a certain date[688].

Even though these water quality and ecological requirements are rather general in nature, they nonetheless stand out in global comparison as representing one of the most environmentally conscious multilateral water governance regimes[689]. Importantly, however, in the context of EU member states the Water Framework Directive and the various other EU directives fully implement and, even, take further the general ecological programme foreseen by the Convention[690]. Consequently, in this respect the Convention has very limited practical significance in intra-EU co-riparian relations.

c) Multilateral basin treaties

All studied European basin treaties were negotiated and adopted in the 1990s and early 2000s. Treaty-making during that period was predominantly inspired by environmental quality considerations, corresponding to the political priorities of the era when pollution control was the major concern and the impacts of climate change were much less prevalent. Consequently, the main focus of contemporary European basin treaties is pollution control and, to a lesser extent, riverine ecology.

The earliest of all, the 1990 *Elbe Convention*, defines the prevention of the pollution of the Elbe and its drainage as the ultimate objective of the cooperation of the parties[691]. Thus, the priorities identified by the Convention revolve around environmental considerations, such as the elimination of waste water and other point source pollution, reduction of discharges resulting from accidents, etc.[692] (The relevant provisions of the 1996 Oder Convention follows very closely those of the Elbe Convention).

[688] UNECE (2011) *op. cit.* p. 35.
[689] GIORDANO (2003) *op. cit.* p. 125.
[690] BARANYAI (2015) *op. cit.* p. 97.
[691] Article 1.1, Elbe Convention.
[692] Article 2.1, *ibid.*

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While the focus of the *Danube Convention* is broadly similar, it is more elaborate and comprehensive in its ecological objectives. It defines "sustainable water management" and "stable, environmentally sound development" as the purpose of transboundary cooperation[693]. To that end, the Convention lays down a number of precise pollution prevention and control requirements as well as calls for the adoption of corresponding measures by the ICPDR and the riparian states in their respective capacities[694].

The *Rhine Convention* is also centred on water quality management and the restoration of the river's riverine ecology. Importantly, the Convention covers not only pollution control and biodiversity measures, but also such important hydrological conditions as the natural flow of solid matter or the interactions between the river, groundwater and alluvial areas[695]. Compared to other basin agreements, the Rhine Convention imposes precise direct obligations on parties with regards to water quality management. Thus, under the Convention riparian states are required to adopt autonomous measures to ensure that wastewater discharges are subject to prior authorisation, discharge of hazardous substances are gradually reduced, the risk of pollution from incidents and accidents is reduced, etc.[696]

The *Meuse Agreement* was designed as a collective vehicle for implementing the EU's Water Framework Directive by the affected riparian states. Consequently, it follows the ecological objectives and structure of the WFD in so far as it calls for the joint analysis of the Meuse Basin, the preparation of a single river basin management plan and programme of measures as well as the coordinated implementation of all supporting monitoring activities[697].

As regards water quality management the *Sava Framework Agreement* can be seen as an outlier. In view of its comprehensive and balanced approach towards water resources management, quality and ecological considerations are far less prominent than in the case of the above basin treaties. Thus, the prevention of water pollution stands on equal footing with other water

[693] Article 2.5, Danube Convention.
[694] Article 5, 6, 7, 8, 9 and 10, *ibid.*
[695] Article 3.1.c), Rhine Convention.
[696] Article 5.4, *ibid.*
[697] Article 4, Accord international sur la Meuse.

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management tasks of the Sava Commission such as flood prevention, utilisation of waters of the basin, extraordinary impacts on the water regime, etc.[698]

d) Bilateral water treaties

Cooperation over water quality has been a *standard feature* of general bilateral water treaties adopted since World War II in Europe. Importantly, water pollution questions were not only covered by agreements concluded between western European nations, but also by those under Communist rule (*e.g.* the 1955 Romanian-Yugoslav, the 1956 Austrian-Hungarian, the 1958 Czechoslovak-Polish or the 1967 Austrian-Czechoslovak frontier water treaties all address transboundary pollution)[699].

Among the relevant contemporary bilateral water treaties the *Albufeira Convention* deserves special attention as it lays down not only the water quality objectives of transboundary cooperation, but also defines precisely the types of measures parties are required to undertake to improve water quality under normal conditions as well as upon pollution incidents[700]. On the other end of the spectrum lie those European bilateral treaties that address quality considerations only superficially. These include some of the early frontier treaties mentioned, many of which are still intact after several decades. A more recent example is the 2009 Finnish-Swedish frontier water agreement which exhausts the subject by requiring the parties to cooperate in the formulation of their national water quality objectives[701].

In must be pointed out, however, that EU member states remain bound by the robust ecological programme laid down by EU water law in their bilateral relations, even if their respective agreements address pollution control or riverine ecology only superficially. Therefore, the occasional absence of explicit ecological requirements at the lowest level of transboundary water governance has very limited practical implications on the actual quality of shared waters.

[698] Annex I, Article 4.1.f), Sava Framework Agreement.
[699] GIORDANO (2003) *op. cit.* p. 129-130.
[700] Article 4.1, 10, 13, 17, Albufeira Convention.
[701] Article 5, Agreement between Finland and Sweden Concerning Transboundary Rivers, Stockholm, 11 November 2009.

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III.2.2.4. Evaluation

International water law and policy has witnessed a notable shift towards ecological issues in the past decades. It is, however, the European Union where such environmental consciousness has gone furthest both in terms of regulatory rigour and policy complexity. This is clearly illustrated by the *dominance of ecological considerations at all levels of transboundary water governance within the EU*. Indeed, under EU law practically all possible water management questions are subordinated to the protection and improvement of the aquatic environment. Non-ecological uses, such as navigation, irrigation, industrial consumption or energy production must all be adjusted to the ecological imperatives of the Water Framework Directive[702]. New interventions that impair freshwater quality and jeopardise the achievement of good water status can only be permitted if they are warranted by "imperative reasons of overriding public interest" and must be limited to the strict necessary minimum[703].

It remains to be seen whether the rather one-sided ecological focus of EU water law will withstand the new hydrological pressures of the Anthropocene. In any case, EU member states are subject to a regulatory framework of such a highly policy ambition and complexity that it is very *unlikely* that issues relating to water quality will give rise to *persistent political tensions* within the European Union.

III.2.3. Cooperation over planned measures

III.2.3.1. Unilateral interventions as a source of water conflict

It is a well-documented fact that most interstate water disputes are linked to some kind of a deliberate *unilateral intervention* into the basin implemented by one (typically upstream) riparian state to the detriment of others[704]. These interventions (measures) can take several shapes, but they mostly relate to flow quantity and timing or the installation of water infrastructures. The anatomy of water conflicts suggests that in the absence of a robust cooperation regime unilateral measures can quickly turn into a flashpoint triggering disputes

[702] Article 4.1, WFD.
[703] Article 4.7, *ibid.*
[704] DELLI PRISCOLI and WOLF (2009) *op. cit.* p. 14.

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among riparian states that often leads to long term tensions in the basin[705]. Indeed, the recent history of co-riparian relations is replete with examples of serious interstate disputes that erupted around dams, dykes, diversions, be it the blocking by India of the flow of the Indus river into Pakistan in 1948[706], the diversion by Slovakia of the Danube from the joint Slovak-Hungarian riverbed in 1992[707] or the highly publicised recent conflict between Egypt and Ethiopia surrounding the construction of the Great Ethiopian Renaissance Dam[708].

Not surprisingly, the prevention of disputes arising out of unilateral riparian action has been a key concern of international water law and policy from the outset. The Montevideo Declaration on Industrial and Agricultural Use of International Rivers, adopted as early as in 1933, already called on riparian states intending to implement projects affecting water use by other basin states to give an advance notice and three months for evaluation of the information provided[709]. The 1966 Helsinki Rules also contained a recommendation on the procedure to be followed by the "moving" state[710]. Today, there is no ambiguity as to the fact that cooperation over planned interventions in shared river basins is one of the core principles of international water law[711]. Given its centre-stage in transboundary water dispute prevention the subject is also a standard feature of hydropolitical assessments.

III.2.3.2. Cooperation over planned measures in international water law

As mentioned above, prior notification of planned measures is considered today as one the three core principles of international water law[712]. Its central role is eloquently illustrated by the fact that the *UN Watercourses Convention* actually dedicates more articles to the subject than any other topics. The Convention clearly spells out that riparian states are under a horizontal obligation to exchange information and consult on the possible effects of a planned intervention on an international watercourse[713]. Should the need arise riparians are also obliged to engage in

[705] *Ibid* p. 20.
[706] *See* section I.3.2.4.b) below.
[707] BARANYAI and BARTUS (2016) *op. cit.* p. 42.
[708] Ethiopia diverts Blue Nile for controversial dam build, BBC, 28 May 2013, http://www.bbc.com/news/world-africa-22696623 (accessed 12 February 2019).
[709] Declaration on Industrial and Agricultural Use of International Rivers, Art. 7, in Seventh International Conference of American States, Final Act 113 at 114 (1933).
[710] Article XXIX.2-4, The Helsinki Rules on the Uses of the Waters of International Rivers, Helsinki Declaration, 14-20 August 1966.
[711] MCCAFFREY (2015) *op. cit.* p. 58.
[712] *Ibid.*
[713] Article 11, UN Watercourses Convention.

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negotiations. This general requirement is broken down to precisely defined procedural steps. The first step is the "timely" notification of a planned measure that must take place well before a decision on the permit or implementation is made. Such notification must contain all the information that enables the affected riparian state to evaluate the possible effects of the planned project[714]. The Convention also sets a basic timeframe – six months – during which the recipient state should communicate its findings, a period that can be extended by additional six months[715]. During this period the state of origin must refrain from permitting or implementing the project[716]. If the recipient state considers that the planned measure contravenes the substantive principles of international water law (*i.e.* equitable and reasonable utilisation and no-harm), it must substantiate its findings with the corroborating documentation[717]. In such a case the parties must enter into consultations with a view to finding a mutually acceptable solution. During this time, but no longer than for an additional six months, the state of origin is obliged to withhold project authorisation or implementation[718]. If a riparian state finds out that another riparian aims to go ahead with a planned measure without prior notification, it can demand the notification documents and procedure described above. If the state of origin denies the need for prior notification, the states concerned must enter into consultations. If during that period the recipient so requests, the state of origin must suspend the project up to six months[719]. It must be pointed out that the Convention does not call on the state of origin to conduct an environmental impact assessment ("EIA"). It merely provides that the results of an eventual EIA must be transmitted to the other basin states[720]. The International Court of Justice, however, usefully clarified the status of EIAs in its 2010 judgement on the *Pulps Mills case*, underlining that "it may now be considered a requirement under general international law to undertake an environmental impact assessment where there is a risk that the proposed […] activity may have a significant adverse impact in a transboundary context"[721].

Other international legal instruments also lay down procedures of prior notification. *E.g.* the *SADC Revised Protocol* contains exactly the same general obligations, procedural steps and

[714] Article 12, *ibid.*
[715] Article 13, *ibid*.
[716] Article 14, *ibid*.
[717] Article 15, *ibid*.
[718] Article 17, *ibid*.
[719] Article 18, *ibid*.
[720] McCaffrey (2016) *op. cit.* p. 38.
[721] Case Concerning Pulp Mills on the River Uruguay (Argentina v. Uruguay), Judgement, ICJ Reports 2010, 14, para 204.

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timelines as those outlined in Part III of the UN Watercourses Convention[722]. Several basin treaties actually set up a collective system of notification and authorisation through the competent basin organisation. For example, the Charter of Waters of the *Senegal* River requires any party planning an intervention with significant impacts to notify the project to other riparian states through the High Commissioner. Projects of a magnitude that can permanently change the basic characteristics of the river (*e.g.* flow volume, navigability, etc.) require the prior approval of all riparian states[723]. The *Mekong* cooperation arrangement also goes beyond the basic rules contained in the UN Watercourses Convention as it lays down a collective notification and evaluation procedure coordinated by the Joint Committee of the Mekong River Commission[724]. Under this mechanism – whose rules are specified in a side agreement – notifications of planned measures are to be made by the state of origin not to the other affected states, but directly to the Joint Committee, which is tasked with the distribution of information and soliciting comments by the affected riparian states. With a view to ensuring a consensus around all planned projects, the Joint Committee is tasked to reconcile all differences in advance and to adopt a decision on every project subject to notification[725]. Another example for prior notification mechanisms is the *Statute of the River Uruguay* between Argentina and Uruguay that calls for notification of planned projects and the relating consultations through the Administrative Commission of the River Uruguay. The Statute aims to ensure consensus among the riparian states concerning each planned project. Consequently, if differences remain between the parties as to the acceptability of the project in question, any party may – following a conciliation procedure – trigger the jurisdiction of the International Court of Justice (as it actually happened in the Pulp Mills case)[726].

III.2.3.3. Cooperation over planned measures in the European Union

Cooperation among EU member states over planned interventions affecting water quality or quantity in other member states is regulated by the parallel (in fact: almost identical) international environmental impact assessment regimes of the EU and the UNECE. In other

[722] Article 4.1, SADC Revised Protocol.
[723] Article 26, Charter of Waters of the Senegal River, 28 May 2002 (Charte des eaux du fleuve Sénégal).
[724] Article 26, Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin.
[725] Procedures for Notification, Prior Consultation and Agreement (PNPCA), adopted by the Council of the Mekong River Commission, 2003.
[726] Articles 7-13 and 60, Statute of the River Uruguay, Salto, 26 February 1975.

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words, the relevant notification and consultation procedures remain *outside* the narrow remit of *water law* both in the EU and the UNECE.

a) EU law

Since 1985 the authorisation of projects with likely significant transboundary effects has been subject to a notification and consultation procedure within the EU. The bloc's first *environmental impact assessment* legislation – Directive 85/337/EEC – already made sure that the authorisation of the most significant water-related projects were made subject to an early assessment and *transboundary consultation*, if their impacts were likely to be felt outside the national borders[727]. Importantly, these included not only hydraulic works per se (such as canalisation, flood-relief works, dams and other water storage installations), but also large industrial facilities, transport and other infrastructure projects, water management projects for agriculture, mining and projects, etc. with a potential impact on water[728] Although the original EIA regime has evolved considerably since the 1980s, the current EU legislation, Directive 2011/92/EU, very much follows the provisions of the original directive and the UNECE's relevant instrument: the 1991 *Espoo Convention*[729]. Thus, where a project of likely transboundary impacts is proposed by an EU member state (country of origin), it has to notify all affected riparian states. The notifying state must provide the same information to the affected member state as it has made available nationally. The affected member state must consult its own public, allowing at least for 30 days for commenting on the environmental impact study. The results of these consultations then must be communicated to the country of origin. The affected riparian state may seek consultations with the country of origin that should be completed within a reasonable timeframe[730]. Importantly, the permitting authority of the country of origin must provide detailed reasons why the comments of the affected riparian state(s) have or have not been taken into consideration[731].

[727] Article 7, Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment.
[728] Annex I-II, *ibid.*
[729] Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment.
[730] Article 7, *ibid.*
[731] Article 9.1, *ibid.*

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This procedure more or less mirrors the Espoo Convention (described in detail below[732]). Importantly, however, in certain aspects the EU directive goes further than the Convention. For example, Directive 2011/92/EU contains an important guarantee for the involvement of the lower riparian states in case doubt arises as to the likelihood of transboundary impact. Unlike under the Espoo Convention, any potentially affected riparian state may trigger the consultation procedure at its own initiative, even if the country of origin fails to make a notification[733]. This removes any incentive for any country of origin to downplay the presence or the significance of transboundary impacts, a recurring feature of international EIAs relating to highly contentious projects. It also provides a shortcut vis-à-vis the cumbersome inquiry procedure foreseen by the Espoo Convention in cases of complacency or non-cooperation by the riparian of origin.

b) UNECE law

At first sight, the UNECE Water Convention seems to address the issue of prior notification of planned measures relatively lightly. The Convention calls upon riparian states to "provide for the widest exchange of information, as early as possible, on issues covered by the provision of [the] Convention"[734]. This obligation is specifically extended to "measures taken and planned to be taken to prevent, control and reduce transboundary impact"[735]. The Convention also foresees parties to undertake environmental impact assessment in their national authorisation schemes for water projects[736]. Moreover, it encourages them to set up bilateral or multilateral regimes and joint bodies so as to "serve as a forum for the exchange of information on existing and planned uses of water and related installations that are likely to cause transboundary impact" and "to participate in the implementation of environmental impact assessments relating to transboundary waters, in accordance with appropriate international regulations."[737]. Consequently, the Convention basically refers the question of prior notification and consultation into the realm of *international impact assessment procedure*.

[732] *See* section III.2.3.3.b) below.
[733] Article 7.1, Directive 2011/92/EU.
[734] Article 6, UNECE Water Convention.
[735] Article 13.1.d), *ibid.*
[736] Article 3.1.h), *ibid.*
[737] Article 9.2.h), j), *ibid.*

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This partial approach was no doubt justifiable at the time of drafting the Convention by the fact that UNECE already had a specific horizontal instrument on transboundary EIAs in place. The so-called *Espoo Convention*, adopted in 1991, sets out precisely the procedure parties are required to follow in case where planned interventions are likely to trigger transboundary environmental consequences[738]. The procedure comprises the preparation of an environmental impact study ("assessment documentation"), the notification of the results of the environmental assessment to the affected riparian states and consultations upon request by the recipient state[739].The state of origin must afford due consideration to the comments made by the recipient state and notify its final decision[740]. When there is a difference among the parties as to the likelihood of environmental impact – *i.e.* the party of origin fails to notify a project and denies the risk of transboundary impact – the affected party may trigger a mandatory fact finding mechanism through an inquiry commission[741].

Given the complementarity of the two regimes, the Espoo Convention provides a sufficient framework for prior notification and consultation with regards to water-related projects with a transboundary impact between UNECE countries[742]. Nevertheless, some authors have criticised the lack of an appropriate regime of prior notification within the UNECE Water Convention text as imprudent draftsmanship[743]. This shortcoming may indeed turn out to be a critical lacuna if the Convention is ratified by countries outside the UNECE region not bound by the Espoo regime.

c) Multilateral basin treaties

The relevant multilateral basin treaties address the issue of planned measures in a highly inconsistent fashion with no identifiable regulatory pattern. The earliest relevant instrument, the *Elbe Convention* covers planned measures only indirectly, in so far as it tasks the Commission for the Protection of the Elbe to "discuss planned […] types of utilisation of the waters which may have serious international repercussions, including hydraulic structures and

738 Convention on Environmental Impact Assessment in a Transboundary Context, Espoo, 25 February 1991.
739 Articles 2-5, *ibid.*
740 Article 6, *ibid.*
741 Annex IV, *ibid.*
742 UNECE (2013) *op. cit.* p. 53.
743 MCCAFFREY (2016) *op. cit.* p. 39. While the shortcomings of the Water Convention in this respect do not amount to a regulatory gap in intra-EU water relations, they may indeed become a critical gap between countries that are party to the Water Convention, but do not apply the Espoo Convention.

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regulation of the waters"[744]. The same language is contained in its sister agreement, the *Oder Convention*[745]. In a similar fashion, the *Meuse Agreement* mentions planned interventions only in relation to the responsibilities of the International Commission of the Meuse. The Agreement calls on the Commission to "strengthen the exchange of information and opinions […] concerning projects subject to environmental impact assessment […] that may have a significant transboundary impact"[746]. The *Rhine Convention* does not mention the issue even indirectly. These noticeable lacunas, however, do not have any practical importance as the relevant riparian states are either EU members or parties to the Espoo Convention.

Against this background the *Danube Convention* constitutes as outlier in so far as it creates a *sui generis* basin-wide notification mechanism. The Convention specifically covers "planned activities […] and measures as far as they cause or are likely to cause transboundary impacts" and defines them very broadly[747]. These planned measures and activities have to be reported to the ICPDR[748]. If no other bilateral or multilateral mechanism is followed by the affected states, the affected riparian may request a consultation with the state of origin. As a general rule, such a consultation must take place in the framework of the ICPDR "with the aim to achieve a solution"[749]. During the consultation period authorisation of the project must be suspended. Should consultations fail to deliver a mutually acceptable solution within one year, the state of origin may go ahead with the project[750].

Even more rigorous is the *Sava Framework Agreement*. It considers cooperation over planned measures such a priority that it calls for the adoption of a specific protocol regulating the issuance of permits for installations and activities that "may have a transboundary impact on the integrity of the water regime"[751]. While such protocol has never been produced, the parties to the Framework Agreement can still rely on the procedures of the Danube Protection Convention, the Espoo Convention or (partially) EU law.

[744] Article 2.1.k), Elbe Convention.
[745] Article 2.1.j), Oder Convention.
[746] Article 4.4.g), Accord international sur la Meuse.
[747] Article 3.2, Danube Convention.
[748] Article 10, *ibid.*
[749] Article 11.1, *ibid.*
[750] Article 11.2, *ibid.*
[751] Article 9.2, Sava Framework Agreement.

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d) Bilateral water treaties

Cooperation concerning planned measures has been a *key feature of bilateral water treaties* in Europe from the outset. Even, some of the earliest water frontier treaties required not only notification and consultation, but also the *consent* of the other riparian to major works that affected water quantity or quality in the relevant frontier catchment area[752]. More recent bilateral agreements also lay down precise notification and consultation requirements. For instance, the 1987 German-Austrian Agreement on cooperation with regards to the Danube basin defines the types of projects and works that are subject to prior notice. Parties are under an obligation to avoid or minimise adverse transboundary impacts and to endeavour to find a mutually acceptable solution should differences remain[753].

The *Albufeira Convention* submits the most relevant such projects to a transboundary environmental impact assessment procedure[754]. Parties must hold extensive consultations with regards to any planned measure with possible transboundary impact through the implementing commission of the Convention. Should parties fail to reach an agreement over the planned project any party may trigger the dispute settlement mechanism of the Convention[755]. The frontier waters agreement between Finland and Sweden also establishes a detailed notification and consultation procedure. No permit can be granted to major watercourse projects (*i.e.* hydro-power plant, water transfer or regulation) with transboundary impacts before bilateral consultations have taken place with a view to finding a mutually acceptable outcome[756]. Importantly, in the national authorisation procedures the Agreement grants the same legal standing to the citizens and groups of the other riparian as those enjoyed by its own[757].

[752] See *e.g.* Article 2.1, Treaty Between the Hungarian People's Republic and the Republic of Austria Concerning the Regulation of Water Economy Questions in the Frontier Region, Vienna, 9 April 1956; Article 3, Agreement between the Government of the Czechoslovak Republic and the Government of the Polish People's Republic Concerning the Use of the Water Resources in Frontier Water, Prague, 21 March 1958.
[753] Articles 2-4, Agreement between the Federal Republic of Germany and the European Economic Community, on the one hand, and the Republic of Austria, on the other, on cooperation on management of water resources in the Danube Basin.
[754] Article 9, Annex II, Albufeira Convention.
[755] Article 8, 26, *ibid.*
[756] Article 20, Agreement between Finland and Sweden Concerning Transboundary Rivers, Stockholm, 11 November 2009.
[757] Article 16, *ibid.*

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III.2.3.4. Evaluation

As regards cooperation over planned measures the provisions of the UNECE Water Convention or those of EU water law appear highly deficient when compared to those of the UN Watercourses Convention. This virtual regulatory lacuna, however, does not in any way compromise co-riparian relations within the EU since the issue is sufficiently regulated by the UNECE Espoo Convention and the EU's environmental impact assessment directive. The same applies to the inconsistent coverage of prior notification and consultation procedures by the major European basin treaties. In summary: cooperation over planned measures with likely transboundary impact seems *sufficiently regulated within the European Union* at multiple layers. No hydropolitical risk can therefore be identified in this context.

III.2.4. Managing hydrological variability

III.2.4.1. The impact of variability management on hydropolitical resilience

Fluctuation of flow quantities is an inherent feature of any natural river system, even in temperate basins characterised by modest intra-annual variability[758]. The variation of high and low water levels plays an important regulating role in riverine ecology and in traditional agriculture. On the other hand, a high degree of natural variability may also act as a precursor to transboundary water conflict. Rivers with outstanding hydrological variability and economic importance display a considerable tendency to trigger or contribute to political tensions among basin states. As Wolf et al. conclude "extreme events of conflicts were more frequent in marginal climates with highly variable hydrological conditions, while the riparians of rivers with less extreme natural conditions have been more moderate in their conflict/cooperation relationship"[759].

Consequently, managing hydrological variability can be a major challenge in co-riparian relations even at best of times. Given, however, the impacts of climate change on the hydrological cycle and human responses thereto (*e.g.* more irrigation in times of drought), controlling flow variability beyond previously recorded ranges will give rise to new levels of

[758] *See* section I.1.4. above.
[759] WOLF, Aaron T, STAHL, Kerstin and MACOMBER, Marcia F. (2003): Conflict and cooperation within international river basins: The importance of institutional capacity, *Water Resources Update* 125, pp. 31-40, p. 31.

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political difficulty all over the world. Not surprisingly, the question features high in recent hydropolitical analyses. In fact, based on a mathematical assessment Dinar et al. actually suggest that adaptation mechanisms for hydro-variability are one of the few key factors of resilience[760].

In the broadest sense of the word variability management is essentially about dealing with *naturally occurring hydrological extremes*, including floods, droughts and other specific variations[761]. It must be pointed out that while both floods and droughts can be considered as hydrological extremes, their impacts on hydropolitics are quite different. *Floods* are typically short term events with a(n almost) mechanical knock-on effect on downstream riparians. The downstream motion of water can be predicted fairly precisely by widely available satellite-based technologies. On mid- and downstream areas, where population density tends to be the highest, this allows authorities and citizens to choose the adequate level of protection. *Droughts*, on the other hand, do not follow precisely calculable patterns and can prolong through several months or years. Severe droughts trigger a variety of response measures by water managers, many of them actually resulting in the intensification of water use with severe impacts on water availability downstream. As a consequence, flood management features among the most "benign" collective action problems of shared river basins, while natural or man-made water shortages or scarcity tends to be the most powerful driver of transboundary conflict (Figure 3). Either way, variability management is closely linked to water quantity regulation.

The potentially very broad range of measures dealing with hydrological variability in a transboundary context can be clustered as follows:

- *short term measures:*
    - flexible water allocation mechanisms (*e.g.* water sharing based on percentages) that require the automatic adjustment of cross-border river flow to changes in water availability[762],
    - domestic water management measures aimed to minimise the transboundary impacts of hydrological extremes (emergency use of reservoirs to store or release water, stricter irrigation procedures, etc.)[763],

[760] DINAR et al. (2014) *op. cit.* p. 20.
[761] *Ibid* p. 8.
[762] DRIESCHOVA et al. (2008) *op.cit.* p. 290.
[763] DE STEFANO et al. (2012) *op. cit.* p. 196.

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- emergency communication and cooperation mechanisms (data collection and sharing, early warning, immediate consultations, mutual assistance among riparian states, etc.)[764].

- *long term measures:*
  - regular review of water allocation and relevant water uses[765],
  - joint construction and/or operation of water infrastructure to increase water supply or store excess water[766],
  - joint long-term planning for and management of hydrological extremes (*e.g.* transboundary flood risk mapping),
  - broadened cooperation with regards to issues that go beyond flow variability or the quantitative aspects of water[767].

III.2.4.2. Variability management in international water law

Concerns about the natural variability of transboundary river flow are not a new phenomenon in international relations. As Drieschova et al. point out as early as in 1863 the Netherlands and Belgium made allocation of the water resources of the Meuse conditional on annual variability. Yet, until relatively lately neither water treaties nor academic research have paid sufficient attention to the issue. As a result, general international water law scarcely addresses variability management in any explicit fashion. Thus, the various principles of the *UN Watercourses Convention* – equitable and reasonable utilisation, the obligation not to cause significant harm and the obligation to cooperate – regulate the issue only indirectly. The principles imply the duty of watercourse states to manage hydrological extremes with due attention being paid to the interests of other riparians. (Indeed, it is suggested by some authors these principles have been formulated with intentional ambiguity on purpose so as to allow flexibility to meet unexpected changes in water availability and other conditions[768]). The Convention also calls on watercourse states to prevent and mitigate, individually and/or jointly, "harmful conditions", *e.g.* floods, droughts or desertification that may have a negative impact on other riparian

[764] *Ibid.*
[765] *Ibid.*
[766] DRIESCHOVA et al. (2008) *op.cit.* p. 290.
[767] *Ibid* p. 291.
[768] *Ibid* p. 285.

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states[769]. When such conditions amount to an emergency situation, *i.e.* a sudden event actually or potentially causing serious harm to other watercourse states, the state of origin must immediately notify the (potentially affected) other riparians and take all practicable measures to prevent, mitigate or eliminate the harmful effects of the emergency[770]. Such emergency cooperation, however, does not apply to gradually unfolding events such as droughts and desertification. In a similar fashion, the SADC Revised Protocol on Shared Watercourses addresses hydrological variability only marginally, calling on riparian states to act individually and/or jointly to prevent and mitigate harmful conditions resulting from such natural causes as floods, droughts or desertification[771].

As the scale of treaty area decreases, specific variability management schemes become more frequent. In fact, a studious review of 50 relevant *basin treaties* concluded between 1980 and 2002 by Drieschova at al. found that 68% of the water agreements explicitly mention flow variability[772]. *E.g.* the Mekong Cooperation Agreement contains general and specific rules for water quantity management for the monsoonal wet and dry seasons[773]. In "cases of historically severe droughts and/or floods", however, the application of regular allocation rules is suspended[774]. Such exceptionally severe hydrological events are subject to early notification and the mandatory involvement of the Joint Committee of the Mekong River Commission with a view to adopting appropriate remedial action[775]. The Charter of Waters of the Senegal River also foresees such consultation procedures in the event pre-fixed water allocations must be revisited due to floods, other natural disasters or water shortages of natural character[776].

Apparently, water treaties primarily concerned about water allocation are more likely to contain some kind of mechanisms to handle extreme flow variations. For instance the 1996 Ganges Treaty between India and Bangladesh calls for immediate consultations should the flow at the Farakka Dam at the border fall below a commonly agreed threshold so as "to make adjustments

[769] Article 27, UN Watercourses Convention.
[770] Article 28, *ibid.*
[771] Article 3.4.a), SADC Revised Protocol.
[772] DRIESCHOVA et al. (2008) *op. cit.* p. 287.
[773] Articles 5 and 6, Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin.
[774] Article 6, *ibid.*
[775] Article 10, *ibid.*
[776] Article 6 and 7, Charte des eaux du fleuve Sénégal.

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on an emergency basis, in accordance with the principles of equity, fair play and no harm to either party"[777].

III.2.4.3. Variability management in the European Union

a) EU law

EU water law addresses several facets of natural hydrological variability. In fact, one of the objectives of the EU's core water legislation, the Water Framework Directive, is to contribute to mitigating the effects of floods and droughts[778]. Yet, the coverage of these phenomena by the WFD is far from being comprehensive, especially in a transboundary context. One major exception however stands out: the *Floods Directive* creates an elaborate system of flood risk mapping and management that pays particular attention to the vulnerabilities of downstream riparian states[779].

Following the above classification the measures aimed at managing hydrological variability in the EU's existing legal toolbox can be summarised as follows.

As regards *short term management* of hydrological extremes all that the WFD does is to create a temporary derogation from the obligation to comply with the objectives of good water status. These circumstances include in particular "extreme floods and prolonged droughts" or other conditions of natural cause or force majeure that are "exceptional or could not reasonably have been foreseen" [780]. If a member state intends to invoke such derogation, it must, ironically, define in advance in the river basin management plan the conditions under which the "unforeseeable" emergency situation can be declared. It also must specify what measures will have to be taken under such circumstances[781].

As regards *long term adaptation* to hydrological variability the WFD goes several steps further. First, it imposed an obligation on member states to undertake a detailed analysis of the main

[777] Article II, Treaty between the Government of the Republic of India and the Government of the People's Republic of Bangladesh on sharing of the Ganga/Ganges waters at Farakka, New Delhi, 21 December 1996.
[778] Article 1.e), WFD.
[779] Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks.
[780] Article 4.6, WFD.
[781] Article 4.6.b), c), WFD.

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characteristics of each river basin by 2004 that had to contain an analysis of all relevant water uses, human and natural impacts on river flow and groundwater status, including abstractions[782]. Ever since Member states have been required to continuously monitor any developments in these factors, including the volume and rate or level of flow[783]. The impacts of natural and man-made fluctuations in stream flow had to be reviewed by 2014 and *appropriate adaptation measures* had to be included in the revised river basin management plans and programme of measures[784]. The coordination framework of the WFD, however, ensures not only the collection and exchange of information among EU member states on hydrological variability in shared basins. Through the consultation procedures in the context of international river basins it also provides an (limited) opportunity to influence each other's plans and measures to manage existing and emerging hydrological extremes.

Finally, EU law lays down sophisticated transboundary cooperation mechanisms in relation to *floods*. The so-called "Floods Directive" sets up a scheme that complements the ecological programme of the WFD with regards to flood risk management. The Directive is not concerned with short term emergency cooperation among riparian states. Rather, it obliges member states to assess, develop and coordinate their flood control activity with a *long term* and comprehensive focus. Thus, EU governments are required to carry out a preliminary flood risk assessment and, subsequently, to establish flood hazard and flood risk maps[785]. Based on these maps member states must adopt flood risk management plans that are coordinated at basin or at least sub-basin level[786]. The Directive requires flood risk management plans to address all aspects of flood management from prevention to emergency preparedness. The plans may also contain long term national adaptation measures such as the promotion of sustainable land use practices, improvement of water retention or controlled emergency flooding[787]. Importantly, the Directive prohibits member states to adopt measures that are liable to significantly increase flood risks upstream or downstream in the same basin, unless it has been specifically agreed upon by the affected riparians[788]. As in the case of international river basins, member states must, as a priority, produce a single flood risk management plan or a set of coordinated plans

[782] Article 5, Annex II, WFD.
[783] Article 8, WFD.
[784] Article 5, Annex VII, WFD. Also *see* EUROPEAN COMMISSION (2009): *River basin management in a changing climate*, CIS guidance document No. 24, Luxembourg.
[785] Articles 4-6, Directive 2007/60/EC.
[786] Article 7.1, *ibid.*
[787] Article 7.3, *ibid.*
[788] Article 7.4, *ibid.*

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for the entire basin. Should the riparian states concerned fail to deliver joint plan(s), the Directive simply calls on individual member states to produce their own flood risk management plan. A similar procedure applies vis-à-vis basin states outside the EU with the difference, however, that member must only "endeavour" to arrive at a single plan with fellow co-riparians that are not bound by the Directive[789].

b) UNECE law

The UNECE Water Convention does not directly address variability management. Nonetheless, it contains a number of obligations that require riparian states to cooperate with respect hydrological extremes. In addition, during the past two decades the Convention bodies have developed a number of soft-law documents that provide guidance to manage the various impacts of climate change, the primary driver of increasing hydrological variability in the European Union. While the latter instruments are legally non-binding, they are seen to contribute significantly to controlling the hydropolitical risks relating to intensifying river flow fluctuations[790].

The starting point under the Convention is the general obligation to prevent, control and reduce transboundary impact[791]. Transboundary impact is defined as "*significant adverse effect* […] caused by a *human activity*" (emphasis added). Yet, the progressive reading of the Convention text and two decades of practice confirm that the impacts of naturally occurring hydrological extremes also fall under this obligation as, eventually, human acts and omissions contribute to the occurrence, magnitude or the damage potential of these phenomena[792]. Hand in hand with the prevention/mitigation obligation goes the general duty of riparian states to cooperate on a multitude of water management issues, such as the joint monitoring and regular assessment of transboundary impacts (including the quantity of transboundary waters, floods and ice drifts)[793] or the early exchange of information[794]. Also, in their basin treaties and/or bilateral arrangements riparian states have to establish warning and alarm procedures as well as

[789] Article 8, *ibid*.
[790] BERNARDINI (2015) *op. cit.* p. 43-44.
[791] Articles 1.2, 2.1, UNECE Water Convention.
[792] KOLLIOPOULOS, Alexandros (2015): The UNECE Model Provisions on Transboundary Flood Management. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 367-378, p. 369.
[793] Article 4, 9.2, 11.1, 13.3, UNECE Water Convention.
[794] Article 6, 13.1, *ibid.*

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contingency plans that cover hydrological extremes[795]. In case of critical situations parties are under a duty to assist each other following the procedures laid down by the Convention[796].

In addition to the above general framework, the various Convention bodies have adopted a range of soft-law instruments that provide further assistance to basin states as to the short and long term management of hydrological variability. First and foremost, the 2009 *guidance document on water and climate adaptation* is designed to assist states to tackle a range of climate change-related water issues in a transboundary context, including flood and drought mitigation and response[797]. Equally important are the *UNECE Model Provisions on Transboundary Flood Management*[798], endorsed by the Meeting of the Parties in 2006, that provide a concrete legislative text that can be used by riparian states in their specific basin-wide or bilateral arrangements to tackle the challenges of transboundary flood control. The Model Provisions follow a similar logic as the EU's Floods Directive, but, unlike the former, they also cover short term risk assessment and emergence response[799].

c) Multilateral basin treaties

Despite its primary ecological focus, the *Danube Convention* contains a number of substantive and procedural provisions that help riparian states address hydrological variability in a systematic and structured fashion. The preamble to the Convention directs specific attention to "the occurrence and threats of adverse effects, in the short and the long term, of *changes in conditions of watercourses* within the Danube River Basin" (emphasis added)[800]. It follows that the primary obligation of Danubian states is to cooperate in the prevention, control and reduction of transboundary "adverse impacts and changes occurring or likely to be caused"[801]. Joint action thus extends not only to man-made transboundary impacts, but must also encompass the monitoring and evaluation of the natural water household and all of its components (precipitation, evaporation, surface and groundwater run-off) in the entire basin[802]. From this general objective flow a number of precisely defined obligations. First, riparian states

[795] Article 3.1, 9.2, 14, *ibid.*
[796] Article 15, *ibid.*
[797] UNECE (2009): *Guidance on Water and Adaptation to Climate Change*, Geneva. Also *see* BERNARDINI (2015) *op. cit.* p. 44.
[798] Model Provisions on Transboundary Flood Management, ECE/MP.WAT/2006/4.
[799] KOLLIOPOULOS (2015) *op. cit.* p. 369.
[800] Second Recital, Preamble, Danube Convention.
[801] Article 5.2, Danube Convention.
[802] Article 1.c.g), *ibid.*

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must monitor, record and assess, jointly and individually, the conditions of the Danube's natural water resources through a number of quantitative parameters, including water balances, flood forecasts or any change in the riverine regime[803]. Second, under the general obligation to prevent, control and reduce transboundary impacts riparian states are obliged to exchange all relevant data, including the operation of existing hydrotechnical constructions (*e.g.* reservoirs, water power plants) and measures aimed at preventing the deterioration of hydrological conditions, erosion, inundations and sediment flow, etc.[804] Regular exchange of information must be supplemented by coordinated or joint communication, warning and alarm systems as well as emergency plans to address critical water conditions, including floods and ice-hazards[805]. Should such a critical situation of riverine conditions arise, riparian states must provide mutual assistance upon the request of the affected basin state[806].

The daughter treaty of the Danube Convention, the *Sava Framework Agreement* goes even further when it comes to managing hydrological variability. The Agreement specifically refers to droughts and water shortages as critical hazards jeopardising the integrity of the water regime of the river[807]. It therefore calls upon riparian states to establish a coordinated or joint system of "measures, activities and alarms in the Sava River Basin for *extraordinary impacts on the water regime*, such as […] discharge of artificial accumulations and retentions caused by collapsing or inappropriate handling, *flood*, *ice*, *drought*, *water shortage* […]" (emphasis added)[808]. To that effect, parties even committed themselves to conclude a special protocol "on the protection against flood, excessive groundwater, erosion, ice hazards, drought and water shortages"[809]. Out of this ambitious variability management programme, however, only a protocol on flood management cooperation was adopted by the riparian states in 2010[810]. This protocol, on the one hand, provides for the coordinated implementation of the EU's Floods Directive in the basin (even though half of the riparian states are not EU members)[811]. On the other hand, in creates an operative system of flood defence, comprising forecasting, warning

[803] Articles 5.2.a) and 9.1, *ibid.*
[804] Articles 3.2 and 12, *ibid.*
[805] Article 16, *ibid.*
[806] Article 17, *ibid.*
[807] Articles 2.1, 13, Sava Framework Agreement.
[808] Article 13.1, *ibid.*
[809] Article 30.1.a), *ibid.*
[810] Protocol on Flood Protection to the Framework Agreement on the Sava River Basin, Gradiška, 1 June 2010.
[811] Articles 3-8, *ibid.*

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and alarm, information exchange as well as the handling of emergency situations and mutual assistance[812].

The *Rhine Convention* addresses variability management along similar lines, although in a far less elaborate fashion. The key objectives of the Convention – the maintenance and restoration of the natural functions of the Rhine basin waters, the environmentally sound management of water resources and general flood protection and prevention – imply the broad cooperation over flood protection and other hydrological hazards[813]. Thus, riparian states must inform the International Commission for the Protection of the Rhine and other riparian states likely to be affected of imminent flooding[814]. They must also draw up warning and alert plans for the Rhine under the coordination by the Commission[815]. As mentioned above, Rhine basin states also actively cooperate on certain long term variability questions such as extreme low water levels and declining water availability even in the absence of explicit treaty requirements to that effect[816].

The Meuse Agreement defines the mitigation of the effects of floods and droughts as one of the key objectives of transboundary cooperation[817]. In both cases joint riparian action should extend to the development of preventive measures[818]. To that end, the International Meuse Commission is tasked to develop recommendations on flood prevention and protection, flood management coordination as well as on the mitigation of the effects of droughts[819]. The Meuse riparians are also obliged to inform each other of any major hydrological events, including imminent floods[820].

The 1990 *Elbe* and the 1996 *Oder Conventions* make no reference whatsoever to hydrological variability, not even flood protection cooperation. The two basin commissions are, however, tasked to monitor the general hydrological situation in their respective catchment areas[821].

[812] Articles 9-11, *ibid.*
[813] Article 3, Rhine Convention.
[814] Article 5.6, *ibid.*
[815] Article 8.1.c), *ibid.*
[816] See section III.2.1.3.c) above.
[817] Seventh and eight recitals, Preamble, Accord International sur la Meuse.
[818] Article 2.c), *ibid.*
[819] Article 4.4.a), b), *ibid.*
[820] Article 3.2.d), *ibid.*
[821] Article 2, Elbe Convention; Article 2, Oder Convention.

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While explicit treaty justification to do so remains limited or entire missing, all relevant river basin commissions are extensively engaged in climate change adaptation and flood management. *E.g.* the International Commission for the Protection of the Danube adopted, in 2012, a climate change strategy which outlines the guiding principles of adaptation and their integration in the ICPDR's activities, especially in implementing the Water Framework Directive and the Floods Directive. Similar strategies have been adopted for the Rhine or in progress for the Sava basin[822].

d) Bilateral water treaties

The most comprehensive of all bilateral water treaties, the *Albufeira Convention* addresses hydrological variability in a substantive and sophisticated manner. The Convention expressly defines the prevention, elimination, mitigation or control of the effects of exceptional situations as a key priority of cooperation between the Spain and Portugal[823]. Consequently, the Convention sets out a robust water allocation regime that caters for natural variations in river flow that also include extreme situations. (Extremes hydrological situations are determined with reference to historic precipitation levels)[824]. Should such a situation emerge, parties must inform each other and the joint Commission and exchange all relevant information[825]. The Convention also sets out concrete substantive measures parties must implement in case of floods and droughts. With regards to *floods* the applicable regime goes further than the usual forecasting-warning-emergency-preparedness provisions most regional or bilateral similar regimes contain. It also gives upper and lower riparian states a right to demand the other party to implement pre-defined (or any other) interventions that are necessary to prevent, control or mitigate the effects of floods[826]. Even more elaborate are the measures relating to *droughts and water scarcity*. In this context the Convention defines a set of concrete drought management measures to prevent and control the effects of low precipitation and discharge. These relate to water demand control (abstractions for consumption), infrastructure management (impoundment, storage and release), waste water discharges, etc.[827] The conditions of exceptional situations – both floods and droughts – are to be defined for every two years and

[822] JEKEL (2015) *op. cit.* p. 247.
[823] Article 10.1.f), Albufeira Convention.
[824] Annex II to the Additional Protocol, Albufeira Convention.
[825] Article 11, Albufeira Convention.
[826] Article 18.5, *ibid.*
[827] Article 19.2, *ibid.*

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subsequently reviewed. The Convention also calls for the joint study of water scarcity and floods with a view to long term prevention and mitigation[828].

Several *other European bilateral water treaties* make some reference to cooperation over *flood* prevention and protection. Most of these treaty provisions are, however, relatively basic, reinstating the general will or duty of the parties to cooperate and/or referring the subject to the activities of the joint commissions[829]. In a limited number of cases bilateral water treaties contain substantive obligations parties must observe in flood protection or other emergency situations. *E.g.* the Hungarian-Ukrainian frontier water treaty requires parties to refrain from permitting any interventions that may raise flood volumes above previously agreed-upon levels. In the spirit of solidarity riparian states are also obliged to provide technical assistance in times of exceptional floods upon demand (the costs of such technical assistance is to be borne by the beneficiary)[830]. As opposed to flood protection the management of *droughts* rarely features in bilateral water treaties. Exceptions are those bilateral agreements that are primarily concerned with transboundary flow regimes or water allocation anyway. Thus, as mentioned above, the 1991 Discharge Rule between upstream Finland and downstream Russia for the Vuoksi river basin calls on riparian states to maintain the flow quantity of the river in a "normal zone", defined by the Rule with reference to historically prevailing natural flow volumes. Should extreme low water levels appear discharge rates must be changed by Finland with a view to minimising adverse effects[831]. The 1970 amendment of the 1958 French-Spanish Agreement regarding the Lake Lanoux also takes into account natural flow variations, although it does not specifically address droughts or floods. The allocation regime calls for the increased discharged towards Spain in the summer months "in order to take account of the evaporation from the enlarged surface area of the Lake"[832].

[828] Articles 18.7 and 19.5, *ibid.*
[829] Article 2.1.b), Agreement between Finland and Sweden Concerning Transboundary Rivers; Articles 2.2.b) and 6, Agreement between the Federal Republic of Germany and the European Economic Community, on the one hand, and the Republic of Austria, on the other, on cooperation on management of water resources in the Danube Basin.
[830] Articles 9.1 and 9.4, Convention between the Government of the Republic of Hungary and the Government of Ukraine on water management questions relating to frontier waters, Budapest, 11 November, 1997.
[831] *See* section III.2.1.3.d) above.
[832] Exchange of Letters Constituting an Agreement between France and Spain Amending the Arrangement of 12 July 1958 relating to Lake Lanoux, 27 January1970.

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III.2.4.4. Evaluation

The four layers of European water law regulate an important aspect of variability management, notably *flood prevention and protection* at an exemplary level of sophistication. Given the high number of catastrophic inundations most international basins witnessed only during this millennium, the complementary regimes of the EU Floods Directive, the UNECE Model Provisions and the extensive cooperation at basin and bilateral level seem to constitute an adequate response to the collective action problems posed by excess water levels. Consequently, insufficient cross-border collaboration with regards to river floods is unlikely to result in major political tensions in the European continent.

Less positive is the picture when it comes to long term adaptation to hydrological extremes, especially *prolonged droughts*. Here, the systematic review of the main characteristics of each basin, as foreseen by the Water Framework Directive, ensures that riparian states address changing hydrological conditions on regular and substantive basis. Also, it allows riparian states to have an impact on the joint river basin management plans and, to a lesser extent, on each other's programmes of measures. Yet, neither EU and UNECE law, nor basin treaties call for real adaptation interventions. The various climate change adaptation strategies developed by the river basin organisations only provide general guidance as to future measures and do not address the potential of political risks prolonged droughts are likely to pose in transboundary relations.

Finally, European water law addresses the *short term consequences* of prolonged *low river flows* only marginally. Undoubtedly, the basic principles of transboundary water cooperation (equitable and reasonable utilisation and the no-harm rule) together with the various information exchange and notification procedures provide a basic framework to address such critical situations. These, however, do not provide any operative guidance to riparian states as to the immediate adaptation measures to be taken, including *adjustments in transboundary flow allocation*. This shortcoming can, in part, be explained by the fact that hitherto basin-wide extreme droughts have been relatively rare (apart from the Iberian Peninsula), so there was no real need and political will to address the contentious issue of national water use restrictions or curtailing transboundary flows. In part, however, the root of the problem lies in the notoriously complacent approach of EU law and decision-makers vis-à-vis the question of transboundary

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water allocation[833]. This regulatory lacuna and political timidity may in the future prove a *critical hydropolitical risk*, if droughts and scarcity continue to intensify in a transboundary context as projected.

III.2.5. Conflict resolution

III.2.5.1. Conflict resolution mechanisms and hydropolitical resilience

Conflict resolution mechanisms[834] are key institutional components of hydropolitical resilience. They provide a means of settling differences over the interpretation or implementation of the relevant governance scheme. They may also serve as a forum for discussing issues that are not envisaged in the underlying legal framework[835]. The sheer presence of a conflict resolution mechanism, however, is not a mechanical indicator of hydropolitical stability. In fact, a recent study by Dinar et al. found a surprising absence of formal dispute settlement procedures in the many of the highly cooperative co-riparian relationships and a higher number of such mechanisms in conflict-prone basins. This suggests that it is those regions that incorporate conflict resolutions mechanisms in their treaties that expect to be in conflictive situations[836]. Moreover, there is also an observable tendency to avoid recourse to conflict resolution mechanisms by riparian states even where they do exist. As Johan Lammers, a renowned scholar and water diplomat, notes in the context of the UNECE Water Convention: "experience has shown that Parties are often not inclined to bring cases against one another, particularly when the case does not directly affect them individually, or when they find themselves in a similar situation"[837].

Naturally, conflict resolution mechanisms are not a speciality of water treaties, but a cornerstone of general international law and politics. Consequently, transboundary water law heavily draws on the institutional solutions developed over the centuries in the broader context of interstate relations. International practice differentiates between a number of soft, hard and alternative mechanisms of resolving conflicts. These include:

[833] *See* section III.2.1.4. above.
[834] The terms "conflict" and "dispute" will be used interchangeably for the purposes of this analysis, irrespective of the existence of divergent interpretations in the relevant conflict resolution literature.
[835] DE STEFANO et al. (2012) *op. cit.* p. 198.
[836] DINAR et al. (2014) *op. cit.* p. 21.
[837] LAMMERS, Johan G. (2014): The Helsinki Water Convention: A New Implementation Mechanism and Committee, *Environmental Policy and Law* 44/1-2, pp. 117-224, p. 119.

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- negotiations (involving only the affected parties),
- enquiry and fact-finding (a third party is engaged to clarify the facts underlying the dispute),
- mediation, conciliation, good offices (a third party is engaged with a view to facilitating the adoption of a mutually acceptable solution),
- arbitration (upon the joint request of the parties an independent arbitrator or a body of arbitrators renders a binding decision or award based on the legal argumentation of the parties),
- litigation (upon the request by one or all parties an established court renders a binding decision on the legal argumentation of the parties).

In the past decades additional avenues of conflict prevention and settlement have emerged, dominantly in the form of compliance and implementation mechanisms developed under international human rights and environmental law[838]. While these treaty-based mechanisms differ greatly, they normally perform four major functions: gathering of performance review information, consideration of instances of non-compliance, response to instances of non-compliance (assistance or penalties) and the formal resolution of disputes[839].

III.2.5.2. Mechanisms of transboundary water conflict resolution in international law

The general obligation of states to settle their disputes peacefully stems from UN Charter[840]. The Charter also enumerates a number of mechanisms states may seize in their effort to resolve their differences pacifically. These include "negotiation, enquiry, mediation, conciliation, arbitration, judicial settlement, resort to regional agencies or arrangements, or other peaceful means of their own choice"[841]. While countries remain free to choose the means of settlement that best suit their specific circumstances, they are not free to undertake any action that might aggravate the situation[842].

[838] BOISSON DE CHAZOURNES, Laurence (2013b): Dispute Settlement Procedures and Fresh Water: Multiplicity and Diversity at Stake. In BOSCHIERO, Nerina et al. (Eds.): *International Courts and the Development of International Law*, The Hague, TCM Asser, pp.109-120, p. 113-115.
[839] UNEP (2007b): *Compliance Mechanisms under Selected Multilateral Environmental Agreements*, Nairobi, p. 10-12.
[840] Article 2.3, Charter of the United Nations, San Francisco, 26 June 1945.
[841] Article 33.1, *ibid.*
[842] SHAW, Malcolm N. (2003): *International Law*, Cambridge, Cambridge University Press, p. 918

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In that spirit the *UN Watercourses Convention* regulates dispute settlement extensively. In the first place, it calls upon states to resolve their differences over the interpretation or application of the Convention by way of negotiations. Should negotiations fail to materialise or produce a mutually acceptable outcome, the affected riparians may jointly seek the involvement of a third party, be it a mediator, conciliator or any joint basin organisation[843]. Alternatively, if no agreement is reached after six months following the request for negotiations, any of the parties affected may trigger an investigation by a mandatory fact-finding commission. This commission has broad investigative powers to establish the facts of the dispute and to formulate recommendations as it sees fit for the resolution of the dispute in an equitable manner[844]. While such recommendations are not legally binding, the parties concerned are required to "consider [them] in good faith"[845]. Finally, parties may accept the mandatory jurisdiction of the International Court of Justice or an arbitral tribunal established in accordance with the detailed rules laid down by the Convention[846]. While most of the mechanisms outlined by the Convention are standard treaty practice, the mandatory fact-finding mechanism represents a true outlier. The choice of the Convention's draftsmen to include this procedure was celebrated by some authors as a progressive step towards mandatory dispute settlement. It was also criticised, however, as a major deterrent against ratification, contributing to the grossly delayed entry into force of the Convention[847].

Major regional and basin treaties also contain provisions on dispute settlement. The *SADC Revised Protocol* on Shared Watercourses provides for a mandatory court procedure before the Tribunal established under the Treaty on the Southern African Development Community, should parties fail to resolve their dispute under the Protocol through non-judicial means[848]. The Statute of the River Uruguay between Argentina and Uruguay also provides for mandatory judicial settlement by way of stipulating the automatic jurisdiction of the International Court of Justice[849]. Before seizing the Court, however, the riparian states must attempt to resolve the issue through the Administrative Commission of the River Uruguay and, subsequently, direct negotiations[850]. The *Mekong Cooperation Agreement* also places the relevant basin

[843] Article 33.2, UN Watercourses Convention.
[844] Article 33.2-8, UN Watercourses Convention.
[845] Article 33.8, UN Watercourses Convention.
[846] Article 33.10, Annex, UN Watercourses Convention.
[847] TANZI and CONTARTESE (2015) *op. cit.* p. 325.
[848] Article 7.1, SADC Revised Protocol.
[849] Article 60, Statute of the River Uruguay.
[850] Articles 58, 59, *ibid.*

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organisation, the Joint Committee of the Mekong River Commission, at the centre of dispute settlement[851]. If the Joint Committee fails to find a solution to the disagreement, the duty to find a peaceful outcome falls back on the governments concerned. The parties may, by mutual agreement, also request the assistance of mediators and "proceed according to the principles of international law"[852].

III.2.5.3. Dispute settlement in the European Union

a) EU law

The EU maintains the world's most effective supranational legal enforcement mechanisms. The most important *sui generis* enforcement procedure within the European Union is the so-called *infringement procedure*. This procedure can be initiated by the European Commission for any given infraction of EU law by any member state. It can lead to the condemnation of the erring state by the European Court of Justice and the eventual imposition of significant financial penalties[853]. This procedure, however, works top-down between the Commission and the member state concerned since it is not designed and capable of handling intra-EU disputes adequately. In fact, member states may also signal alleged instances of non-compliance by other member states to the Commission which can take up and investigate the matter. If this relates to an EU law compliance issue that also happens to be a subject of a bilateral dispute between two (or more member) states – *e.g.* persistent transboundary water pollution – the Commission's intervention may eventually solve the interstate problem too. Recourse to this avenue for the purposes of dispute settlement, however, can yield success only in a limited range of cases. In the first place, the actual problem must relate to clearly identifiable provisions of EU law. Since these are predominantly concerned with water quality questions or certain (non-sanctioned) cooperation procedures, the restricted material scope of the infringement procedure automatically omits the most pertinent types of transboundary disputes such as those relating to allocation, short term variability management, etc.[854] Moreover, the Commission has no obligation whatsoever to take up the matter and investigate it in full. This is a critical consideration since the Commission is traditionally reluctant to engage in the bilateral legal

[851] Article 34, Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin.
[852] Article 35, *ibid.*
[853] Articles 258, 260, TFEU.
[854] *See* section II.2.3.6. above.

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disputes of member states whose prime subject is not a gross violation of EU law[855]. Consequently, it is unlikely that the infringement procedure will ever emerge as a mechanism that can be readily triggered to solve transboundary water disputes.

Under the Treaty on the Functioning of the European Union *a member state can also sue another member state* directly before the European Court of Justice[856]. This procedure, however, suffers from a series of structural shortcomings that render such avenue almost completely ineffective. First of all, prior to seizing the Court, the applicant member state must submit the matter to the Commission for pre-litigious consideration. Thus, only if the Commission fails to take over the case within three months, can the applicant member state proceed with the case to the Court. The latter, however, also implies that the Commission is not convinced of the legal (or political) merit of the case, so it is likely to intervene in the procedure against the applicant member states, reducing the chances of success dramatically. Finally, member states themselves are very reluctant to challenge each other directly under EU law. Therefore, not only are such cases extremely rare (only four such judgements have been delivered since 1958), they are also regarded as politically unfriendly gestures and a legally risky enterprise[857].

Mention can also be made of the so-called *preliminary ruling procedure* which concerns the abstract interpretation of EU law by the European Court of Justice upon the initiative of a national court. It cannot be excluded that a particular question submitted by the national judge to the ECJ is also subject to a water-related dispute by two (or more) EU basin states[858]. In such a specific case the verdict of the ECJ can significantly contribute to the resolution of the problem. Nevertheless, such an eventuality is likely to remain extremely rare. As outlined above, the range of EU provisions that directly relate to the most contentious transboundary water problems is inherently narrow. Thus, in the first place, apart from certain water quality issues, it is difficult to find a question that would make an adequate subject of preliminary ruling. Second, even if such a question can be isolated, the national judge can only engage the

[855] As information on individual infringement cases in the prejudicial phase of the procedure are disclosed by the European Commission only sporadically, this statement can be best corroborated by the general infringement statistics of the Commission and the case law of the European Court of Justice. These two sources do not identify a single case where the Commission voluntarily took over an explicit bilateral dispute between member states. Also *see* section II.2.3.5. points a) and b) above.
[856] Article 259, TFEU.
[857] BARANYAI (2015) *op. cit.* p. 99.
[858] *See* section II.2.3.5. point b) above.

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ECJ, if he or she identifies profound and hitherto unresolved uncertainties as to the proper meaning of the legal provision that is (also) the subject of the transboundary water dispute. But transboundary water disputes usually emerge not because the erring state is unable to correctly construe *e.g.* an important definition of the Water Framework Directive, rather, because of actual implementation gaps. The evaluation of implementation gaps, however, cannot become the subject of preliminary ruling by the ECJ (as they belong to the infringement procedure). Third, a preliminary ruling procedure presupposes the existence of a judicial process before a national court of law. Since EU member states cannot directly sue each other before national courts for non-compliance with EU law – that would pre-empt the prerogatives of the ECJ under Article 259 of the TFEU – any such procedure can only be triggered by a proxy actor (*e.g.* a like-minded NGO). Yet, even if the aggrieved state finds a suitable proxy to act before a national court (preferably one located in the erring riparian), the applicant in that national procedure can only propose recourse to preliminary ruling by the ECJ, but cannot compel the judge to do so. Consequently, even where the aggrieved riparian can identify an EU legal issue that can actually be transformed into a litigation before a national court by a proxy actor with adequate standing, its actual influence on the progression of the case – let alone the procedure before the ECJ – remains close to zero. Of course, it may exceptionally happen that an EU riparian state maliciously orchestrates such legal action to cause nuisance to the other basin state. Overall, however, the very design of the preliminary ruling procedure will always render it an unsuitable avenue to resolve transboundary water disputes.

The inherent weaknesses of bilateral conflict resolution under general EU law are not corrected in the context of transboundary water issues either. Under the Water Framework Directive a member state that has identified "an issue that has an impact on the management of its waters but cannot be resolved by that member state" – a euphemistic description of a transboundary problem – may report to "any other member state concerned"[859]. Such "other member state", however, is not obliged to engage in any meaningful dialogue to resolve the problem. Alternatively, the WFD also allows member states to refer all potential interpretative or implementation differences to the European Commission[860]. Under this *quasi mediation procedure* all the Commission is required to do is to "respond" to the submission within six months (such "response" has no legal effect whatsoever). This procedure has been rightly

[859] Article 12, WFD.
[860] *Ibid.*

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criticised as lacking any enforcement power, with no reported instance of recourse to it as yet[861]. Given the European Commission's well-known reluctance to engage in the bilateral disputes of EU member states, the soft good offices procedure is unlikely to ever fulfil the role of a meaningful water dispute settlement mechanism.

Finally, EU law effectively bars member states from recourse to *judicial settlement under multilateral treaties* (*e.g.* the UNECE Water Convention or basin treaties ratified by the EU). Most international water treaties allow parties to accept the ultimate jurisdiction of the International Court of Justice or an arbitral tribunal to resolve their disputes. Yet, EU member states can undertake these kind of general submissions only vis-à-vis non-EU countries. This restriction flows from the expansive jurisprudence by the European Court of Justice aiming to safeguard its monopoly to interpret EU law. In the landmark Mox Plant case – that concerned a dispute between Ireland and the United Kingdom under the UN Convention on the Law of the Seas – the Court concluded in 2006 that EU member states cannot trigger the dispute settlement mechanisms of international treaties to which the EU is a party. Recourse to such external settlement mechanisms for intra-EU affairs – goes the verdict – would "create a manifest risk that the jurisdictional order laid down by the Treaties and, consequently, the autonomy of the [EU] legal system may be adversely affected"[862]. As a result, member states' freedom to use established international judicial mechanisms to settle disputes among themselves is limited to issues that can in no way be connected to the application of EU law[863] (as it happened *e.g.* in the Rhine chloride arbitration between Netherlands and France)[864]. Even in such narrow pool of cases, however, member states are required to inform and consult the European Commission before any submission is made to any non-EU judicial mechanism[865]. While the Mox Plant case applies squarely to binding mechanisms of dispute settlement, uncertainties still remain as to the legal impacts of the judgement on non-binding mechanisms

[861] KEESSEN, Andrea M., VAN KEMPEN, Jasper and VAN RIJSWICK, Helena (2008): Transnational river basin management in Europe, *Utrecht Law Review* 4 pp. 35-56, 21 p.
[862] C-459/03, Commission v. Ireland, ECR 2006, I-04635.
[863] SZABÓ, Marcel (2008): The Mox Plant Case: the way towards Euro-chauvinism? In BÁNDI, Gyula (Ed.): *The Impact of ECJ Jurisprudence on Environmental Law*, Budapest, Szent István Társulat, pp. 143-166, p.152-153.
[864] The Rhine Chlorides Arbitration concerning the Auditing of Accounts (Netherlands-France), 12 March 2004, PCA Award Series 2008. Here, while the underlying treaty – the 1976 Convention on the Protection of the Rhine against Pollution by Chlorides – is concerned with a par excellence water pollution issue (thus subject to EU law), the actual dispute revolved around the correct interpretation of its 1991 Additional Protocol on the financial obligations of the riparian states.
[865] C-459/03, Commission v. Ireland, ECR 2006, I – 4657, para 179-182.

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such as negotiations, conciliation, meditation or the activity of the Implementation Committee of the UNECE Water Convention[866].

In summary: EU law fails to provide effective mechanisms for the resolution of transboundary water disputes. At the same time it deprives member states from the use of important dispute settlement mechanisms under international law. What it offers instead is a set of procedures almost completely left to the initiative and judgement of the European Commission[867].

b) UNECE law

The UNECE Water Convention foresees regular consultations between the parties as well as provides for the establishment of joint bodies as a primary forum of co-riparian communication and cooperation[868]. These provisions are meant to ensure the prevention of major transboundary water disputes. Should, however, such disputes nonetheless arise, parties are called upon to settle the matter through negotiations or "any other means of dispute settlement acceptable to the parties"[869]. The Convention does not define any further mandatory steps. However, it allows parties to accept the jurisdiction of the International Court of Justice or an arbitral tribunal to be established under the Convention for disputes not resolved through non-judicial channels[870]. By a decision of the Meeting of the Parties in 2013 an additional body: the Implementation Committee was established to complement traditional mechanisms of conflict prevention and resolution[871]. The Implementation Committee provides parties with further means to deal with alleged breaches of obligations stemming from the Convention combining features of mediation, conciliation or simple advisory assistance[872]. While to some extent the judicial procedures and the implementation review process can have overlapping elements, Attila Tanzi, monographer of the issue and member of the Implementation Committee, underlines the complementarity of the two systems: "non-compliance procedures are not formal and strict procedures aimed at breaches of [obligations] and related legal responsibility, but rather flexible means aimed at providing assistance to parties in addressing problems of implementation and

[866] *See* section III.2.5.3.b) below.
[867] BARANYAI (2015) *op. cit.* p. 99.
[868] Articles 12, 9.2, UNECE Water Convention.
[869] Article 22.1, *ibid*.
[870] Article 22.2, *ibid.*
[871] Decision III/2 on the review of compliance with the Protocol, ECE/MP.EIA/23.Add.3-ECE/MP.EIA/SEA/7.Add.3
[872] TANZI and CONTARTESE (2015) *op. cit.* p. 326.

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compliance"[873]. In conclusion: UNECE water law provides parties with a full menu of soft and proper legal mechanisms to avoid and/or resolve transboundary water conflicts.

c) Multilateral basin treaties

The *Elbe Convention* and the *Oder Convention* do not contain dispute settlement clauses. This obvious shortcoming may be due to the fact that, formally speaking, both conventions are concerned with the establishment and operation of river basin organisations. Moreover, the Elbe Convention is essentially a bilateral Czech-German treaty, while the Oder Convention mainly concerns Germany and Poland only, thus, the parties may address their differences in relation to the two conventions through the bilateral cooperation mechanisms. The *Agreement on the Meuse* goes further only slightly. In case of differences, parties are merely called upon to seek a solution by way of negotiation or any other acceptable means of dispute settlement[874].

The *Danube Convention* provides for the usual dispute settlement mechanisms. As a first step, parties must strive to resolve their differences by way of negotiations or any other means acceptable to the parties to the dispute. The basin organisation, the International Commission for the Protection of the River Danube, may be invited to assist "if appropriate"[875]. If no solution is found by the parties within 12 months after the notification of the issue to the ICPDR, the issue must be submitted for a final and legally binding decision to the International Court of Justice or an arbitral tribunal. Parties have the option to choose either means of compulsory jurisdiction. Importantly, however, if a party fails to commit itself to any mechanism, it will be considered as having accepted arbitration[876]. The *Rhine Convention* follows a similar regulatory pattern, except that the default mandatory forum of dispute settlement is arbitration[877].

The most extensive system of dispute settlement is contained in the *Sava Framework Agreement* that is modelled closely on the relevant chapter of the UN Watercourses Convention. Accordingly, parties must first settle their dispute through negotiation. If this fails to produce an acceptable outcome, they may jointly invite a third party to provide good offices, mediation or conciliation. They may equally refer the issue to arbitration or the International Court of

[873] *Ibid* p. 328.
[874] Article 8, Accord international sur la Meuse.
[875] Article 24.1, Danube Convention.
[876] Article 24.2, Danube Convention.
[877] Article 16, Annex, Rhine Convention.

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Justice. If they cannot, within six months, solve the issue through third-party involvement, any riparian states can trigger a mandatory fact-finding mission by a committee composed of three independent experts[878]. While participation in the fact-finding procedure is mandatory, the report of the committee has no binding force[879]. Importantly, as the Sava is a sub-basin of the Danube, Sava basin states are also parties to the Danube Convention. Hence, with regards to their Sava-related disputes that are also covered by the Danube Convention (practically all matters except for navigation), they can rely on both mandatory mechanisms: fact-finding and compulsory arbitration.

d) Bilateral water treaties

Most European bilateral treaties, either concerned with general water cooperation or individual watercourses and/or projects, provide for some kind of dispute settlement mechanism. Of the treaties examined by this study the least elaborate is the 2010 Finnish-Swedish agreement that only calls for the settlement of disputes by way of negotiations through diplomatic channels[880]. The 1987 Austrian-German Danube cooperation treaty first calls on parties to settle their differences through negotiations, to be followed by arbitration should negotiations fail[881]. A similar solution is employed by the Hungarian-Ukrainian frontier water treaty that defines the mandatory jurisdiction of the arbitral tribunal to be set up under the UNECE Water Convention[882]. The Albufeira Convention refers disputes of predominantly technical nature to an inquiry commission before the matter is submitted to arbitration[883]. Specific or single issue water treaties tend to specify the competence of general bilateral dispute settlement mechanisms to adjudicate water-related matters. Examples include the 1958 French-Spanish agreement concerning the Lake Lanoux[884] or the 1984 Belgian-Luxembourgish convention on the construction on waste water treatment plants along the river Sure[885].

[878] Article 22, Sava Framework Agreement.
[879] Article 24, *ibid*.
[880] Article 30, Agreement between Finland and Sweden Concerning Transboundary Rivers.
[881] Article 9, Agreement between the Federal Republic of Germany and the European Economic Community, on the one hand, and the Republic of Austria, on the other, on cooperation on management of water resources in the Danube Basin.
[882] Article 15, Convention between the Government of the Republic of Hungary and the Government of Ukraine on water management questions relating to frontier waters.
[883] Article 17, Albufeira Convention.
[884] Article 7, Agreement between the Government of the French Republic and the Spanish Government relating to Lake Lanoux.
[885] Article 17, Convention between the Kingdom of Belgium and the Grand Duchy of Luxembourg relating to the Waters of the Sûre, Brussels, 17 March 1980 (Convention entre le Royaume de Belgique et le Grand-Duché de Luxembourg au sujet des eaux de la Sûre).

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III.2.5.4. Evaluation

As in the case of all previous subjects, the legal framework for the resolution of transboundary water disputes has multiple layers within the European Union. What distinguishes this particular topic from the preceding issues is, however, the *gross incoherence* among the overlapping regulatory levels. In the case of major water policy questions such as allocation, water quality or variability management the, EU, the UNECE, basin and bilateral arrangements follow more or less similar directions. The various water law instruments thus do not contradict one another. Rather, in most cases they are positively complementary, to some extent filling critical regulatory gaps.

The resolution of transboundary water disputes, especially when it comes to binding (judicial) mechanism, is, however, seen as a horizontal constitutional question in the EU rather than a sublet of water policy. Consequently, the *supremacy of primary EU law* must be upheld at any price, even if this imperative gives rise to potentially gross repercussions on the functioning of the broader international legal order.

As European primary law overrides the provisions of the UNECE Water Convention as well as basin and bilateral treaties it automatically deprives member states of important and relevant dispute settlement mechanisms under international law. What EU law offers in the stead is the inadequate infringement procedure or the toothless "reporting" of transboundary water problems to the European Commission. Ultimately, member states may also have direct recourse to the European Court of Justice against fellow EU riparian states, but such procedure faces such legal and political obstacles that render such an exercise a more or less futile adventure.

In conclusion: European water law displays an *important hydropolitical gap* as it fails to provide effective mechanisms for the resolution of a potentially very wide spectrum of transboundary legal disputes between EU member states.

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Chapter 3
Adaptive capacity of EU transboundary water Governance: the dynamic dimension of resilience

III.3.1. The role of adaptive capacity in hydropolitical resilience

The application of "conventional" hydropolitical indicators to the resilience of transboundary water cooperation in the previous chapter has revealed *important vulnerabilities* in the collective management of shared watercourses *within the European Union*. These vulnerabilities may become critical drivers of political tension, if the current trends of hydrological change continue to unfold as projected within the existing system of transboundary water governance. The likelihood of conflict can, however, be significantly reduced or even eliminated, if the governance of shared waters among EU member states can be flexibly adjusted to these emerging pressures.

The ability of a governance system to adjust to changing external circumstances is captured by the notion of *adaptive capacity* that has entered the water policy discourse from the resilience and systems science literature. According to this literature adaptive capacity is a central feature of resilience for it enables a social-ecological system to *absorb disturbance* while retaining the *same fundamental structure, function and identity*[886]. Gupta et al. define adaptive capacity as the "characteristics of institutions that empower [the relevant] actors to respond to short and long-term impacts either through planned measures or through allowing and encouraging creative responses from society both ex ante or ex post"[887]. Here, the focus is on the ability to proactively plan for change (top-down) and/or to create the conditions for bottom-up action by social actors. Others, like Claudia Pahl-Wostl, place the emphasis on the *learning capacity* of systems to move from incremental improvements of established routines to fundamental transformation[888].

[886] HILL, Margot (2013): Adaptive Capacity of Water Governance: Cases From the Alps and the Andes, *Mountain Research and Development* 33(3), pp. 248-259, p. 249.
[887] GUPTA, Joyeeta et al. (2010): The adaptive capacity wheel: a method to assess the inherent characteristics of institutions to enable the adaptive capacity of society, *Environmental Science and Policy* 13, pp. 459-471, p. 461.
[888] PAHL-WOSTL, Claudia (2009): A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes, *Global Environmental Change* 19, pp. 354–365, p. 358-361.

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III.3.2. Measuring adaptive capacity: the indicators used

Adaptive capacity is a latent property of a governance system that is activated only in response to a crisis or an opportunity. Such latency, coupled with the inherent elasticity of the underlying concept, renders the measurement of adaptive capacity an uncertain and somewhat arbitrary exercise[889]. Yet, various resilience indicator sets have been developed over the years to evaluate the adaptive capacity of governance systems. The main characteristics of adaptive capacity are usually summarised along the following features:

- open and frequent lines of communication,
- the ability to learn and store knowledge and experience,
- flexibility in decision-making and problem solving,
- responsive power structures that consider the need of all stakeholders.
- collaboration and action between both formal and informal institutions at multiple scales[890].

In the context of transboundary water governance Barbara Cosens, a multidisciplinary researcher of the resilience of water governance regimes, applies a similar but slightly expanded indicator set:

- multiple, overlapping levels of control with one level of either control or strong coordination at the scale of the particular social-ecological system,
- horizontal and vertical transfer of information and coordination of decision-making among entities and individuals with a decision making role,
- meaningful public participation,
- local capacity building, and
- authority to respond (adapt) to changes in circumstances across a range of scenarios[891].

In the context of the EU's Water Framework Directive this set of indicators has been expanded with two additional items: monitoring and system feed-back and enforcement by Green et al.[892]

[889] LOCKWOOD, Michael at al. (2015): Measuring the dimensions of adaptive capacity: a psychometric approach, *Ecology and Society* 20(1), pp. 37-50, p. 38.
[890] GARMESTANI et al. (2013) *op. cit*. p. 10.
[891] COSENS (2010) *op. cit.* p. 256.
[892] GREEN, Olivia O. et al. (2013): EU water governance: striking the right balance between regulatory flexibility and enforcement? *Ecology and Society* 18(2), pp. 10-20, p. 11.

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While the above indicators have been applied to the assessment of the adaptive capacity of water governance regimes extensively, they do not, however, seem fully suitable for the evaluation of co-riparian relations, let alone to address the legal and institutional gaps identified in the previous chapter. Nonetheless, they provide a general toolkit, whose certain elements can be adapted to the particular purposes of this analysis as follows. Indicators relating to sub-state level actions or actors – such as public participation or local capacity building – are mostly irrelevant in a state-to-state context and are therefore omitted. Certain other issues – *e.g.* the existence of polycentric, multilevel governance structures in the EU – have been already discussed extensively in the foregoing, thus no specific indicators to that effect needs to be employed subsequently[893]. In view of these limitations the following set of indicators is proposed for the assessment of the adaptive capacity the system of transboundary water governance within the European Union:

- coordination among the different levels and actors;
- transfer of information and feedback;
- authority and flexibility in decision-making and problem-solving.

Evidently, none of the above indicators or characteristics can be measured quantitatively through a robust matrix of variables. Neither are they capable of defining the boundaries of the actual learning capacities of the relevant governance regimes. Yet, by way of identifying certain critical legal, institutional and political hurdles the indicators chosen may provide useful information about the *fundamental ability or inability* of the EU system of transboundary water governance to adapt to emerging hydropolitical challenges.

III.3.3. Coordination among the different levels and actors of transboundary water governance

The multiplicity of governance layers can enhance resilience as it allows flexibility to develop policy measures at the scale most appropriate for the problem[894]. In order, however, to achieve the optimal outcome, *coordination* among the various players must be ensured both *horizontally* and *vertically*.

[893] *See* section II.2.4. above.
[894] GREEN et al. (2013) *op. cit.* p. 12.

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Obviously, the nature and intensity of coordination depends predominantly on the *legal relationship* among the relevant actors. Where the legal link is weak or missing between the various decision-makers of transboundary water governance, the coordination also tends to be weak or non-existent. In such cases, coordination is left to the *mutual political will* of the relevant actors. Contrariwise, coordination tends to be robust and meaningful where the relationship among the various actors is based on a solid legal instrument.

III.3.3.1. Horizontal coordination

As regards *horizontal coordination* the most relevant relationship is the one between the two relevant policy-making bodies: the *UNECE* and the *European Union*. As discussed extensively above, the interplay of the two regimes is characterised by the clear dominance of EU water law and policy[895]. Although the European Union and its member states constitute the largest group among the parties to the UNECE Water Convention, the political engagement of the European Commission – the external representative of the EU – in the work of the Convention bodies remains limited. According to the publicly available documents of the large number of relevant meetings held by the UNECE (minutes, lists of participants, etc.) the European Commission is present only at a selected number of events. Even if present, it hardly makes significant contribution to the deliberations[896]. This goes against the repeated invitation of Convention bodies to strengthen the cooperation between the EU and the UNECE in the field of water policy[897]. On the other hand, none of the Convention bodies have any formal role in the formulation of EU water policy and law, let alone its implementation. Consequently, the *institutional interaction* between the relevant EU and UNECE bodies remains *limited*, with almost no coordination whatsoever on their work programme, implementation experience, etc. This is a serious shortcoming as the lack of overall synchronisation between these two universally praised regimes leads to suboptimal practical outcomes on either side: the EU fails to directly benefit from the dynamic and problem-oriented work programme of the Convention, whereas the Convention bodies cannot directly rely on the wealth of experience accumulated by the European Commission in the implementation of decades of EU water law and policy. It must be pointed out, however, that there have been a number of issue-specific areas – e.g. the

[895] *See* section II.2.4. above.
[896] *See* the relevant meeting documents at: https://www.unece.org/environmental-policy/conventions/water/envwatermeetings.html#/ (accessed 12 February 2019).
[897] UNECE Report on the Workshop on Approaches and Tools for River Basin Management: Experience Drawn from the Implementation of the EU Water Framework Directive, MP.WAT/WG.1/2001/8.

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implementation of the EU's Water Initiative[898] or the preparation of certain technical and expert documents[899] – where the mutual benefits of cooperation have been successfully realised between the two entities.

An additional critical segment of horizontal coordination is the *interaction between riparian states*. As shown in Part II, EU member states are inter-linked through an almost seamless web of multilateral and bilateral cooperation treaties[900]. These all contain institutional arrangements that create a framework for formal cooperation. Although, the level of actual interaction very much depends on the scope and character of the given treaty and the political willingness of the riparian states concerned, each EU member state can expect and even enforce a certain degree of cooperation vis-à-vis its fellow riparians. Yet, as the experience of the first implementation cycle of the WFD confirms, horizontal coordination among member states is often inconsistent[901].

III.3.3.2. Vertical coordination

Vertical coordination among the various actors of transboundary water governance seems more comprehensive. The *UNECE* maintains an intense and structured relationship with bodies operating at basin or bilateral level. Given that the establishment of "joint bodies" is a core obligation under the UNECE Water Convention, the Convention bodies pay particular attention to the activity of the formal institutions of co-riparian cooperation, *e.g.* by way of providing assistance to the their establishment, operation, promoting inter-RBO coordination, allowing participation in various Convention meetings and events, etc.[902] In turn, the various basin commissions take an active part in the practical implementation of the Convention[903].

As regards basin treaties and organisations, the *EU* itself seems to be more engaging as well. The EU is party to the Rhine and the Danube Conventions. Therefore, the European Commission follows the activity of the two relevant basin commissions closely. In turn, as shown above, all basin organisations within the EU actively participate in the implementation

[898] https://www.unece.org/env/water/npd.html (accessed 12 February 2019).
[899] http://www.unece.org/index.php?id=45241 (accessed 12 February 2019).
[900] *See* Figure 12 above.
[901] GREEN et al. (2013) *op. cit.* p. 13.
[902] http://www.unece.org/env/water/workshop_joint_bodies_2013.html, http://www.unece.org/env/water/joint_bodies_workshop_2014.html (accessed 12 February 2019).
[903] JEKEL (2015) *op. cit.* p. 235-248.

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of the Water Framework Directive[904], providing a direct link between the EU and basin-wide activities. Occasionally, the EU actively relies on the support of basin organisation. As regards the Danube, for instance, the European Commission, has, over the past two decades, launched a number of initiatives – such as the Danube-Black Sea Task Force (2001)[905] or the EU's Danube Region Strategy (2011)[906] – in whose implementation the International Commission for the Protection of the Danube has played an important part. Yet, given the rigid structure of EU decision-making none of the basin organisations at issue have any official role in the formulation of EU water law and policy.

Finally, mention also must be made of the coordination between *EU institutions and member states*. Here, the relationship is based on Treaty on the Functioning of the European Union and secondary EU legislation. In terms of formal decision-making member states – through the Council of the European Union – strongly influence the adoption of legal and policy instruments relevant for transboundary cooperation. At the level of implementation the network of *EU water directors* also play an important role besides the European Commission, even though their activity is not based the primary or secondary law of the EU, but on an autonomous initiative of the European Commission[907]. Equally powerful is the impact of the Commission on national water policy. Through the systematic supervision of the implementation of EU law, the Commission can enforce the legal requirements of transboundary cooperation and, to a lesser extent, can mediate co-riparian disputes[908]. In summary, vertical interaction between EU institutions and member states is robust, lively and reciprocal in nature.

III.3.4. Transfer of information and feedback

Any system of governance can only adapt to changing circumstances in its operating environment, if it *receives sufficient information* of these changes and such information is fed into the complex and operational *review mechanism*[909].

[904] *See* section II.2.2.3. above.
[905] https://www.icpdr.org/main/activities-projects/dablas (accessed 12 February 2019).
[906] https://www.icpdr.org/main/activities-projects/icpdr-eu-strategy-danube-region (accessed 12 February 2019).
[907] *See* section II.2.3.1.b) above.
[908] *See* section II.2.3.5. above.
[909] COSENS (2010) *op. cit.* p. 239.

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III.3.4.1. Horizontal flow of information

As shown above, horizontal coordination among the multilateral actors of transboundary water governance remains *fragmented, unbalanced* and somewhat occasional. This condition is also reflected in the quality and extent of exchange of information between the *UNECE* and the *European Union*. The reporting requirements under the UNECE Water Convention apply to state parties only[910]. Consequently, the European Union remains exempt from this obligation, although at its own initiative it could participate in the reporting exercise[911]. In the opposite direction – *i.e.* from the UNECE towards the EU – there are no established formal channels of information exchange.

As regards the mutual provision of information at *co-riparian* level all four – *i.e.* UNECE, EU, basin and bilateral – layers of governance contain various obligations. These extend from regular water quality monitoring and data exchange, through notification of planned measures all the way to early warning in emergency situations[912]. These obligations undoubtedly cover many or most of the legitimate information needs of affected riparian states. Yet again, the practical experience of the Water Framework Directive suggests that these information channels often prove insufficient or they are not used efficiently[913].

III.3.4.2. Vertical flow of information

Contrary to the foregoing, the vertical flow of information between *the UNECE and state* parties, on the one hand, and the *European Commission and EU member states*, on the other, has legally clearly defined robust channels. As mentioned above, since 2015, state parties of the UNECE Water Convention are obliged to report to the Convention Secretariat on their implementation according to a template defined by a decision of the meeting of the parties[914]. (More experience is available under the Convention's Water and Health Protocol which contains specific reporting obligations under Article 6[915]). As 2016-2017 were a pilot phase for the reporting exercise, no systemic conclusions can yet be drawn about the efficiency of the

[910] Decision VII/1 on reporting under the Convention, ECE/MP.WAT/49/Add.2.
[911] *Ibid* point 3.
[912] *See* sections II.2.2. and II.2.3. above.
[913] GREEN et al. (2013) *op. cit.* p. 13.
[914] *See* section III.3.4.1. above.
[915] https://www.unece.org/env/water/protocol_third_reporting_cycle.html (accessed 12 February 2019).

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vertical flow of information. Importantly, however, as the reporting template covers a number of key governance questions, this will surely expand the knowledge base available to the Convention bodies in the review of the existing arrangement.

Even more robust are the reporting obligations imposed on *EU member states vis-à-vis the European Commission*. These reporting obligations are related to the implementation of the Water Framework Directive as well as other water legislation[916]. Additional EU legislation on the environment also call for reporting to the Commission on various water-related subjects[917]. As shown above, member states can, exceptionally also report to the Commission on a voluntary basis issues that cannot be dealt by them individually[918]. Importantly, the flow of information between the Commission and member state authorities is neither imbalanced nor unidirectional. Member states can also grossly benefit from the rich databases the Commission makes available to them. Thus, the vast array of raw information and analyses provided by the Commission, the European Environment Agency, Commission's Joint Research Centre and Eurostat on water are fed into the EU's open access water database (Water Information System for Europe, WISE)[919] that creates an informational common ground for member states to plan and implement water policies at national level. Moreover, through the various implementing committees of the WFD and the regular gatherings of the water directors EU member states can obtain ample information about the Commission's planned and on-going activities relative to transboundary water management[920]. The quality of the vertical flow of information within the EU should therefore not create any obstacle to flexible adaptation.

III.3.5. Authority and flexibility in decision-making and problem-solving

The transfer of information and coordination among the various actors of transboundary water governance is a necessary, but not a sufficient condition for adapting to changing hydrological and political conditions. If the various actors have no authority to respond to the governance gaps identified, these are likely to grow into critical vulnerabilities threatening the continued functioning of the system as a whole. The *authority to respond to emerging challenges* is largely perceived as an institutional question that is defined by formal institutions. However, it is also

[916] Article 3, 5, 8, 11, 13, 15, 24 and 25, Directive 2000/60/EC.
[917] *See* section II.2.3.3. above.
[918] *Ibid.*
[919] https://water.europa.eu/freshwater (accessed 12 February 2019).
[920] *See* section II.2.3.5.a) above.

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strongly influenced by informal regimes and cultural-cognitive factors[921]. While these rather fluid categories are hardly amenable to precise measurement, their qualitative analysis can nonetheless identify important constraints that limit the overall adaptive capacity of the system.

On a general level the *UNECE Water Convention* has proved to be a remarkably flexible instrument, being capable of addressing a wide range of issues not foreseen at the time of its drafting. This openness did not only manifest in the thematic expansion of the Convention to areas such as the nexus between water, food, energy or adaptation to climate change, but also in the creation of new and innovative institutional solutions (Implementation Committee, monitoring, etc.)[922]. Yet, the gradual expansion of the Convention's system has taken place mainly through the *decisions of the meeting of the parties* (MOP) or *soft-law instruments*, rather than through formal amendments to the Convention text. The only amendments adopted to the Convention concerned the expansion of its scope *ratione personae* allowing regional economic organisations and non-UNECE countries to accede to the Convention[923]. The choice of MOP decisions and soft-law instruments over treaty amendments to expand the activities of the Convention seems to confirm the complacency of the parties to open up the Convention to substantial modifications. Such complacency, however, has not, as yet, seemed to amount to a critical barrier to the adaptation of the Convention to changing circumstances and the needs of parties. To the contrary, the Convention bodies have been able to bridge such critical institutional gaps such as the transfer of information (monitoring) or the efficiency of dispute settlement (implementation committee) successfully. The flexible language of the Convention and its expansive interpretation by the Convention bodies also allowed addressing pressing new issues such as transboundary water allocation and climate change adaptation in a substantive manner[924]. This consistent record of progressive achievements, supported by an inherent culture of openness, partnership and engagement, suggests that the UNECE transboundary water governance regime displays a very high capacity of adaptation. It remains to be seen, however, if this remarkable yet limited (formal) ability to adjust will be sufficient to withstand the test of much more conflictual co-riparian relations in the European heartland.

[921] PAHL-WOSTL (2009) *op. cit.* p. 356-357.
[922] *See* section II.2.2.2.d) above. Also *see* BERNARDINI (2015) *op. cit.* p. 32-34.
[923] UNECE (2013) *op. cit.* p. 6.
[924] *See* section II.2.2.2.d) above.

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More complicated are the legal, institutional and political conditions influencing the adaptive capacity of the *EU's water governance regime*. While the Water Framework Directive is based on adaptive implementation cycles with clearly defined feedback mechanisms, this inherent review mechanism does not extend to the revision of the underlying water policy objectives themselves[925]. In other words: the monitoring-feedback-review process works fine so long as it does not question the dominance of ecological objectives under the WFD. This limitation renders the fact that the WFD, unlike several other environmental directives, does not contain a general policy review procedure all the more regrettable. Instead, it merely calls for a periodic evaluation of by the Commission of its implementation by member states and the necessary technical adaptation of the monitoring requirements[926]. As a result, the Commission will review every six years whether or not member states apply the WFD correctly. These reviews are, however, not supposed to address the question whether or not the WFD in its current form is the right instrument to respond to the changing hydrological realities in the EU.

Such constraints are probably not surprising in view of the *EU's restricted authority of the EU* – under Article 192.2. of the TFEU – to take on such critical water issues as transboundary *water quantity management* and river flow allocations[927]. As noted above, Article 192.2 does not prevent the EU to regulate transboundary water quantity management, it only makes in significantly more difficult to do so. Yet, the constant opposition of certain member states under the shield of the unanimity voting as well as its own complacency to engage in bilateral issues prompt the European Commission to systematically reject any substantial consideration of transboundary water quantity issues[928]. This means that the relative legal barrier (unanimity) created by the TFEU is elevated into an almost insurmountable institutional barrier by the prevailing political and cultural conditions.

Even more complicated would be the elimination of the *dispute settlement gap* identified in the previous chapter[929]. Here, hydropolitical vulnerability is created by the latent competition of supranational courts for jurisdictional hegemony. This has led to a situation where EU's own constitutional regime rejects the competence of any dispute resolution forum other than the

[925] GREEN et al. (2013) *op. cit.* p. 5-6.
[926] Articles 18 and 20, WFD.
[927] *See* section III.2.1.3.a) above.
[928] BARANYAI (2015) *op. cit.* p. 100.
[929] *See* section III.2.5.3.a) above.

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European Court of Justice which is largely unsuitable to adjudicate bilateral water disputes[930]. While in theory there may be transboundary water issues that do not fall under the jurisdiction of the ECJ (*e.g.* allocation), the uncompromising attitude of the European Commission to the supremacy of the ECJ suggests that it would challenge any recourse by member states to international courts and tribunals even in cases where the EU legal basis remains very weak (as it actually happened in the Mox Plant case)[931]. Consequently, EU law creates an absolute barrier to the elimination of the systemic gap as regards water dispute settlement between member states.

III.3.6. Evaluation

The system of transboundary water governance within the European Union displays *a number of important vulnerabilities*, such as the lack of water quantity management and allocation, limited tools for the management of hydrological variability and the limited availability of adequate dispute resolution mechanisms.

The foregoing analysis of the adaptive capacity of the EU's water governance systems shows that these *vulnerabilities are likely to persist* in the long term in view of the EU's *limited authority and flexibility in decision-making and problem-solving*. Most importantly, the rigid EU legal framework, coupled with a number of political and cultural obstacles, does not allow the flexible adaptation of EU water policy objectives and measures to changes in basin hydrology and co-riparian politics. This applies particularly to the *quantitative aspects* of transboundary water management that is not only absent from contemporary EU water policy, but powerful legal constrains suggest that it is likely to remain so in the foreseeable future. Even more limited is the EU's adaptive capacity vis-à-vis *transboundary water dispute settlement*, an important precondition of hydropolitical stability. Here, the EU's own constitutional system prevents member states to have recourse to established international judicial forums without offering suitable alternative mechanisms. Since this condition relates to the core of the EU's legal architecture member states will remain deprived of external water dispute mechanisms probably indefinitely.

[930] SZABÓ (2008) *op. cit.* p. 163.
[931] *See* section III.2.5.3. a) above.

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PART IV
CONCLUSIONS AND RECOMMENDATIONS

This study has investigated the resilience of existing transboundary water governance regimes in the European Union as well as their adaptive capacity in the face of changing hydro-political conditions. The assessment covered the regional multilateral treaty framework, the various river basin treaty regimes as well as the EU's proper supranational legal and institutional system.

The main conclusions of the assessment can be summarised as follows:

- The European Union and its member states maintain *one of the most extensive and elaborate system of transboundary water governance* in the world. The regional UNECE regime, the basin and bilateral treaties of member states as well as the EU's *sui generis* legal framework stand out as regards their comprehensive geographical coverage, strong ecological focus or cooperation over planned projects.
- Despite such positive overall picture, however, *significant structural deficiencies* have been identified that may give rise to critical vulnerabilities, should the prevailing hydrological conditions of transboundary cooperation continue to change as projected due to increased climate variability.
- As regards the key legal and institutional indicators of hydropolitical resilience the following gaps must be highlighted:
    - *the absence of water quantity management:* EU water law and the European treaty framework (apart from occasional bilateral water treaties) almost comprehensively ignore the quantitative aspects of transboundary water management. Such one-sided ecological focus could be very well justified by the relative abundance of freshwater resources and the dominance of environmental quality considerations at the place and time of the conception of these regimes. This lacuna, however, means that the EU and its member states cannot rely on a solid legal framework to address the transboundary implications of the most important hydrological impact of climate change: increased variability of river flows;
    - *the absence of water allocation mechanisms:* a direct consequence of the absence of water quantity management is that – apart from the basic principles of international water law – there are no rules and mechanisms in place in the EU

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to govern water allocation between riparian states. Given that water allocation disputes are the most common source of inter-state tensions in hydro-diplomacy, this omission may turn into a major vulnerability gap in several parts of Europe, if water stress or scarcity continues to intensify as projected. The dominance of water quality and ecological requirements at UNECE, EU and basin level results in a gross regulatory asymmetry. Basin states have to comply, individually and collectively, with uniform and precise water quality requirements whose implementation is closely linked to the availability of water. Yet, the same countries are almost completely deprived of legal rights and mechanisms to demand that the necessary amount of water is made available to them. As a result, riparian states with high exposure to exogenous water sources may infringe their EU and international water quality obligations for the lack of sufficient volumes despite their best intentions and efforts;

- *limited management of hydrological variability in a transboundary context:* an additional consequence of the foregoing is the one-sided approach to the transboundary management of hydrological extremes. While the four layers of European water law regulate flood prevention and protection at an exemplary level of sophistication, less positive is the picture when it comes to the management of droughts. Even though member states are required to assess changing hydrological conditions in their share of international basins, neither EU and UNECE law, nor basin treaties call for real adaptation interventions in the case flow volumes decline. Undoubtedly, the basic principles of transboundary water cooperation (equitable and reasonable utilisation and the no-harm rule) together with the various information exchange and notification procedures create a basic framework to address such critical situations. These, however, do not amount to any operative guidance as to the immediate adaptation measures to be taken, including *adjustments in transboundary flow allocation*. This shortcoming can largely be attributed to the complacent approach of EU law and decision-makers vis-à-vis the question of transboundary water allocation;
- *inadequate mechanisms of dispute settlement:* the dispute settlement mechanisms available to EU member states are inadequate to channelize and resolve significant transboundary water conflicts. The EU's own legal system places the European Commission at the centre of law enforcement, which, however, investigates parallel violations of member states and tends to avoid any

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engagement in bilateral disputes. Consequently, there are no readily available, easy-to-access platforms in place to handle co-riparian differences. Also, EU law generally prohibits arbitration or recourse to the International Court of Justice in the context of most transboundary water issues. Instead, it only permits member states to sue each other before the European Court of Justice. This option, however, does not offer a viable alternative due to a series of political and institutional constraints. European water law therefore displays an important hydropolitical gap as it fails to provide effective mechanisms for the resolution of a potentially very wide spectrum of transboundary legal disputes between EU member states.

- The analysis of the *adaptive capacity* of the EU's water governance systems has shown that the above vulnerabilities are likely to persist in the long term for the following reasons:
  - *weak coordination among the different levels and actors of transboundary water governance:* horizontal coordination and flow of information between the two major multilateral blocks of transboundary governance – the UNECE and the EU – is insufficient, preventing the mutually beneficial optimisation of the two regimes. In fact, the EU's relevant legal instruments, in particular the Water Framework Directive, dominate contemporary co-riparian relations in the Union to such extent that it has the tendency to side-line all other issues. This legal-political asymmetry is also reflected in the attitude of the relevant water governance institutions, especially that of the European Commission, vis-à-vis other regimes;
  - *fragmented flow of information and feedback:* the shortcomings of coordination imply that the horizontal flow of information between the UNECE and the EU remains fragmented, unbalanced and somewhat occasional. The European Union, although a party to the UNECE Water Convention, remains exempt from the reporting obligations to the Convention bodies. The same applies in the opposite direction: the UNECE has no access to any established formal channels of information exchange with EU institutions;
  - *limited authority and flexibility in decision-making and problem-solving:* the rigid legal framework of the EU, coupled with a number of political and cultural obstacles, does not allow the flexible adaptation of the EU water policy to changes in basin hydrology and co-riparian politics. This applies particularly to

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the quantitative aspects of transboundary water management that is not only absent from contemporary EU water policy, but powerful legal constrains suggest that it is likely to remain so in the foreseeable future. Even more limited is the EU's adaptive capacity to properly handle bilateral water disputes, an important precondition of hydropolitical stability. The current formulation of the Treaty on the Functioning of the European Union, as interpreted by the European Court of Justice, suggests that the inability of member states to have recourse to international tribunals to adjudicate bilateral water issues is likely to persist indefinitely.

In order to ensure the long term stability of transboundary water cooperation in the European Union the following measures are recommended:

- *address hydro-political vulnerability in a comprehensive manner:* the competent UNECE and EU institutions (most prominently: the European Commission), basin organisations and member states should address hydropolitical vulnerability in a comprehensive, open and inclusive manner;
- *address transboundary water quantity management and water allocation:* the constitutional limits to adopting water quantity management measures (*i.e.* the unanimity requirement) should not be used as a justification for ignoring the pressing issue of transboundary water allocations. Despite the popular perception, the Treaty on the Functioning of the European Union does delegate powers to the EU to address transboundary water quantity management, it simply makes the adoption of binding rules on the subject more difficult. In view of its clear competence to do so, the European Commission should thoroughly explore existing and possible intra-EU tensions that may arise over transboundary water allocation. Should, as a result, the adoption of legal measures appear necessary, the Commission should investigate the political viability of such EU measures and alternative legal avenues (enhanced cooperation, intra-EU treaties, etc.). The transboundary implications of water quantity management should be taken on board along the same lines at UNECE, basin and bilateral level as appropriate;
- *expand the scope of vulnerability management:* the progressive approach of the EU to transboundary flood prevention and control should be extended to other hydrological extremes. This should include at least risk mapping, substantive obligations as well as cooperation procedures with regards to droughts and desertification. Particular attention

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should be paid to the short and long term transboundary impacts of national drought management measures;

- *review dispute settlement and enforcement mechanisms in the EU:* the availability and effective use of mandatory dispute settlement mechanisms is a major guarantee of the stability of co-riparian relations. The European Commission should therefore investigate options for bilateral dispute settlement that go beyond the feeble quasi mediation procedure under the Water Framework Directive, without affecting the judicial monopoly of the European Court of Justice. Relevant examples in and outside the EU include mediation, fact finding commissions, compliance mechanism, mutual evaluation, etc.
- *strengthen the effectiveness of the existing co-riparian cooperation mechanisms:* the experience of the first two planning cycles of the Water Framework Directive leaves room for significant improvement. This may include the development of guidance materials or procedural recommendations on member state cooperation, enhanced supervision by the European Commission, strengthening the role of basin commissions, etc. With improved cooperation many of the looming hydropolitical challenges could be resolved or mitigated before they turn into interstate disputes;
- *strengthen cooperation among the different levels and actors of transboundary water governance:* the currently suboptimal interplay among the various layers and actors of transboundary water governance could be significantly improved through enhanced collaboration. These do not require any legislative changes or additional resources, only vision and political effort. Most important in this context would be the more active collaboration of the European Commission and the Secretariat of the UNECE Water Convention. The European Commission could also play a more active role at basin level, making use of the diversity of its powers and its multi-faceted relationship with member states.

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SOURCES

Bibliography

ADELPHI (2014): *The Rise of Hydro-Diplomacy - Strengthening foreign policy for transboundary waters,* Climate Diplomacy Report, Berlin,

ALLOUCHE, Jeremy (2005): *Water Nationalism: An Explanation of Past and Present Conflicts in Central Asia, the Middle East and the Indian Subcontinent?* Ph.D. Thesis No. 699, Geneva, Université de Genève

BÁNDI, Gyula (Ed.) (2009): *The Impact of ECJ Jurisprudence on Environmental Law*, Budapest, Szent István Társulat

BÁNDI, Gyula (2011): *Környezetjog* [Environmental Law], Budapest, Szent István Társulat

BARANYAI, Gábor (2015): The Water Convention and the European Union: The Benefits of the Convention for EU Member States. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 88-100

BARANYAI, Gábor (2016): Managing Upstream-Downstream Dichotomy in European Rivers: A Critical Analysis of the Law and Politics of Transboundary Water Cooperation in the European Union. In EDSI: *The Water Footprint in Decision Sciences*, Proceedings of the 7th EDSI Conference, Helsinki, Finland, pp. 318-330

BARANYAI, Gábor and BARTUS, Gábor (2016): Anatomy of a deadlock: a systemic analysis of why the Gabčíkovo–Nagymaros dam dispute is still unresolved, *Water Policy* 18, pp. 39-49.

BAUMGARTNER, Thomas and PAHL-WOSTL, Claudia (2013): UN-Water and its Role in Global Water Governance, *Ecology and Society* 18, pp. 3-19, p. 6.

BELINSKIJ, Antti (2015): Cooperation between Finland and the Russian Federation. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 310-318

BERNARDINI, Francesca (2015): The Normative and Institutional Evolution of the Convention. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 32-48

BIGAS, Harriet (Ed.) (2012): *The Global Water Crisis: Addressing an Urgent Security Issue*, Papers for the InterAction Council, 2011-2012, Hamilton, Ontario, UNU

BISWAS, Asit K. (2007): Management of Transboundary Waters: an Overview. In VARIS, Olli, TORTAJADA, Cecilia and BISWAS, Asit K. (Eds.): *Management of Transboundary Rivers and Lakes*, Berlin, Heidelberg, Springer, pp. 1-21

BOISSON DE CHAZOURNES, Laurence (2013a): *Fresh Water in International Law*, Oxford, Oxford University Press

BOISSON DE CHAZOURNES, Laurence (2013b): Dispute Settlement Procedures and Fresh Water: Multiplicity and Diversity at Stake. In BOSCHIERO, Nerina et al. (Eds.): *International Courts and the Development of International Law*, The Hague, TCM Asser, pp.109-120

BRUHÁCS, János (2011): The International River Law in the Early 2000s. In KOVÁCS, Péter (ed): *International Law – a Quiet Strength*, Budapest, Pázmány Press

BUJDOS, Ágnes (2017): *The Analysis of the Rules on Transboundary Water Pollution*, PhD Thesis, Debrecen, Debreceni Egyetem

CANELAS DE CASTRO, Paulo (2009): *Luso-Spanish Cooperation on the Management of the Waters of the Shared Rivers - A Model within the European Model?* Conference Paper, http://umir.umac.mo/jspui/bitstream/123456789/15128/1/4446_0_MEDITERRANEAN%20CONF%20-%20Luso-Spanish%20wATERManagement%20-MODEL%20within%20the%20Model-%2002022009.doc (accessed 12 February 2019)

CHATTERJEE, Indrani (2013): *Evaluating International Water Treaty Impacts & Risks: The Albufeira Convention and the Spanish Experience*, University of California at Riverside https://economics.ucr.edu/seminars_colloquia/2013-14/applied_economics/I%20Chatterjee%20paper%20for%2011%206%2013%20seminar.pdf (accessed 12 February 2019)

CONCA, Ken (2006): *Governing Water: Contentious Transnational Politics and Global Institution Building*, Cambridge MA, MIT Press

COOLEY, John. K. (1984): The war over water, *Foreign Policy* 54 pp. 3–26

COSENS, Barbara (2010): Transboundary River Governance in the Face of Uncertainty: Resilience Theory and the Columbia River Treaty, *Journal of Land, Resources & Environmental Law* 30, pp. 229-265

COSTA, Leonardo, VERGÉS, Josep and BARRAQUÉ, Bernard (2008): *Shaping a new Luso-Spanish Convention*, Economics Working Papers 082008, Católica Porto Business School, Universidade Católica Portuguesa

CRAIG, Paul and DE BÚRCA, Gráinne (2003): *EU Law, Text, Cases, and Materials*, Oxford, Oxford University Press

DEL CASTILLO LABORDE, Lilian (2015): The UNECE Water Convention from a Latin American Perspective. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the*

Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation, Leiden, Boston, Brill Nijhoff, pp. 435-450

DELLAPENNA, Joseph. W. and GUPTA, Joyeeta (2008): The Evolution of Global Water Law. In DELLAPENNA, Joseph. W. and GUPTA, Joyeeta (Eds.): *The Evolution of the Law and Politics of Water*, Dordrecht, Springer, pp. 3-20

DELLAPENNA, Joseph. W., GUPTA, Joyeeta, LI, Wenjing and SCHMIDT, Falk (2013): Thinking about the future of global water governance, *Ecology and Society* 18:3, pp. 28-37

DELLI PRISCOLI, Jerome and WOLF, Aaron T. (2009): *Managing and Transforming Water Conflicts*, Cambridge, Cambridge University Press

DE STEFANO, Lucia, DUNCAN, James, DINAR, Shlomi, STAHL, Kerstin, STRZEPEK, Kenneth M. and WOLF, Aaron T. (2010): *Mapping the Resilience of International River Basins to Future Climate Change-Induced Water Variability*, World Bank Water Sector Board Discussion Paper Series, Paper No. 15, Washington D.C., The World Bank

DE STEFANO, Lucia, DUNCAN, James, DINAR, Shlomi, STAHL, Kerstin, STRZEPEK, Kenneth M. and WOLF, Aaron T. (2012): Climate change and the institutional resilience of international river basins, *Journal of Peace Research* 49:1, pp. 193-209

DINAR, Shlomi (2008): *International Water Treaties – Negotiation and cooperation along transboundary rivers*, London, Routledge

DINAR, Shlomi, KATZ, David, DE STEFANO, Lucia and BLANKESPOOR, Brian (2014): *Climate Change, Conflict, and Cooperation – Global Analysis of the Resilience of International River Treaties to Increased Water Variability*, Policy Research Working Paper 6916, Washington D.C., The World Bank

DOMBROWSKY, Ines (2008): Institutional design and regime effectiveness in transboundary river management? The Elbe water quality regime, *Hydrology and Earth System Sciences Discussions*, European Geosciences Union 12(1), pp. 223-238

DOMBROWSKY, Ines (2009): Revisiting the potential for benefit sharing in the management of transboundary rivers, *Water Policy*, 11 pp. 125-140

DRIESCHOVA, Alena, GIORDANO, Mark and FISCHHENDLER, Itay (2008): Governance Mechanisms to address flow variability in water treaties, *Global Environmental Change* 18, pp. 285-295

ELHANCE, Arun (1999): *Hydropolitics in the 3rd World: Conflict and Cooperation in International River Basins*, Washington D.C., United States Institute of Peace Press

ESPEY, Molly and TOWFIQUE, Basman (2004): International bilateral water treaty formation, *Water Resources Research* 40, W05S05, doi:10.1029/2003WR002534

DOI: 10.15774/PPKE.JAK.2019.003

EUROPEAN COMMISSION (2003): *Towards a Guidance on Establishment of the Intercalibration Network and the Process on the Intercalibration Exercise*, CIS Guidance Document No. 6, Luxembourg

EUROPEAN COMMISSION (2009): *River basin management in a changing climate*, CIS guidance document No. 24, Luxembourg

EUROPEAN COMMISSION (2015): *Ecological flows in the implementation of the Water Framework Directive*, CIS guidance document No. 31, Luxembourg

EUROPEAN ENVIRONMENT AGENCY (2009): *Water resources across Europe – confronting water scarcity and drought*, EEA Report No. 2/2009, Copenhagen

EUROPEAN ENVIRONMENT AGENCY (2012a): *European waters – assessment of status and pressures*, EEA Report No. 8/2012, Copenhagen

EUROPEAN ENVIRONMENT AGENCY (2012b): *Water resources in Europe in the context of vulnerability*, EEA Report No. 11/2012, Copenhagen

EUROPEAN ENVIRONMENT AGENCY (2012c): *Climate change, impacts and vulnerability in Europe 2012 – An indicator-based report*, EEA Report No. 12/2012, Copenhagen

EUROPEAN ENVIRONMENTAL BUREAU (2005): *EU Environmental Policy Handbook*, Brussels, http://www.wecf.eu/cms/download/2004-2005/EEB_Book.pdf (accessed 12 February 2019)

FISCHER, Günther, HIZSNYIK, Eva, TRAMBEREND, Sylvia and WIBERG, David (2015): *Towards indicators for water security – A global hydro-economic classification of water challenges*, IIASA Interim Report, Laxenburg, International Institute of Applied Systems Analyis

GARRICK, Dustin, ANDERSON, George R.M., CONNELL, Daniel and PITTOCK, Jamie (Eds.) (2013): *Federal rivers: managing water in multi-layered political systems*, Cheltenham, Edward Elgar Publishing

GARMESTANI, Ahjond S. and BENSON, Melinda H. (2013): A framework for resilience-based governance of social-ecological systems, *Ecology and Society* 18(1), pp. 9-20

GIORDANO, Mark, DRIESCHOVA, Alina, DUNCAN, James, SAYAMA, Yoshiko, DE STEFANO, Lucia and WOLF, Aaron T. (2014): A review of the evolution and state of transboundary freshwater treaties, *Int. Environ. Agreements* 14, pp. 245-264

GIORDANO, Meredith A. (2002): *International River Basin Management: Global Principles and Basin Practice*, PhD Thesis, Corvallis, Oregon State University

GIORDANO, Meredith A. (2003), Managing the Quality of International Rivers: Global Principles and Basin Practice, *Natural Resources Journal* 43, pp. 111-136

DOI: 10.15774/PPKE.JAK.2019.003

GOODIN, Robert E. (2010): *The Oxford Handbook of International Relations,* Oxford, Oxford University Press

GREEN, Olivia O., GARMESTANI, Ahjond S., VAN RIJSWICK, Helena and KEESSEN, Andrea M. (2013): EU water governance: striking the right balance between regulatory flexibility and enforcement? *Ecology and Society* 18(2), pp. 10-20

GUPTA, Joyeeta, TERMEER, C., KLOSTERMANN, J., MEIJERINK, D. , VAN DEN BRINK, M, JONG, P., NOOTEBOOM, S. and BERGSMA, E. (2010): The adaptive capacity wheel: a method to assess the inherent characteristics of institutions to enable the adaptive capacity of society, *Environmental Science and Policy* 13, pp. 459-471

HILL, Margot (2013): Adaptive Capacity of Water Governance: Cases From the Alps and the Andes, *Mountain Research and Development,* 33(3) pp. 248-259

HOMER-DIXON, Thomas (1999): *Environment, scarcity, and violence,* Princeton, NJ, Princeton University Press

JEKEL, Heide (2015): Integrated Water Resources Management as a Tool to Prevent or Mitigate Transboundary Impact. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation,* Leiden, Boston, Brill Nijhoff, pp. 228-248

JIMÉNEZ CISNEROS, Blanca E., OKI, T., ARNELL, N.W., BENITO, G., COGLEY, J.G., DÖLL, P., JIANG, T. and MWAKALILA, S.S. (2014): Freshwater resources. In FIELD, C.B. et al. (Eds.): *Climate Change: Impacts, Adaptation and Vulnerability*. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge, Cambridge University Press

KANWAR, Shalini, GUPTA, Ashim Das and NEWTON, Joshua (2009): Background on the concepts of vulnerability and resilience as applied to the South and Southeast Asian region. In UNEP: *Hydropolitical Vulnerability and Resilience along International Waters - Asia,* Nairobi

KEESSEN, Andrea M., VAN KEMPEN, Jasper and VAN RIJSWICK, Helena (2008): Transnational river basin management in Europe, *Utrecht Law Review* 4 pp. 35-56

KINNA, Rémy (2015): The UNECE Water Convention Viewed from the Perspective of the SADC Revised Protocol on Shared Watercourses. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation,* Leiden, Boston, Brill Nijhoff, pp. 466-485

KITTINGER, Wilhelm (1997): *The Danube River Protection Convention.* In LYONS MURHY, Irene (Ed.): *Protecting Danube Basin Resources,* NATO ASI series (Series 2: Environment) Dordrecht, Springer, pp. 43-47

KLISE, Geoffrey T., NEIR, Alyssa M., CAMPANA, Michael E., EWING, Amy, BASAK VENER, Berrin and RIEU-CLARKE, Alistair (2009): Hydrovulnerability of West Asia. In UNEP: *Hydropolitical Vulnerability and Resilience along International Waters - Asia*, Nairobi

KOLLIOPOULOS, Alexandros (2015): The UNECE Model Provisions on Transboundary Flood Management. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 367-378

KOMATINA, Dejan and GROŠELJ, Samo (2014): Transboundary Water Cooperation for Sustainable Development of the Sava River Basin. In MILAČIČ, Radmila, SCANCAR, Janez and PAUNOVIĆ, Momir (Eds.): *The Sava River*, Berlin, Heidelberg, Springer, pp. 1-25

KRÄMER, Ludwig (2002): Thirty Years of EC Environmental Law: Perspectives and Prospectives, *Yearbook of European Environmental Law* 2, pp. 155-182.

KUIJPER, Peter Jan (2013): "It Shall Contribute to … the Strict Observance and Development of International Law…" In COURT OF JUSTICE OF THE EUROPEAN UNION (2013): *The Court of Justice and the Construction of Europe: Analyses and Perspectives on Sixty Years of Case-law*, The Hague, TCM Asser Press, pp. 589-612.

LAMMERS, Johan G. (2014): The Helsinki Water Convention: A New Implementation Mechanism and Committee, *Environmental Policy and Law* 44/1-2, pp. 117-224

LOCKWOOD, Michael, RAYMOND, Christopher M., OCZKOWSKI, Eddie and MORRISON, Mark (2015): Measuring the dimensions of adaptive capacity: a psychometric approach, *Ecology and Society* 20(1), pp.37-50

MCCAFFREY, Stephen (2001): *The Law of International Watercourses: Non-navigational Uses*, Oxford, Oxford University Press

MCCAFFREY, Stephen (2015): The 1997 UN Convention: Compatibility and Complementarity. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 51-59

MCCAFFREY, Stephen (2016): UN Watercourses Convention – Implementation and Relationship to the UNECE Water Convention, *Environmental Policy and Law* 46/1, pp. 35-39

MATIC, Jasnica Klara (2011): The Framework Agreement on the Sava River Basin (FASRB). In MONTINI, Massimiliano and BOGDANOVIC, Slavko (Eds.): *Environmental Security in South-Eastern Europe*, NATO Science for Peace and Security Series C: Environmental Security, Dordrecht, Springer, pp. 229-241

MERREY, Douglas J. (2009): African models for transnational river basin organisations in Africa: An unexplored dimension, *Water Alternatives* 2(2), pp. 183-204

DOI: 10.15774/PPKE.JAK.2019.003

NEIR, Alyssa M., KLISE, Geoffrey T. and CAMPANA, Michael E. (2009): The concept of vulnerability as applied to North America. In UNEP: *Hydropolitical Vulnerability and Resilience along International Waters – North America*, Nairobi, pp. 17-22

NEWTON, Joshua (2007): Hydropolitical vulnerability of South America's international watercourses. In UNEP: *Hydropolitical Vulnerability and Resilience along International Waters – Latin America and the Caribbean*, Nairobi

NEWTON, Joshua (2014): *"Water, Water Everywhere, Nor any Drop to Drink": An Exploration of the Lack of a Formal Global Water Governance Regime*, PhD Thesis, Medford, Tufts University, Fletcher School of Law and Diplomacy

NORMAN, Emma S., COHEN, Alice and BAKKER, Karen (2015): The Water Convention from a North American perspective. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 423-434

MACRORY, Richard (1993): European Community Water Law, *Ecology L.Q.* 20, pp. 119-139

MCINTYRE, Owen (2015): The Principle of Equitable and Reasonable Utilisation. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 146-159

MILLY, Paul C. D., BETENCOURT, Julio, FALKENMARK, Malin, HIRSCH, Robert M., KUNDZEWICZ, Zbigniew W., LETTENMAIER, Dennis P. and STOUFFER, Ronald J. (2008): Stationarity is Dead: Whiter Water Management? *Science* 319, pp. 573-579, p. 573.

MILMAN, Anita, BUNCLARK, Lisa, CONWAY, Declan and ADGER, Neil W. (2012): *Adaptive Capacity of Transboundary Basins in the Mediterranean, the Middle East and the Sahel*, Tyndall Working Paper 151, Norwich, University of East Anglia

MOELLENKAMP, Sabine (2007): The "WFD-effect" on upstream-downstream relations in international river basins? Insights from the Rhine and the Elbe basins, *Hydrology and Earth System Sciences Discussions*, European Geosciences Union, 4 (3), pp.1407-1428

MOSELLO, Beatrice (2008): Water in Central Asia: a prospect of conflict or cooperation? *Journal of Public and International Affairs* 19, pp. 151-174

MOYNIHAN, Ruby (2015): The Contribution of the UNECE Water Regime to Transboundary Cooperation in the Danube River Basin. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 296-307

PAHL-WOSTL, Claudia, GUPTA, Joyeeta and PETRY, Daniel (2008): Governance and the Global Water System: A Theoretical Exploration, *Global Governance* 14, pp. 419-436

PAHL-WOSTL, Claudia (2009): A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes, *Global Environmental Change* 19, pp. 354–365

PAHL-WOSTL, Claudia (2015): *Water Governance in the Face of Global Change: From Understanding to Transformation,* Berlin, Heidelberg, Springer

RAI, Subash P., SHARMA, Nayan and LOHANI A.K. (2016): Transboundary Water Sharing: Issues Involved, *Environmental Policy and Law* 46/1, pp. 62-68

REES, Gerdy (2010): *The Role of Power and Institutions in Hydrodiplomacy: Does Realism or Neo-Liberal Institutionalism offer a stronger theoretical basis for analysing inter-state cooperation over water security?* MA paper, London, School of Oriental and African Studies

REICHERT, Götz (2016): *Transboundary Water Cooperation in Europe: A Successful Multidimensional Regime?* Leiden, Boston, Brill Nijhoff

RIEU-CLARKE, Alistair (2007): The Role and Relevance of the UN Convention of the Non-Navigational Uses of International Watercourses to the EU and its Member States, *British Yearbook of International Law* 78(1), pp. 389-428

RIEU-CLARKE, Alistair (2009): Challenges to Europe's Water Resources. In UNEP: *Hydropolitical Vulnerability and Resilience along International Waters – Europe*, Nairobi, pp. 17-28

RIEU-CLARKE, Alistair, MOYNIHAN, Ruby and MAGSIG, BjØrn-Oliver (2012): *UN Watercourses Convention - User's Guide*, Dundee, University of Dundee

RIEU-CLARKE, Alistair (2015): Remarks on the Drafting History of the Convention. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 3-15

ROCKSTRÖM, Johan, STEFFEN, W., NOONE, K. , PERSSON, Å., CHAPIN III, F. S., LAMBIN, E., LENTON, T. M., SCHEFFER, M., FOLKE, C., SCHELLNHUBER, H., NYKVIST, B., DE WIT, C. A., HUGHES, T., VAN DER LEEUW, S., RODHE, H., SÖRLIN, S., SNYDER, P. K., COSTANZA, R., SVEDIN, U., FALKENMARK, M., KARLBERG, L., CORELL, R. W., FABRY, V. J., HANSEN, J., WALKER, B., LIVERMAN, D., RICHARDSON, K., CRUTZEN, P. and FOLEY, J. (2009): Planetary Boundaries: Exploring the Safe Operating Space for Humanity, *Ecology and Society* 14(2), pp. 32-65

SADOFF, Claudia W., HALL, J.W., GREY, D., AERTS, J.C.J.H., AIT-KADI, M., BROWN, C., COX, A., DADSON, S., GARRICK, D., KELMAN, J., MCCORNICK, P., RINGLER, C., ROSEGRANT, M., WHITTINGTON, D. and WIBERG, D. (2015): *Securing Water, Sustaining Growth: Report of the GWP/OECD Task Force on Water Security and Sustainable Growth*, Oxford, University of Oxford

SALMAN, Salman M. A. (2009): *The World Bank Policy for Projects on International Waterways: An Historical and Legal Analysis*, Law, Justice and Development Series, Washington D.C., The World Bank

SERENO, Amparo (2014): *Climate Change in Albufeira Convention*, http://www.academia.edu/9031808/CC_in_Albufeira_Convention (accessed 12 February 2019)

SCHMEIER, Suzanne (2013): *Governing International Watercourses - River Basin Organizations and the sustainable governance of internationally shared rivers and lakes*, London, Routledge

SHAW, Malcolm N. (2003): *International Law*, Cambridge, Cambridge University Press

STEFFEN, Will, BROADGATE, Wendy, DEUTSCH, Lisa, GAFFNEY, Owen and LUDWIG, Cornelia (2015): The trajectory of the Anthropocene: The Great Acceleration, *The Anthropocene Review* 2(1), pp. 81–98

STARR, Joyce R. (1991): Water wars, *Foreign Policy* 82, pp. 17–36

STRATEGIC FORESIGHT GROUP (2011): *Himalayan Solutions Co-operation and Security in River Basins*, Mumbai

STRATEGIC FORESIGHT GROUP (2015): *Water Cooperation Quotient*, Mumbai

SUBRAMANIAN, Ashok, BROWN, Bridget and WOLF, Aaron T. (2014): Understanding and overcoming risks to cooperation along transboundary rivers, *Water Policy* 16, pp. 824-843

SZABÓ, Marcel (2008): The Mox Plant Case: the way towards Euro-chauvinism? In BÁNDI, Gyula (Ed.): *The Impact of ECJ Jurisprudence on Environmental Law*, Budapest, Szent István Társulat, pp. 143-166

SZILÁGYI, János Ede (2018): *Vízszemléletű kormányzás – vízpolitika – vízjog* [Water governance – water policy – water law], Miskolc, Miskolci Egyetemi Kiadó

TANZI, Attila and CONTARTESE, Cristina (2015): Dispute Prevention, Dispute Settlement and Implementation Facilitation in International Water Law: The Added Value of the Establishment of an Implementation Mechanism under the Water Convention. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 319-329

TANZI Attila and KOLLIOPOULOS, Alexandros (2015): The No-Harm Rule. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 133-145

DOI: 10.15774/PPKE.JAK.2019.003

TANZI Attila, MCINTYRE, Owen and KOLLIOPOULOS, Alexandros (2015): The Contribution of the UNECE Water Convention to International Water Law. In TANZI, Attila et al. (Eds.): *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Its Contribution to International Water Cooperation*, Leiden, Boston, Brill Nijhoff, pp. 533-540

Transboundary water management in Africa: challenges for development cooperation (2006), Study for the research and consultancy project „Cooperation on Africa's transboundary water resources" on behalf of the Ministry for Economic Cooperation and Development (BMZ)/Waltina Scheumann et al. (Eds.). Dt. Institut für Entwicklungspolitik

TURTON, Anthony (2008): The Southern African Hydropolitical Complex. In VARIS, Olli, TORTAJADA, Cecilia and BISWAS, Asit K. (Eds.): *Management of Transboundary Rivers and Lakes*, Berlin, Heidelberg, Springer, pp. 21-80

UNECE (2009): *Guidance on Water and Adaptation to Climate Change*, Geneva

UNECE (2011): *Strengthening Water Management and Transboundary Water Cooperation in Central Asia: The Role of UNECE Environmental Conventions*, Geneva

UNECE (2013): *Guide to Implementing the Water Convention*, Geneva

UNEP (2005): *Hydropolitical Vulnerability and Resilience along International Waters – Africa*, Nairobi

UNEP (2007a): *Hydropolitical Vulnerability and Resilience along International Waters – Latin America and the Caribbean*, Nairobi

UNEP (2007b): *Compliance Mechanisms under Selected Multilateral Environmental Agreements*, Nairobi

UNEP (2009a): *Hydropolitical Vulnerability and Resilience along International Waters – Asia*, Nairobi

UNEP (2009b): *Hydropolitical Vulnerability and Resilience along International Waters – Europe*, Nairobi

UNEP (2009c): *Hydropolitical Vulnerability and Resilience along International Waters – North America*, Nairobi

UNITED NATIONS (1978): *Register of International Rivers*, Oxford, Pergamon Press

UN-WATER (2013): *Water Security and the Global Water Agenda: A UN-Water Analytical Brief*, Hamilton, Ontario, UNU

DOI: 10.15774/PPKE.JAK.2019.003

US NATIONAL INTELLIGENCE COUNCIL (2012a): *Global Trends 2030: Alternative Worlds*, Washington D.C.

US NATIONAL INTELLIGENCE COUNCIL (2012b): *Global Water Security*, Intelligence Community Assessment, Washington D.C.

VAN RIJSWICK, Marleen, GILISSEN, Herman K. and VAN KEMPEN, Jasper (2010): The need for international and regional transboundary cooperation in European river basin management as a result of new approaches in EC water law, *ERA Forum* 11, pp. 129–157

VINOGRADOV, Sergei (2007): Regime Building for Transboundary Water: The Evolution of Legal and Institutional Frameworks in the EECCA Region, *Water Law* 18, pp. 77-94.

VÖRÖSMARTY, Charles J, GREEN, Pamela, SALISBURY, Joseph and LAMMERS, Richard B. (2000): Global Water Resources: Vulnerability from Climate Change and Population Growth, *Science* 289, pp. 284-288

WOLF, Aaron T., NATHARIUS, Jeffrey A., DANIELSON, Jeffrey J., WARD, Brian S. and PENDER, Jan K. (1999): International river basins of the world, *International Journal of Water Resources Development* 15:4, pp. 387–427

WOLF, Aaron T. (1999): Criteria for equitable allocations: The heart of international water conflict, *Natural Resources Forum* 23, pp. 3-30

WOLF, Aaron T. (2000): From Rights to Needs: Water Allocations in International Treaties. In FEITELSON, Eran and HADDAD, Marwan (Eds.): *Management of Shared Groundwater Resources*, Dordrecht, Kluwer, pp. 133-165

WOLF, Aaron T, STAHL, Kerstin and MACOMBER, Marcia F. (2003): Conflict and cooperation within international river basins: The importance of institutional capacity, *Water Resources Update* 125, pp. 31-40

WOLF, Aaron T. (2009): Hydropolitical vulnerability and resilience. In UNEP: *Hydropolitical Vulnerability and Resilience along International Waters – Europe*, Nairobi, pp. 1-16

WORLD ECONOMIC FORUM (2011): *Water Security: The Water-Food-Energy-Climate Nexus*, Washington D.C., Island Press

WORLD ECONOMIC FORUM (2015): *Global Risks 2015*, 10th Edition, Geneva

WORLD ECONOMIC FORUM (2016): *Global Risks 2016*, 11th Edition, Geneva

WORLD ECONOMIC FORUM (2017): *Global Risks 2017*, 12th Edition, Geneva

WORLD ECONOMIC FORUM (2018): *Global Risks 2018*, 13th Edition, Geneva

WOUTERS, Patricia (2013): *International Law - Facilitating Transboundary Water Cooperation*, Global Water Partnership Technical Committee, Background papers No. 17

WRC plc (2012): International Coordination (Part V). In WRC plc (Ed.): *Comparative Study of Pressures and Measures in the Major River Basin Management Plans*

WWAP (United Nations World Water Assessment Programme) (2012): *The United Nations World Water Development Report 4: Managing Water under Uncertainty and Risk*, Paris, UNESCO

WWAP (United Nations World Water Assessment Programme) (2014): *The United Nations World Water Development Report 2014: Water and Energy*, Paris, UNESCO

WWAP (United Nations World Water Assessment Programme) (2015): *The United Nations World Water Development Report 2015: Water for a Sustainable World*, Paris, UNESCO

WWAP (United Nations World Water Assessment Programme) (2016): *The United Nations World Water Development Report 2016: Water and Jobs*, Paris, UNESCO

ZALASIEWICZ, Jan, WILLAMS, Mark, STEFFEN, Will and CRUTZEN, Paul (2010): The New World of the Anthropocene, *Environ. Sci. Technol*. 44, pp. 2228-2231

ZALASIEWICZ, Jan, WATERS, C., SUMMERHAYES, C., WOLFE, A., BARNOSKY, A., CEARRETA, A., CREUTZEN, P., ELLIS, E., FAIRCHILD, I., GAŁUSZKA, A., HAFF, P., HAJDAS, I., HEAD, M., ASSUNÇÃO IVAR DO SUL, J., JEANDEL, C., LEINFELDER, R., MCNEILL, J., NEAL, C., ODADA, E., ORESKES, N., STEFFEN, W., SYVITSKI, J., VIDAS, D., WAGREICH M. and WILLIAMS, M. (2017): The Working Group on the Anthropocene: Summary of evidence and interim recommendations, *Anthropocene* 19, pp. 55-60

ZAWAHRI, Neda A. and MCLAUGHLIN MITCHELL, Sara (2011): Fragmented Governance of International Rivers: Negotiating Bilateral versus Multilateral Treaties, *International Studies Quarterly* 55, pp. 835–858

ZEITOUN, Mark and WARNER, Jeroen (2006): Hydro-hegemony – a framework for analysis of trans-boundary water conflicts, *Water Policy* 8, pp. 435–460

ZIKOS, Dimitros and HAGEDORN, Konrad (2017): Competition for Water Resources from the European Perspective. In ZIOLKOWSKA, Jadwiga R. and PETERSON, Jeffrey M. (Eds.): *Competition for Water Resources Experiences and Management Approaches in the US and Europe*, Amsterdam, Elsevier, pp. 19-35

Cases

Case Relating to the Territorial Jurisdiction of the International Commission for the River Oder, PCIJ, Series A, No. 23, 1929

DOI: 10.15774/PPKE.JAK.2019.003

Trail Smelter Arbitration (United States v. Canada) (1938, 1941) 3 RIAA 1905

Corfu Channel Case (United Kingdom v. Albania), ICJ Reports 1949, 4

Lake Lanoux Arbitration (France v. Spain) (1957) RIAA 281

Case Concerning the Gabčíkovo-Nagymaros Project (Hungary v. Slovakia), Judgement, ICJ Reports 1997, 7

C-36/98, Spain v. Council, ECR 2001, I-00779

C-459/03, Commission v. Ireland, ECR 2006, I-4657

Case Concerning Pulp Mills on the River Uruguay (Argentina v. Uruguay), Judgement, ICJ Reports 2010, 14

C-461/13, Bund für Umwelt und Naturschutz Deutschland e.V. v. Federal Republic of Germany, ECLI:EU:C:2015:433

Treaties

Treaty between the United States and Great Britain relating to Boundary Waters, and Questions Arising between the United States and Canada, Washington, 11 January 1909

Treaty between the United States of America and Mexico relating to the utilization of the Waters of the Colorado and Tijuana Rivers and of the Rio Grande, Washington, 2 March 1944

Treaty between the Hungarian People's Republic and the Republic of Austria Concerning the Regulation of Water Economy Questions in the Frontier Region, Vienna, 9 April 1956

Treaty on the Functioning of the European Union, Rome, 25 March 1957

Agreement between the Government of the Czechoslovak Republic and the Government of the Polish People's Republic Concerning the Use of the Water Resources in Frontier Water, Prague, 21 March 1958

Agreement between the Government of the French Republic and the Spanish Government relating to Lake Lanoux, Madrid, 12 July 1958

Indus Waters Treaty, Karachi, 19 September 1960

Convention between the Swiss Federal Council and the Government of the French Republic on the Protection of Geneva Lake Against Pollution, 16 November 1962

DOI: 10.15774/PPKE.JAK.2019.003

Agreement concerning the International Commission for the Protection of the Rhine against Pollution, Bern, 29 April 1963

Agreement between the Republic of Finland and the Union of Soviet Socialist Republics Concerning Frontier Watercourses, Helsinki, 24 April 1964

Agreement between the Government of the Polish People's Republic and the Government of the Union of the Soviet Socialist Republics Concerning the Use of the Water Resources in Frontier Waters, Warsaw, 17 July 1964

Agreement Regulating the Withdrawal of Water From Lake Constance, Berne, 30 April 1966

Statute of the River Uruguay, Salto, 26 February 1975

Convention for the protection of the Rhine against chemical pollution, Bonn, 3 December 1976

Treaty between Czechoslovakia and Hungary concerning the construction and operation of the Gabčíkovo- Nagymaros System of Locks, Budapest, 16 September 1977

Agreement between France and Switzerland concerning the Intervention of Bodies in charge Fighting against Accidental Water Pollution by Hydrocarbons or Other Substances Capable of Altering the Water, Geneva, 17 December 1977

Arrangement between the State Council of the Republic and Canton of Geneva and the Prefect of Haute-Savoie on the Protection and Recharge of the Franco-Swiss Genevois Aquifers, Geneva, 9 June 1978

Convention between the Kingdom of Belgium and the Grand Duchy of Luxembourg relating to the Waters of the Sûre, Brussels, 17 March 1980 (Convention entre le Royaume de Belgique et le Grand-Duché de Luxembourg au sujet des eaux de la Sûre)

Vuoksi Agreement on Discharge Rule in Lake Saimaa and the Vuoksi River, 1989

Convention on the International Commission for the Protection of the Elbe, Magdeburg, 8 October 1990

Convention on Environmental Impact Assessment in a Transboundary Context, Espoo, 25 February 1991

Agreement between the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan, Turkmenistan and the Republic of Uzbekistan on Cooperation in the Field of Joint Management on Utilization and Protection of Water Resources from Interstate Sources, Statute of the Interstate Commission for Water Coordination of Central Asia, Alma-Ata, 18 February 1992

DOI: 10.15774/PPKE.JAK.2019.003

Convention on the Protection and Use of Transboundary Watercourses and Lakes, Helsinki, 17 March 1992

Convention on the Transboundary Effects of Industrial Accidents, Helsinki, 17 March 1992

Agreement on the Protection of the River Scheldt, Charleville Mezieres, 26 April 1994

Agreement on the Protection of the River Meuse, Charleville Mezieres, 26 April 1994

Convention on Cooperation for the Protection and Sustainable Use of the Danube, Sofia, 29 June 1994

Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin, Chieng Rai, 5 April 1995

Convention on the International Commission for the Protection of the Oder, Wroclaw, 11 April 1996

Treaty between the Government of the Republic of India and the Government of the People's Republic of Bangladesh on sharing of the Ganga/Ganges waters at Farakka, New Delhi, 21 December 1996

Convention on the Law of Non-navigational Uses of International Watercourses, New York, 21 May 1997

Convention between the Government of the Republic of Hungary and the Government of Ukraine on water management questions relating to frontier waters, Budapest, 11 November, 1997

Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, Aarhus, 25 June 1998

Agreement on the General Principles of the Rational Use and Protection of Transboundary Water Bodies of the State Members of the Commonwealth of Independent States, Moscow, 11 September 1998

Convention on the Co-operation for the Protection and the Sustainable Use of the Waters of the Luso-Spanish River Basins, Albufeira, 30 November 1998 (Convenio sobre cooperación para la protección y el aprovechamiento sostenible de las aguas de las cuencas hidrográficas hispanoportuguesas)

Convention on the Protection of the Rhine, Bern, 12 April 1999

SADC Revised Protocol on Shared Watercourses, Windhoek, 7 August 2000

Charter of Waters of the Senegal River, 28 May 2002 (Charte des eaux du fleuve Sénégal)

DOI: 10.15774/PPKE.JAK.2019.003

Tripartite Interim Agreement between the Republic of Mozambique and the Republic of South Africa and the Kingdom of Swaziland for Co-Operation on the Protection and Sustainable Utilisation of the Water Resources of the Incomati and Maputo Watercourses, Johannesburg, 29 August 2002

International Agreement on the River Meuse (Accord international sur la Meuse), Gent, 3 December 2002

Framework Agreement on the Sava River Basin, Kranjska Gora, 3 December 2002

Protocol on Strategic Environmental Assessment (SEA) to the Convention on Environmental Impact Assessment in a Transboundary Context, Kiev, 21 May 2003

Protocol for Sustainable Development of Lake Victoria Basin, Arusha, 29 November 2003

Agreement between the Council of Ministers of the Republic of Albania and the Government of the Republic of Macedonia for the protection and sustainable development of Lake Ohrid and its watershed, Skopje, 17 June 2004

Protocol amending the Convention on Co-operation for the Protection and Sustainable Use of the Waters of Luso-Spanish River Basins signed 30 November 1998, 4 April 2008

Agreement between Finland and Sweden Concerning Transboundary Rivers, Stockholm, 11 November 2009

Protocol on Flood Protection to the Framework Agreement on the Sava River Basin, Gradiška, 1 June 2010

Convention for the Prevention of Conflicts Related to the Management of Shared Water Resources in Central Africa, Brazzaville, 22 December 2018

Legal acts of the European Union

Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment

Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment

Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna

Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption

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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

Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment

Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information

Directive 2003/35/EC of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage

Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 concerning the management of bathing water quality

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

Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks

Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy

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

Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)

Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment

Decision No. 1386/2013/EU of the European Parliament and of the Council of 20 November 2013 on a General Union Environment Action Programme to 2020 ‘Living well, within the limits of our planet’