

Transboundary water cooperation in the European Union: a hydro-political gap assessment

Gábor Baranyai

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Contact information:

www.danubewaterquality.eu

Prepared by:

Gábor Baranyai

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Executive summary

The Danube has the most international river basin of the world. Danubian countries, however, managed to turn the hydrological and political complexities of the basin into a source of exemplary cooperation and integration. Nonetheless, European transboundary water governance faces considerable challenges as a result of climate change and other powerful forces of the Anthropocene. This study, conceived under the auspices of the European Union's Danube Region Strategy, aims to investigate these challenges in the European context and to suggest corresponding solutions.

The starting point of the assessment is the so-called “hydro-political dilemma”, i.e. why and how states do or do not cooperate over transboundary water resources. The study reviews the main legal and institutional models in place to manage this dilemma under international law, regional treaties as well as European Union law. Consequently, the hydro-political vulnerability of the European Union is analysed at three levels: legal and institutional frameworks offered by international water law, the basin treaty framework of European states and the water governance regime of the European Union. The assessment matrix is based on a number of legal and institutional indicators (water quality management, water allocation, risk management, variability management, cooperation over planned projects, dispute settlement and supranational institutions). It is assumed that if all these constituent elements are in place in a particular river basin, riparian states will be able to manage even extreme changes in hydrological conditions successfully.

The main findings of the study confirm that the European Union and its member states have one of the most extensive and elaborate system of transboundary water governance in global comparison. The pan-European treaty framework regime, the European basin agreements and the EU's own water legislation stand out as regards comprehensive geographical coverage, strong ecological focus, cooperation over planned water-relation projects as well as transboundary risk management.

Nevertheless, important vulnerability gaps are identified that may pose significant difficulties in intra-EU water cooperation, if not addressed early. These include the absence of water quantity management, the lack of water allocation mechanisms, the narrow scope of variability management and, finally, the inadequacy of the dispute settlement mechanisms of the EU.

Based on these findings the study formulates recommendations to the European institutions and EU member states suggesting to address the hydro-political vulnerability gaps identified in a comprehensive manner.

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Chapter 1

Introduction

1.1 The need for a critical analysis of water governance in the European Union

The water policy and legislation of the European Union (EU) is globally praised for its wide scope, broad purpose, comprehensive ecological approach, elaborate planning, monitoring and implementation tools as well as for its river-basin framing. Not only does the EU have a spectacular range of legislative and policy instruments in place, its actual and potential member states are also parties to a series of bilateral and multilateral treaties that are supposed to cover all major water management issues either at basin level or in the context of bilateral relations. Compared to other regions of the world this is an enviable position. It is therefore not surprising that there is very little political discourse on transboundary water issues in the EU.

However, the relative development of the EU's water governance regime should not lead to complacency. There are a number of factors that may upset the existing hydro-political balance between EU members and/or neighbouring countries. First, the *stationarity* of hydro-climatic conditions no longer qualifies as the point of departure for policy-making and institution development. As most of the impacts of climate change are expressed through increased hydrological *variability*, any existing water governance system that is based on the stationarity model needs to be revisited. Second, despite its relative small size Europe has the highest number of international river basins. The geo-physical conditions and political settings of these basins vary greatly. This calls for flexible and adaptive water governance mechanisms that can handle all such complexities. Finally, a number of existing studies on the subject have identified certain gaps in Europe's hydro-political resilience, but have chosen not to investigate them further. If such vulnerabilities exist, they had better be revealed as early as possible.

Through an in-depth investigation of the hydro-political resilience of the European Union this study aims to contribute to the strengthening of the EU's transboundary water governance system so that it can successfully prevent or mitigate the water-related inter-state tensions experienced in large number elsewhere in the world.

1.2 The structure of this study

The study begins with the problem setting: an overview of the transboundary watercourses of the world, including river basins shared by the constituent members of large federal countries. It is followed by a brief summary of the main drivers of change: the age of the Anthropocene and its various impacts on freshwater resources and on the hydro-political balance at global and regional level (Chapter 2).

The proper subject of the study is introduced through an overview of the political phenomenon commonly coined as the "hydro-political dilemma", i.e. why and how states cooperate or do not cooperate over transboundary water resources (Chapter 3).

This is followed by a detailed description of the main water governance models of the world: international law, regional treaties and mechanisms, with a particular focus on the European Union. As large federations experience similar inter-jurisdictional challenges internally as sovereign states in their transboundary water relations, a summary of a selected number of federal water governance models is provided to broaden the empirical base of the analysis (Chapter 4).

The concept of hydro-political resilience and vulnerability is introduced through a summary of the methodology used and conclusions drawn by the most important studies available on the subject (Chapter 5).

Subsequently, the hydro-political vulnerability of the European Union is analysed at three levels: legal and institutional frameworks offered by international water law, the basin treaty framework of European states and the water governance regime of the European Union (Chapter 6).

The closing chapter draws some conclusions on the current state of and formulates recommendations for the future improvement of transboundary water governance in the European Union (Chapter 7).

Chapter 2

The challenges of transboundary water governance in the Anthropocene

2.1 Introduction

This chapter contains a comprehensive problem setting. It first outlines the scale and distribution of the shared river basins of the world, with an outlook to federal rivers (Section 2.2). The introduction into physical parameters of shared water resources is followed by an overview of the main effects on freshwater resources of our modern age, eloquently termed as “Anthropocene” in view of the magnitude of the human induced geo-physical impacts on the world (Section 2.3). The physical impacts on the availability and quality water may give rise to potentially grave political changes. These changes, summarised subsequently, are considered to be one of the major drivers of political instability worldwide by 2030 (Section 2.4). Finally, a brief introduction is provided into the “hydro-political cooperation dilemma”, a description of why countries experience major difficulties in transboundary water relations, to be followed by a summary of the actual record of transboundary water cooperation (Section 2.5).

2.2 The scale and distribution of transboundary river basins in the world

Transboundary river basins – i.e. individual catchment areas that intersect or demarcate political boundaries – are ubiquitous. The Transboundary Freshwater Dispute Database¹, the most commonly employed relevant dataset maintained by the Oregon State University, identifies 263 international river basins (Figure 1). These basins overlay 148 countries and account for about 60% of global freshwater flows. The catchment areas are also home to 40% of the world’s population and cover approximately 47% of the Earth’s surface.

The countries that have no transboundary watercourses are either islands (from Australia to Malta) or microstates (e.g. the Vatican), except for the countries of the Arab Peninsula (Saudi Arabia, Qatar, Bahrain, Kuwait, Yemen, Oman, United Arab Emirates) where there are no permanent watercourses².

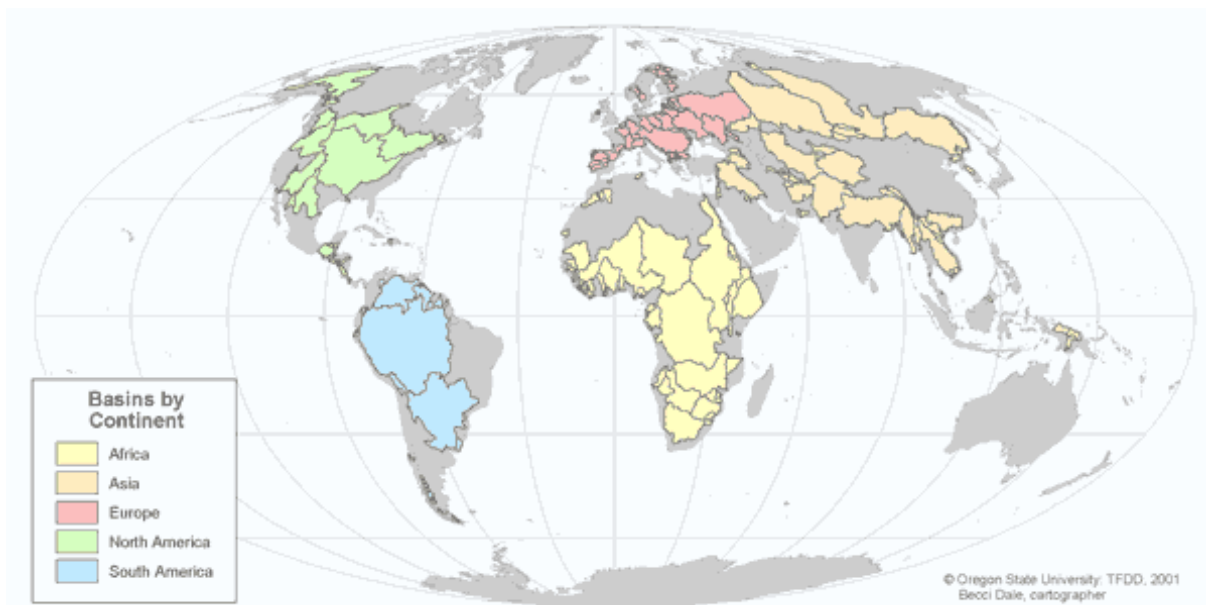
33 countries have more than 95% of their territories within the hydrological boundaries of one or more international basins. All basins differ in size, political complexity, hydro-logical conditions, etc. Some, however, are extremely complex, the most notable of which is the Danube basin with 19 riparians.

The geographical distribution of shared river basins is uneven, with Europe having the largest number of international basins (69), followed by Africa (59), Asia (57), North America (40), and South America (38).

¹ <http://www.transboundarywaters.orst.edu/database/>

² Strategic Foresight Group (2015): *Water Cooperation Quotient*, p. 37.

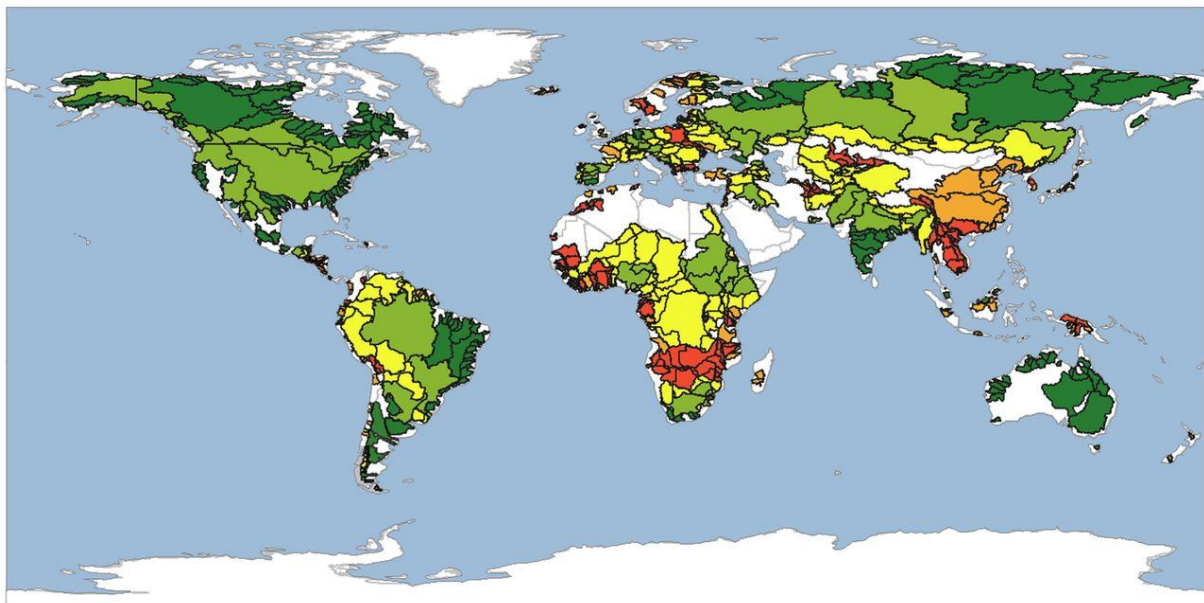
Figure 1: International river basins



As delineated by the Transboundary Freshwater Dispute Database project, Oregon State University, 2000. Source: International River Basins, Wolf et al. (1999), updated 2001.

The picture gets further complicated if one adds two important variables to the above dataset. First, most large international river basins are in fact complex rivers systems that contain *international sub-basins* that, on a smaller scale, often display the same political and hydrological complexities as the overall basin. Second, another 40% of the world's population lives in the world's 28 *federal* countries whose *river basins* are also subject to multiple jurisdictions. Many federal rivers are international rivers too (Figure 2).

Figure 2: Federal rivers



Dark green: domestic rivers falling within 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 et al. (2013)

2.3 The Anthropocene and its impact on freshwater resources

The second half of the 20th century witnessed an unprecedented progress in science and technology. The ensuing increase in industrial and agricultural production left major impacts on the Earth's system. During this period world population has doubled (reaching 6 billion in 2000) and the global economy has grown 15-fold. Urbanisation has accelerated to reach 50% by 2000. Given the power and scale of man's impact on Earth it has been proposed by leading scientists to rename our epoch as "Anthropocene" to mark humanity's departure from the Holocene era characterised by relatively stable climatic conditions³.

The impacts of these changes on water are particularly severe. Technological development, intensive agriculture, expansion of transport, urbanisation, increased population as well as growing personal demand for water have resulted in water consumption levels that are not sustainable for the world's 7 billion inhabitants, let alone the 9 billion people expected by 2050.

Out of the above drivers 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 follows⁴:

- dramatic *decrease of renewable water resources* for 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 (the main sources of water quality degradation include 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),
- in regions with *snowfall increasing alterations* of stream flow,
- in *glacierfed* rivers expected *decrease in total meltwater yields* in the long run. Continued loss of glacier ice implies a shift of peak discharge from summer to spring.

Importantly, certain climate mitigation and adaptation measures may have also negative implications on water as well. Afforestation, hydroelectric developments, carbon capture and storage or even solar energy production are activities of high water footprint.

³ Bhaduri et al. (2014), p. viii.

⁴ Jiménez Cisneros et al. (2014), p. 232-234.

2.4 Political impacts on global hydropolitical balance

Most of the world's technical and political instruments to manage rivers have, thus far, been based on the concept of *stationarity*, an idea that river runoffs fluctuate within predictable ranges of variability. The scientific findings cited above however suggest that altered precipitation patterns and other human interventions render future *river flow variability* outside the bounds of previously observed events⁵. This, coupled with the impacts of other human-induced phenomena such as population growth, unilateral water development and pollution or unbalanced levels of economic development may become a disruptive factor in transboundary water relations⁶.

It is therefore no surprise that the geopolitical risks associated with the unfolding hydro-climatic changes have become a major focus of international policy. A 2012 publication of the US National Intelligence Council outlining global megatrends⁷, based on a mapping of environmental water scarcity (Figure 3), concludes that “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 conflicts⁸.

In addition to water stress, transboundary floods also pose a considerable risk to co-riparian relations. While only 10% of the floods are of transboundary character, these floods account for human casualties, displaced individuals and financial damages disproportionately⁹.

Strikingly, the Global Risks 2015 Report of the World Economic Forum ranks water crisis as the number one risk in terms of impact and number eight in terms of likelihood¹⁰, highlighting its potential to trigger major inter-state challenges such as large scale involuntary migrations.

2.5 The hydropolitical cooperation dilemma: the challenges of bridging upstream-downstream asymmetry

2.5.1 The structural difficulties of transboundary water cooperation

Water management is often coined as conflict management by definition¹¹. Water is such a fundamental asset that competing human, economic, social and biological needs inevitably lead to competition for the same resource. The difficulties of integrating all legitimate demands for water are exacerbated by the fact that water management is usually

⁵ Milly et al. (2008), p. 573.

⁶ Giordano & Wolf, http://transboundarywater.geo.orst.edu/publications/atlas/atlas_html/interagree.html

⁷ US National Intelligence Council (2012): *Global Trends 2030: Alternative Worlds*.

⁸ Ibid p. 66-67.

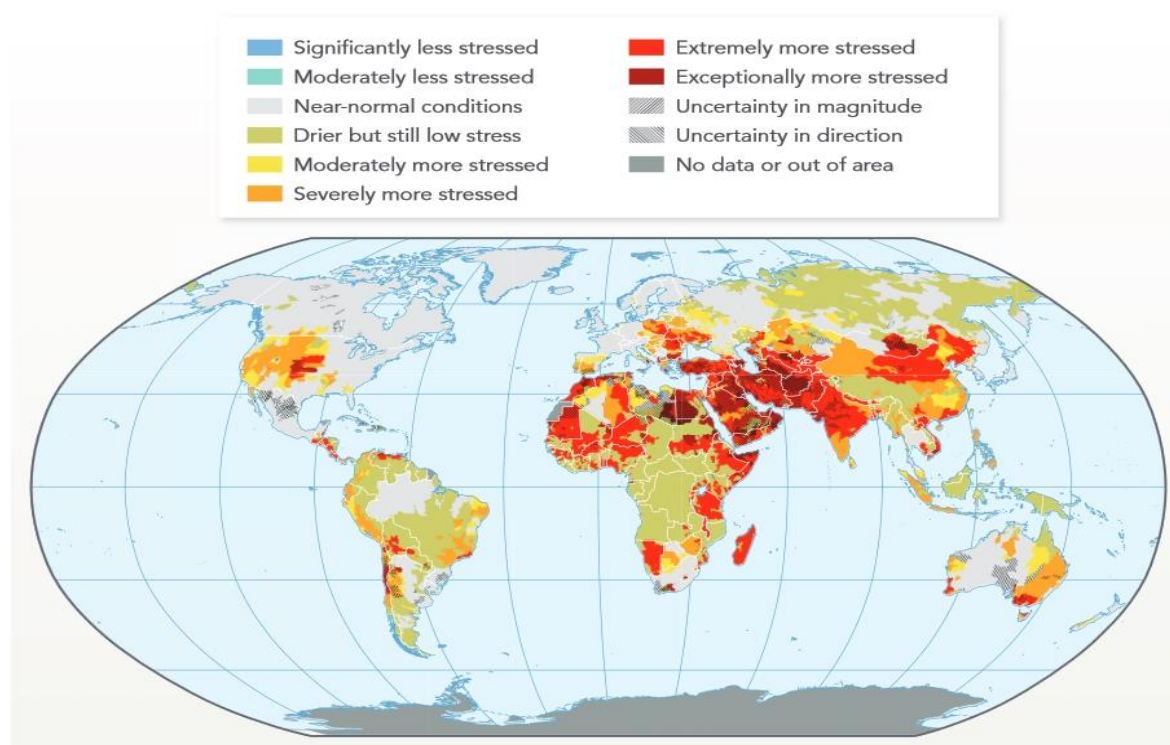
⁹ Bakker (2006), p. 276.

¹⁰ <http://reports.weforum.org/global-risks-2015/top-10-infographics/>

¹¹ Wolf (2009), p. 4.

Figure 3: Environmental water scarcity index by basin

ENVIRONMENTAL WATER SCARCITY INDEX BY BASIN: HIGH-STRESS BELT BY 2030



Source: National Intelligence Council (2012): *Global Trends 2030: Alternative Worlds*, p. 69

fragmented at national and subnational level. If one adds international boundaries, the chances to find mutually acceptable solutions decrease exponentially¹².

At the core of the challenge lies the natural asymmetry of upstream-downstream users. As eloquently put by one author: “[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”¹³. This strong sentiment of exposure and suspicion of unilateralism often emerges even more intensely within federal states, rendering shared river basin management a major test of federal systems of governance¹⁴.

To close the upstream-downstream asymmetry one has to overcome a number of structural difficulties. First, countries often feel that cooperation over transboundary watercourses and lakes affects *core concerns of statehood* such as sovereignty, territorial integrity and security¹⁵. Especially in regions characterised by high political tension 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-

¹² Ibid.

¹³ Lord Birdwood, 1954, quoted by Dinar (2008), p. 37.

¹⁴ Garrick et al. (2014), p. 3.

¹⁵ Dinar (2008), p. 16.

making power to a supranational entity¹⁶. Second, water issues often revolve around *core values* and *cultural constructions* that date back generations. Cultural similarities may facilitate cooperation, while cultural differences (stereotypes of neighbouring nations, enemy images) can become major hindrances. The strong political and emotional mobilising power of water renders intra-basin cooperation an easy subject of *domestic politics*. In many cases the water conflicts arise or remain unresolved due to domestic political determinations¹⁷. Finally, the chances of water cooperation are strongly influenced by a number of variables, such as geography (border creator rivers are easier to manage jointly than through-border rivers), the aggregate power of the countries involved, other (non-water-related) linkages among the riparians, etc.¹⁸

2.5.2 Record of transboundary water cooperation

Despite the above difficulties statistical evidence confirms that differences over transboundary waters are more likely to result in cooperation than conflict¹⁹. Historically, the number of acute conflicts over water has been significantly lower than instances of cooperation. The extensive qualitative research of Wolf (1998) 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-Mideast cases accounted for only five acute events. Almost 90% of all conflicts on record relate to *water quantity and infrastructure*. The 507 conflict-related events are grossly outnumbered by the nearly 1300 cooperative events (treaties, projects, institutions, joint initiatives, etc.) accounted for during the same period²⁰.

In 2013 the Transboundary Freshwater Dispute Database accounted around 250 proper basin or sub-basin agreements²¹. While these still cover less than 50% of the number of international river basins, they apply to most significant river basins, accounting for 70% of the world's transboundary areas (42 million km²) 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 ever decade²².

This generally positive overall picture however hides important nuances. First, the depth, legal, institutional solidity and the geographical coverage of these treaties vary greatly. Only around one-third of multilateral basins have treaties signed by three or more states. Only 11 basins have a treaty that includes all riparians and only about a quarter of all basin treaties cover the entire catchment area. Another important shortcoming of a large number of transboundary treaties is that they omit basin-specific issues. This is because they are either too general in nature or they apply to all waters between riparians without further specifications (boundary or frontier treaties)²³. Finally, while the presence of a treaty is an unquestionable token of cooperation, these agreements are often born out of prolonged

¹⁶ Subramanian et al. (2014), p. 835.

¹⁷ Dinar (2008), p. 30-32.

¹⁸ Idid, p. 16-23.

¹⁹ Wolf (2009), p. 7.

²⁰ Ibid.

²¹ Giordano et al. (2013), p. 252.

²² Ibid, p. 262.

²³ Ibid p. 255.

(near) conflict situations that can generate lasting distrust among the parties and doubts about the resilience of the newly established framework²⁴.

Mention must also be made of the cooperation record of shared *federal river basins*. Surprisingly, statistical records show that waters flowing through subnational political units have a higher potential for conflict than in the international setting. There are several historic and contemporary examples of such clashes, occasionally involving violence at local level²⁵.

²⁴ Wolf (2009) describes the usual negotiating dynamics as follows: “At some point, one of the riparians, generally the regional power, will implement a project that impacts at least one of its neighbors. In the absence of relations or institutions conducive to conflict resolution, the project can become a flashpoint, heightening tensions and regional instability, and requiring years or, more commonly, decades, to resolve—the Indus treaty took 10 years of negotiations, the Ganges 30, and the Jordan 40—and, all the while, water quality and quantity degrades to where the health of dependent populations and ecosystems is damaged or destroyed. This problem gets worse as the dispute gains in intensity; one rarely hears talk about the ecosystems of the lower Nile, the lower Jordan, or the tributaries of the Aral Sea—they have effectively been written off to the vagaries of human intractability. During such periods of low level tensions, threats and disputes rage across boundaries with relations as diverse as those between Indians and Pakistanis and between Americans and Canadians. Water was the last and most contentious issue resolved in negotiations over a 1994 peace treaty between Israel and Jordan, and was relegated to “final status” negotiations—along with other of the most difficult issues such as Jerusalem and refugees—between Israel and the Palestinians. p. 9.

²⁵ E.g. interstate violence and death along the Cauvery River in India, to the USA, where California farmers blew up a pipeline meant for Los Angeles, to intertribal bloodshed between Maasai herdsmen and Kikuyu farmers in Kenya. See Delli Priscoli & Wolf (2009), p. 1.

Chapter 3

Governance models to manage shared river basins: legal and institutional mechanisms in the world

3.1 Introduction

This chapter describes in a nutshell the most important and best known legal and institutional mechanisms that are in place to manage shared river basins. The overview begins with water governance rules and institutions that exist at global level (Section 3.2). It is followed by a brief analysis of transboundary water governance regimes in the various UN regions (Section 3.3), with a more detailed outline of the European regime (Section 3.4-3.5). Finally, a brief introduction into the federal governance of shared river basins is provided (3.6). As the objective of this chapter is to offer a basis for further comparative analyses, it does not contain a critical review of the various rules and mechanisms described.

3.2 Transboundary water governance at global level

3.2.1 Overview

One might reasonably assume that the prominence of transboundary waters in international relations all around the world should have, thus far, brought about solid global legal and institutional solutions to address the problem of shared river basins. The consensual view is, however, the opposite. While the past decade has usefully raised the global profile of water policy considerations, the policies and institutions that concern water issues at global level remain fragmented and are likely to remain so for the foreseeable future²⁶. This applies particularly to the problem of transboundary water governance which is one of the politically most controversial subjects of international law and politics.

Nevertheless, some recent developments give the hope of a significant improvement of the present situation. These include notably the entry into force, in 2014, of the 1997 UN International Watercourses Convention²⁷ and the global opening in 2013 of the UNECE Transboundary Water Convention²⁸. These two instruments are expected to solidify the legal and the institutional bases of water cooperation globally.

3.2.2 International law

The use and protection of shared water resources is governed by a number of fundamental principles rooted in general international law, the two above global conventions and the considerable jurisprudence of the International Court of Justice and other international tribunals.

The point of departure of state conduct in the context of shared water resources is a set of core principles emanating, directly or indirectly, from the Charter of the United Nations. These include the principle of good neighbourliness, the commitment to promote peace and

²⁶ Dellapenna et al. (2013), p. 28.

²⁷ Convention on the Law of the Non-navigational Uses of International Watercourses, 1997

²⁸ Convention on the Protection and Use of Transboundary Watercourses and International Lakes, 1992

security, to duty to cooperate, the obligation to resolve disputes by peaceful means or the principle of the “rule of law”²⁹.

Specific principles and rules for transboundary water governance are found in the 1997 UN International Watercourses Convention, the 1992 UNECE Water Convention as well as a number of regional treaties and political instruments, such as the UN General Assembly resolution on transboundary aquifers³⁰.

There is broad academic recognition that the cornerstones of international water law are three basic legal principles as follows: (i) the equitable and reasonable utilisation, (ii) prevention of significant harm (the “no-harm” rule) and the (iii) prior notification of and consultation on planned measures with significant transboundary effects³¹. These principles find their clearest legal expression in the UN International Watercourses Convention that, in this respect, is considered as a codification of customary international law.

The above basic framework is supplemented by some general environmental law principles, such as the precautionary principle, the polluter pays principle or the sustainability principle (not elaborated here).

3.2.3 The 1997 UN International Watercourses Convention

Since 2014 there have been two global instruments at hand that define general cooperation frameworks for transboundary water issues: the 1997 UN International Watercourses Convention and the 1992 UNECE Water Convention. As the latter is also discussed in relation to Europe below, the following summary only covers the UN International Watercourses Convention.

Adoption of the UN International Watercourses Convention in 1997 by the UN General Assembly was preceded by two decades of legal research and codification under the auspices of the International Law Commission. It took another 17 years to gather a sufficient amount of ratifications to trigger its entry into force. The Convention is generally recognised as a codification of the principles of international law governing the non-navigational uses of international watercourses. It 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”³².

Among the various provisions of the Convention the *equitable and reasonable utilisation of international watercourses*³³ stands out as the dominant principle of contemporary water law. The principle implies a number of obligations. 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 of the interests of other riparians. Second, the principle encompasses the right of states to utilise the shared river as well as the duty to cooperate in the protection of it. The Convention also enumerates the most important factors that have to be taken into account in determining whether a

²⁹ Wouters (2013), p. 13-22.

³⁰ Resolution No. 66/104 *The law of transboundary aquifers* A/RES/66/104, 9 December 2011.

³¹ Mccaffrey (2015), p. 58.

³² Ibid, p. 54.

³³ Article 5.

particular use can be considered equitable and reasonable³⁴. It underlines that there is no mandatory priority among competing water uses, but in the case of a conflict between uses, special attention must be paid to the “requirements of vital human needs”³⁵.

The other overarching principle of international water law is the so-called “*no-harm*” rule. It implies that states utilising their share of the international watercourse must take all necessary measures to prevent causing significant harm to other riparians. If such harm is nevertheless caused, all appropriate measures must be taken to eliminate or mitigate it³⁶.

The Convention also describes the duties of states to cooperate over *planned measures* that may have a significant negative impact on other riparians as well as the related procedures that include prior notification and consultation³⁷.

In addition to the above three bedrock principles, the Convention also sets out basic requirements concerning *pollution prevention* and *control* and the *protection* of riverine and marine *ecosystems*³⁸.

Finally, the Convention defines detailed rules of *dispute resolution*³⁹. Cross-border water disputes must be resolved peacefully bilaterally or through the involvement of third-party mechanisms, 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 strong step forward towards a mandatory third-party dispute settlement⁴⁰. Regardless, however, of these extra-judicial mechanisms, the parties may refer their dispute to the International Court of Justice or an arbitral tribunal.

3.2.4 Institutions

Water policy has no dedicated specialised agency, programme, fund, etc. in the United Nations system. It does not imply, however, that water is not looked after within the UN. Conversely, there are 31(!) various UN bodies that are engaged significantly in water policy issues⁴¹ plus the Secretary-General himself has a dedicated advisory board on water and sanitation⁴². This institutional cacophony results in considerable overlaps and rivalry among the various actors, despite the existence of an internal coordination platform called UN-

³⁴ Article 6.1 “(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.”

³⁵ Article 10.

³⁶ Article 7.

³⁷ Articles 11-19.

³⁸ Articles 20-23.

³⁹ Article 33, Annex.

⁴⁰ Tanzi et al (2015), p. 325.

⁴¹ CBD, FAO, IAEA, IFAD, ILO UNICEF, UNCTAD, UNCCD, UN DESA, UNDP, UN ECA, UNEP, UNECLAC, UN ESCAP, UN ESCWA, UNESCO, UN FCCC, UN-HABITAT, UNHCR, UNIDO, UNISRD, UNITAR, UNU, UN WOMEN, UNWTO, World Bank, WFP, WHO, WMO.

⁴² UNSGAB.

Water. Given however its weak mandate and the lack of political supervision the influence of UN-Water is limited and is likely remain unable to create a uniform United Nations water policy⁴³.

There is a number of other intergovernmental (e.g. OECD, Global Water Partnership) and international non-governmental organisations (e.g. World Water Council) who dedicate all or significant parts of their activities to water issues at global level. While their contribution to the transboundary discourse is invaluable, none of them can be regarded as the global lead institution in the field.

3.3 Transboundary water governance in Africa, Asia and the Americas

3.3.1 Africa

The African continent has the highest percentage of transboundary watercourses, with over 90% of its surface waters being of transboundary character. It boasts some of the largest international rivers such as the Nile, Congo, Niger, Zambezi, Orange, Okavango, etc. and a series of the biggest international lakes. Africa is also known for the underutilisation of its water resources, for example less than 4% of the available water is utilised, and less than 7% of the hydropower potential is realised⁴⁴.

While Africa has a growing number of basin treaties and basin organisations, over half of the basins are not covered at all or fully by treaties. The greatest progress has been achieved in Southern Africa, where under the auspices of the Southern African Development Community, the Republic of South Africa has been the driving force behind expanding and/or revising the basin treaty and institutional structure⁴⁵. Important developments have taken place in other river basins too, such as the Senegal River, the Niger or the Chad basins. Important challenges remain however in particular in the Nile basin where there is a fundamental tension between historic water allocation rights and divergent developmental needs and policies of upstream and downstream riparians.

Africa does not have a comprehensive transboundary water treaty. Nonetheless, the African Ministers' Council on Water (AMCOW), established in 2002, provides a continent-wide cooperation platform to address, among others, transboundary water management issues: AMCOW's 2011 Governance and Management Action Plan calls for the development and implementation of basin level principles⁴⁶.

3.3.2 Asia

Asia has some of the world's most utilised transboundary rivers, though the hydrological and political conditions vary hugely among the various sub-regions of the continent.

South and Southeast Asia is home to about 2 billion people and covers four major international river basin systems: the Ganges-Brahmaputra-Meghna, the Indus, the Mekong and the Salween River basins. While these basins have some kind of treaty based-

⁴³ Baumgartner & Pahl-Wostl (2013), p. 6.

⁴⁴ Wouters (2013), p. 8-11.

⁴⁵ Scheumann & Neubert (2006), p. 3.

⁴⁶ <http://www.amcow-online.org/images/about/Governance%20and%20Management.pdf>

cooperation (except for the Salween River), the treaties at issue fail to deal with the emerging new problems and pressures with a comprehensive, basin-wide approach. Transboundary water management is thus characterised by recurring interstate tensions⁴⁷.

Many of the international rivers of *West Asia* (Middle East, Caucasus and Central Asia), such as the Tigris, Euphrates, Jordan, do not only suffer from excessive human and climatic pressures, cooperation is also hampered by the general political instability of the region. While inter-state disputes over water tend to reach high political intensity in the *Central Asian* region too, the countries concerned also benefit from the UNECE Water Convention and the various international development programmes aimed to stabilise the hydro-political situation through cooperation⁴⁸.

In the Asian continent *China* represents a special case. China, the “water tower” of Asia, is a riparian to eighteen international river basins, some of which constitute the world’s largest and most utilised water systems. China itself is relatively water rich, but due to its highly uneven geographic and temporal distribution only 10% is consumed. Over a quarter of the country’s total discharge flows to downstream countries. Until relatively recently, China had almost no cooperation with downstream riparians and stayed away from the development of international water law and policy. Thus, China has very limited cooperation with its southern neighbours on the Indus, Brahmaputra, Salween and the Mekong basins. Despite recent developments, most Chinese water treaties deal mainly with border issues, with a very limited number address use, allocation or ecosystem protection⁴⁹. Thus China’s cooperation with its neighbours today is still largely limited to such depoliticised topics, such as technical data sharing for flood prevention and navigation⁵⁰.

3.3.3 The Americas

North America has a long history of creating institutions that govern, manage, and regulate transboundary water resources. Treaty frameworks addressing transboundary water resources between the United States and Canada and the United States and Mexico were developed over a century ago⁵¹. Despite the severe consequences of hydro-climatic changes already felt strongly in US-Mexico relations North America, together with Europe, displays the highest degree of hydro-political resilience (see Chapter 4 below).

South and Central America is characterised by the abundance of water resources and a low population density compared to other continents. As a result, the amount of water available per capita is the highest in the world in the region. There are significant and largely unregulated transboundary rivers cross South and Central America. Many of these basins are, however, have no (e.g. Orinoco basin) or relatively basic joint governance schemes in place. Two positive cases however regularly mentioned as exemplary models of cooperation: the La Plata River and the Titicaca Lake. Decades of cooperation in the La Plata and the Lake Titicaca basins have produced steady progress towards the development of comprehensive, sustainable, basin-wide transboundary governance⁵².

⁴⁷ Kanwar et al. (2009), p. 53.

⁴⁸ UNECE (2012).

⁴⁹ Wouters (2015), p. 448.

⁵⁰ Yan & Magee (2009), p. 110.

⁵¹ Nier et al. (2009), p. 17.

⁵² Newton (2007) p. 66.

3.4 Transboundary water governance in Europe

3.4.1 Overview

The European continent has the highest number of international river basins in the world as well as some of the most complicated ones (see Chapter 5). Yet, it has also developed one of the most extensive and sophisticated system of transboundary water governance. Europe is the only continent that has developed an overarching treaty framework: the UNECE Water Convention and its protocols. It also maintains a highly successful institutional system that is specifically dedicated to transboundary collaboration. Moreover, the majority of European countries are also member states of the European Union or candidates for accession. These countries also have to apply the general and water-specific legislation of the EU that, among others, has important implications for transboundary cooperation.

Europe's relative success in managing transboundary water relations is attributable to a number of factors. Except for the Iberian Peninsula, most of Europe's international rivers have, until recently, had abundant flows, not exceeding the historic ranges of variability. Also, Europe is largely free from the most common human-induced pressures that seriously complicate hydro-politics elsewhere: there are no significant population or urbanisation pressures on most river basins, upstream countries tend to be rich and environmentally conscious with no unilateral water development agenda, etc. There is also a long history of cooperation in most river basins as well as, at least in the EU, environmental protection is a broadly shared political priority⁵³.

These favourable conditions however do not prevail in the entire continent. The rivers of the Balkans Peninsula or the large eastern river basins of the continent (Dnieper, Dniester, Don, Volga) are in a much less favourable state in terms of ecological status, institutional protection or political attention.

3.4.2 The UNECE Water Convention

The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention) has been developed under the auspices of the United Nations Economic Commission for Europe, the UN's regional cooperation body for the Pan-European region (whose members also comprise the countries of the former Soviet Union, the United States and Canada). The Convention was adopted in 1992 and entered into force in 1996. It has quickly evolved into a full-fledged model platform for transboundary water cooperation. It has two protocols – Protocol on Water and Health, Protocol on Civil Liability – of which the latter is not yet in force.

The Convention requires parties to enter into specific basin agreements and to establish joint bodies⁵⁴. As a framework instrument it does not replace bilateral or multilateral agreements on specific basins or aquifers, rather it is intended to complement their implementation. The Convention was amended in 2003 (effective as of 2013) to allow the accession by any member states of the United Nations outside the UNECE region.

The core obligations under the Convention include:

⁵³ Mccaffrey (2015), p. 57.

⁵⁴ Article 9

- to prevent, control and reduce adverse transboundary impacts on the environment, human health and socioeconomic conditions. Transboundary impact is defined broadly to include effects on human health and safety, flora, fauna, soil, air, water, climate, landscape and historical monuments or other physical structures or the interaction among these factors; they also include effects on the cultural heritage or socio-economic conditions resulting from alterations to those factors⁵⁵,
- to manage shared waters in a reasonable and equitable manner using the ecosystem approach and guided by the precautionary principle and the polluter-pays principle⁵⁶,
- to preserve and restore ecosystems⁵⁷,
- to carry out environmental impact assessments, to draw up contingency plans, set water-quality objectives and minimize the risk of accidental water pollution⁵⁸.

While the focus of the Convention is more ecological than that of the UN International Watercourses Convention, the object and purpose of the two agreements can be considered as substantially the same⁵⁹. Thus the two conventions helpfully complement each other, creating a positive synergy between the two legal regimes.

The UNECE Water Convention, unlike the UN International Watercourses Convention, is also supported by a robust institutional framework, including the regular meetings of the parties, a compliance mechanism, various working and expert groups and a highly active secretariat. The Convention bodies are engaged in a very broad range of activities, including assessment of the state of water bodies, information exchange, capacity building, etc. The Convention has also successfully ventured out into such new progressive topical areas as climate change adaptation or the payment for ecosystem services⁶⁰.

3.4.3 European basin treaties and organisations

Europe has not only the highest number of river basins in global comparison, but also the widest basin treaty coverage (see Chapter 4 below). This is not surprising in view of the fact that the UNECE Water Convention obliges parties to enter into basin agreements and in view of the active assistance the Convention bodies lend to the development of such treaties. This new body of agreements born in the spirit of the UNECE Water Convention includes the basin treaties relating to the Danube, the Oder, the Meuse and Scheldt, the Rhine and a series of bilateral water (frontier) treaties between Spain and Portugal, several ex-Soviet member states (on the most important European basin treaties see Chapter 5 below) and their EU neighbours⁶¹.

The European basin agreements have also established river basin commissions that provide a platform not only for the implementation of the treaties, but also for addressing new challenges that emerge in the basin. Some basin commissions, such as the International

⁵⁵ Article 1.2

⁵⁶ Article 2

⁵⁷ Article 2, 3

⁵⁸ Article 2, 3, 14

⁵⁹ McCafrey (2015). p. 58.

⁶⁰ http://www.unece.org/fileadmin/DAM/env/water/publications/brochure/Convention_E_A4.pdf

⁶¹ Trombitcaia & Koepfel (2015), p. 15.

Commission for the Protection of the River Danube, run a wide range of programmes that expand the basic activities covered by the basin treaty in a progressive fashion.

3.5 Transboundary water governance in the European Union

3.5.1 The environmental policy of the European Union

Water issues in the European Union fall under the broader category of environmental policy under one of the EU's founding treaties, the Treaty on the Functioning of the European Union (TFEU). It is an important qualification as EU water policy remains subject to the general principles and the limitations of environmental policy that flow from the TFEU and the Treaty on the European Union (TEU). These principles include "the principle of sustainable development" and "a high level of the protection and improvement of the quality of the environment"⁶².

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 problems⁶³. To the latter end the EU and its member states have to cooperate with third countries and international organisations and may enter into international agreements⁶⁴. Importantly, these agreements form an integral part of the EU's legal system and, as such, are binding on the EU institutions and its member states⁶⁵.

The objectives of EU environmental policy must be pursued in accordance with a number of 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 the principle that the polluter should pay⁶⁶.

In general, the EU adopts its own environmental legislation through the so-called ordinary legislative procedure, i.e. by the joint decision of the Council of ministers (voting by qualified majority) and the European Parliament (voting by simple majority)⁶⁷. 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)⁶⁸. Arguably, this exception is designed to safeguard member states' ability to regulate the flow of water as they wish (a perceived prerequisite of national sovereignty) by way of granting veto power to any member state and by excluding the European Parliament, generally seen as an activist, green force in the joint decision-making process. This has however created a

⁶² Preamble to the TEU, Article 3.3 TEU.

⁶³ Article 191.1 TFEU.

⁶⁴ Article 191.4 TFEU.

⁶⁵ Article 216.2 TFEU.

⁶⁶ Article 191.2 TFEU.

⁶⁷ Article 192.1 TFEU.

⁶⁸ Article 192.2 TFEU.

situation where adopting EU measures specifically addressing water quantity management has become virtually impossible, with the ultimate result of downplaying quantitative issues in EU water policy.

3.5.2 Overview of the water legislation of the European Union

The centrepiece of EU water legislation is the so-called Water Framework Directive (WFD) adopted in 2000⁶⁹. 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 place.

The WFD lays down a comprehensive framework for the protection and the improvement of the aquatic environment. It 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 water⁷⁰. Its regulatory approach is based in the integrated assessment and management of all impacts on the aquatic environment, extending the previous chemical focus to biological, ecosystem, economic, morphological aspects and, to a lesser extent, quantitative issues. 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.)⁷¹. These objectives are summarised as “good water status” that is described by normative ecological and chemical parameters for surface waters and chemical and quantitative parameters for groundwater⁷². Importantly, the WFD considers quantitative issues as “ancillary” to water quality, conspicuously leaving surface water quantity to a regulatory grey zone⁷³.

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. If a river basin is shared by more than one member state it has to be assigned to an international river basin district⁷⁴. 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 states⁷⁵. The main instruments 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). Member states are obliged to carry out an

⁶⁹ 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.

⁷⁰ Article 1 WFD.

⁷¹ Article 4 WFD.

⁷² “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).

⁷³ In view of the procedural obstacles relating to regulating water quantity described above the WFD has to make a strained effort to justify why the WFD covers certain aspects of water quantity management. See recitals (4), (19), (23), (25), (34) and (41) of the preamble to the WFD.

⁷⁴ Article 3 WFD.

⁷⁵ Article 3, 13 WFD.

extensive monitoring of the quality of the aquatic environment along EU-wide coordinated methodologies⁷⁶.

The WFD, as its name suggests, provides only a framework for water policy. There exists a range of additional legislative measures addressing various specific water-related issues. 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 directive⁷⁷, the single most costly piece of environmental legislation ever to be implemented in EU history⁷⁸. 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, i.e. nitrates pollution from agricultural sources is regulated by the so-called nitrates directive⁷⁹. It aims to protect surface and groundwater by preventing nitrates from agricultural sources polluting ground and surface waters and by promoting the use of good farming practices. Discharges into surface waters of the most prominent hazardous substances is governed by the environmental quality standards directive⁸⁰ that sets limit values for 33 priority hazardous substances and 8 other pollutants with a view to their progressive elimination. The groundwater directive⁸¹ establishes a regime which defines groundwater quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater. The EU's general industrial pollution legislation, the so-called industrial pollution (formerly: IPPC) directive⁸² lays down an integrated permitting system for the most important industrial installations, with strict conditions relating to surface water, groundwater and soil protection. Importantly, it subjects all existing and future permits to a periodic review in light of the developments in the best available technique. While less relevant in this context, mention must nevertheless be made of the drinking water directive⁸³, the bathing water directive⁸⁴, the flood risk management directive⁸⁵ or the marine strategy directive⁸⁶, all contributing to the broad environmental objectives of the WFD.

Significantly, other EU environmental measures may have important effects on water management. These include horizontal legislation such as the environmental impact

⁷⁶ Article 8, Annex V WFD.

⁷⁷ Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment.

⁷⁸ http://ec.europa.eu/environment/water/water-urbanwaste/implementation/factsfigures_en.htm

⁷⁹ Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources.

⁸⁰ 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.

⁸¹ 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.

⁸² Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control).

⁸³ Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption.

⁸⁴ Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 concerning the management of bathing water quality.

⁸⁵ Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks.

⁸⁶ 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.

assessment and the strategic environmental impact assessment directives⁸⁷, the directive on the access to environmental information⁸⁸, the environmental liability directive⁸⁹, EU nature conservation measures, especially the habitats directive⁹⁰.

Finally, it must be underlined that while EU water law, especially the Water Framework Directive contains important provisions that require cross-border, sometimes basin-level cooperation, the EU does not have a specific dedicated institutional framework for transboundary issues. Rather, the underlying regulatory approach appears to be that if every EU member state fulfils its obligations nationally, it will lead to an ideal situation where no major transboundary issues emerge, or, should such issues nevertheless emerge (e.g. floods or pollutions incidents) they can be contained under the issue-specific directive. It also means that the UNECE Water Convention remains the overarching legal framework for transboundary cooperation.

3.5.3 Institutions

EU water law, especially the WFD is supported by an elaborate system of political and technical bodies administered by the European Commission that have produced a broad range of guidance and other resource documents (most importantly the Common Implementation Strategy of the WFD)⁹¹. Member States chief water regulators cooperate actively on a formal basis through the network of appointed national water directors. Also, the EU member states also benefit from the vast and well-funded technical apparatus of the various agencies of the European Commission, especially the European Environmental Agency, that carries out environmental monitoring, data collection and analysis of all environmental media, water included.

Nevertheless, as a result of the ecological focus of EU water law and the absence of a dedicated transboundary institutional framework, the EU lacks a number of institutional mechanisms that normally play a key role in interstate water relations. The most important such missing elements are compliance review and assistance and dispute settlement (for a critical analysis see Chapter 5 below).

3.6 Federal water governance models for shared river basins

3.6.1 Introduction

As indicated in Figure 2 above, rivers and lakes that are shared by the constituent units of the 28 or so federal or quasi federal countries of the world serve around 40% global population. They include some of the world's largest river basins (Indus, Ganges-

⁸⁷ 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.

⁸⁸ Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information.

⁸⁹ 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.

⁹⁰ Council Directive of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna.

⁹¹ European Commission (2001).

Brahmaputra, Amazon, etc.) a great number of which are international rivers at the same time.

The management of water resources shared at federal level faces similar hydro-political challenges as transboundary rivers and lakes. Paradoxically, empirical research shows (See Section 2.5.2 above) that water disputes occur more frequently in intra-state relations than between sovereign countries and their intensity can easily reach levels seldom experienced in international relations (even though as “internal” affairs such conflicts tend to remain unreported in international media). Water management is severely complicated by the political partition of these countries and the division of powers between the federal and constituent unit governments. As a result, federations too can have great difficulty adopting cooperative and functional approaches to water policy, especially in situations of increased hydroclimatic variability that impinges significantly on river flows and water quality, rendering water management one of the biggest tests of the federal system of governance⁹².

Federal water governance regimes are rooted in the federations’ respective constitutional frameworks. As federal legal and institutional architectures differ hugely, federal water governance regimes show great diversity too. The fact that the universal principles of the United Nations and the fundamental rules of international water law, a commonly accepted point of departure in the context of transboundary water management, do not apply in intra-state relations complicates even further their comparative analysis.

Nevertheless, the past few years have seen a new wave of comprehensive research into the problem of federal water governance that provides a solid basis for the juxtaposition of federal systems of water management to other multi-layered water governance regimes.

3.6.2 Links between the federal and international water governance regimes: the critical issues

While federal water governance systems often confront similar challenges to those emerging in the international context, they also enjoy the benefits of a *single constitutional structure* that, in most cases, provides a sufficient framework to settle the most important water issues arising in intra-state relations. This is a critical distinction as federal governments tend to be major actors in the resolution of internal conflicts over the equitable distribution of the costs and benefits of water management⁹³. Successful water integrated water resources management indeed often requires a clear leadership at federal level, even in truly devolved federal structures⁹⁴.

Another distinct feature of federal systems is that federal governments invariably hold some *fiscal powers* over the constituent units. This provides them with a significant room for manoeuvre to compel (through taxes) or entice (through transfers) federal unit governments to undertake certain water management measures, even where their formal powers to intervene are operationally constrained by constitutional rules or practice⁹⁵.

Finally, most federal structures have very well developed mechanisms to *settle* constitutional and/or certain water-related (typically allocation-driven) *disputes* among the

⁹² Garrick et al. (2014), p. 3-7.

⁹³ Ibid p. 17.

⁹⁴ Anderson (2014), p. 339.

⁹⁵ Ibid p. 340.

unit governments as well as vis-à-vis the federal government. This is a critical advantage against international law where the mandatory jurisdiction of the International Court of Justice or other supranational tribunals is always exceptional and requires the general or specific agreement of the states in dispute.

In view of the primary focus of this study only a limited set of questions that are critical for the stability of intra-state water relations are addressed below in relation to the following five selected federal countries as follows:

- issues: existence at federal level water policy and framework legislation, rules on water quantity management (water allocation), environmental quality, variability management and dispute settlement,
- countries: United States, Canada, South Africa, Spain and India.

3.6.3 United States

The United States is the oldest federation in the world. It originates in the union of pre-existing colonies that enjoyed full control of their natural resources, including water. Such devolved approach to water policy prevails even today, even though the federal government plays an active and pragmatic role shaping water management across the US through legislation, spending or as a mediator in inter-state disputes.

Water quantity management, especially allocation of water among states, remains firmly in the hands of the states. US states have a range of legal and institutional frameworks at their disposal to regulate water allocation among themselves, including those involving Congress or the US Supreme Court. Most commonly used are the so-called water compacts, inter-state treaties that specify water allocation rules and governance structures known as compact commissions⁹⁶. Water compacts are particularly widespread among irrigation-dependent western US states whose river systems exhibit high degrees of hydro-climatic variability. The allocation rules contained in these compacts vary greatly, from rather rigid fixed rates of apportionment to flexible proportionate rules that share the risk of water variability among states. Allocation issues also dominate inter-state water disputes vis-à-vis water quality, habitat or species-related problems of conflicts⁹⁷. On the other hand, *water quality* and the protection of the aquatic environment are mainly governed by federal statute.

Another important characteristics of inter-state US water policy is the highly *litigious approach* of states and other water users. States sue each other and the federal government on a regular basis. Even, private parties often challenge decisions of inter-state compact commissions. The broad availability of legal remedies against “sovereign” action has been successfully used by downstream states to overcome the inability of compact commissions to address changing hydrological conditions in inter-state relations⁹⁸.

In summary, the United States does *not have an integrated federal water policy framework*, even though some critical aquatic issues, such as *water quality* and the protection of endangered species are regulated by federal acts. The most important inter-state water

⁹⁶ Schlager & Heikkilä (2014), p. 61.

⁹⁷ Ibid p. 67.

⁹⁸ Ibid p. 68

issue tends to be *water allocation*, a property rights consideration under US law. US states have various mechanisms to regulate water allocation among themselves, with the most commonly used instrument being transboundary compacts. Many of these compacts contain *flexibility rules* that require water allocation be adjusted to changing hydro-climatic conditions. Finally, inter-state water disputes are frequently settled in *courts*, providing downstream users with powerful judicial tools to redress upstream “opportunism” in water relations.

3.6.4 Canada

Canada is a country with abundant water resources that also has the highest per capita water consumption in the world. As a result, water issues have, historically, not been of high political or social concern for Canadians⁹⁹. Recently however the so-called Prairie Provinces (Alberta, Saskatchewan, Manitoba) have witness significant water challenges locally and in a transboundary context due to climate change, population pressure and large scale energy-related developments (hydropower, oil sand mining, etc.).

Canada is one of the most devolved federations of the world, where the federal government often remains complacent to intervene in inter-provincial matters even in cases where it has the powers to do so. While the constitutional system of Canada provides the federal government with various headings under which it could regulate water issues, the dynamics of federal politics and a restrictive constitutional jurisprudence has led to a tradition of non- or belated reactive engagement in water issues. Therefore, the default position for water management in Canada is provincial regulation¹⁰⁰. Provinces however cannot be compelled to cooperate on transboundary water issues, let alone establish river basin plans or commissions. While many large shared rivers have some basic allocation or management framework, they tend to be very general in nature, lack dispute settlement mechanisms or of a questionable constitutional status¹⁰¹. This poses great difficulties for downstream provinces e.g. in the case of the Mackenzie Basin, the tenth largest river basin in the world. Here, competing uses and development policies (e.g. oil sand extraction in Alberta) have led to significant environmental degradation that can hardly be corrected under the existing loose cooperation framework agreement. Federal disinclination to impose solutions is exacerbated by the tradition of not litigating intergovernmental disputes. This creates little incentive for upstream provinces to seriously address the issue of interjurisdictional water sharing¹⁰².

In summary, Canada has *no national water policy*, leaving *water quality* and *quantity* management almost entirely to the *provinces*. Even though Canada has some of the world’s largest shared river basins, there are *no general cooperation frameworks* or mechanisms in place to govern the inter-provincial water management. Moreover, political *tradition prevents* downstream provinces to seek redress in *courts*, rendering the Canadian system of federal water management one of the weakest in the world.

⁹⁹ Horbulyk (2014) p. 93.

¹⁰⁰ Saunders (2014) p. 80.

¹⁰¹ Saunders (2014) p. 84, Horbulyk (2014) p. 97.

¹⁰² Horbulyk (2014), p. 86.

3.6.5 South Africa

Federalism in South Africa is a relatively recent development. After the fall of apartheid a broad national consensus has led to the adoption of a new constitution in 1996 has established a “quasi-federal” structure that is based on the strong cooperation of the federal and provincial governments as some powers are exercised concurrently¹⁰³. Importantly, the 1996 constitution recognises the human right to a healthy environment and the right to food and water which has direct implications for the entire spectrum of water management. Notably, the point of departure of water management is the requirement to guarantee minimum environmental water requirements (the so-called ecological reserve) and water for basic human needs (the BHN reserve) that enjoy priority over other uses.

The 1996 constitutional reform also coincided with the unfolding of a major water crisis that called for a significant overhaul of the management of South Africa’s scarce water resources. The 1997 Water Management Act divided South Africa into 19 mega-basins termed Water Management Areas to be management by smaller catchment management agencies. Importantly, Water Management Areas overlap with neither provincial, nor river basin boundaries. This was a deliberate to avoid the pitfalls of political and “basin-federalisation” of water management, in particular the undesirable fragmentation of water management functions and powers seen elsewhere¹⁰⁴. Consequently, provinces do not play a determining role in water management, including water allocation, basin transfers or environmental protection. While practical management is to be carried out by the catchment management agencies (most of which have not yet been set up), the central government can step in at any time if the catchment authorities fail to perform their functions.

In conclusion, water management has sound *policy and legal foundations* in South Africa at *national level*, with clear *environmental quality* and *water allocation* objectives. The implementation of water policy remains in the hand of catchment management agencies who operate under a close supervision of the national government. Provincial governments have no formal powers in water governance so as to avoid historic inequalities in water allocation as well as the “balkanisation” of resource management.

3.6.6 Spain

Spain is one of the most water stressed countries in Europe. It has a *comprehensive national water policy* and *institutional system* that is under growing physical and political pressure due to the intensifying competition for its highly variable resources in a mostly semi-arid environment. Spain, as a member state of the EU, is also obliged to implement EU environmental and water legislation.

River basins that intersect the boundaries of two or more autonomous communities (regions) are considered as “federal rivers” whose entire management is assigned to river basin authorities that operate under the supervision of the federal government. Purely regional rivers are administered by regional water agencies. The autonomous communities are responsible for water and sanitation services, environmental protection, agriculture, forestry and spatial planning.

¹⁰³ Muller (2014), p. 180.

¹⁰⁴ Ibid p. 191.

In recent years *growing demand for water* and *increased variability* has given rise to serious tensions among autonomous communities as well as the national government. Regions have been trying to expand their control over the water flowing through their territories, increasingly by unilateral action¹⁰⁵. More arid regions have also been pushing for controversial intra-basin transfer projects to be funded by the national government. Given the political complexities of regional water issues, various national governments have, on a selective basis, approved the rearrangement of federal basins, leading to successful legal challenges by affected regional governments before the Constitutional Court and the Supreme Court of Spain. These recurring conflicts are putting the system of federal water governance under serious strain, risking the gradual disintegration of the existing structure¹⁰⁶.

In summary, Spain has a *comprehensive national water policy framework* in place that addresses both *qualitative* and *quantitative issues*. Increased *hydro-climatic variability* however continues to create tensions among the various autonomous communities, suggesting that the existing governance framework is incapable of absorbing the pace of change. Regional-national political interplay has prevented the national government to undertake leadership, leaving *dispute resolution* mainly to the judiciary. The highest courts of the country have played a central role in defending the federal system of water governance in Spain.

3.6.7 India

India has is a hugely diverse federal structure with equally diverse hydrological conditions. 16 of India's 18 river basins are inter-state and, except for one, all of them are water scarce or stressed. Constitutionally, states have the main responsibility for water. While the Union parliament also has powers to legislate on inter-state water disputes, apart from two early acts in 1956, it has never managed to do so. *Nor* has the Union government been able to impose a *coherent national water policy* or even to play a significant role in inter-state water relations¹⁰⁷. Various attempts to create federal level water policy principles have failed due to the resistance of states who take a narrow view of no-give-and-take in inter-state water relations¹⁰⁸. While Indian states conclude water agreements with each other, the river basin boards under a 1956 act that envisaged the creation of advisory bodies for the integrated water development of inter-state river basin never came into being due to the non-cooperation of states.

The lack of federal water management rules and enforcement, coupled with huge seasonal variations in water availability influenced by the monsoon as well as by the superimposing human impacts (population growth, urbanisation, industrialisation, irrigation) have made India a home to *frequent and sometimes violent inter-state water allocation disputes*. Since 1956 India has had a system of ad hoc *tribunals for inter-state water disputes*. The history of such tribunals is however not of resounding success. To date there have been only five tribunals convened. Procedures are cumbersome, cases may take years to settle, there are no agreed water-sharing principles to guide awards, parties have no recourse to legal remedies, etc. Given the highly political nature of the disputes, states increasingly resist

¹⁰⁵ Alibiac et al. (2014), p. 149.

¹⁰⁶ Ibid p. 155.

¹⁰⁷ Garrick (2014), p. 14.

¹⁰⁸ Hooja (2014), p. 226.

compliance with the awards¹⁰⁹. The absence of readily available dispute settlement mechanism is likely to make states more and more assertive over water sharing issues.

In summary, India is a highly water stressed country whose major rivers systems are shared by several states. Yet, *no federal water policy* or framework *legislation* exist that could govern inter-state water relations. Given the unsustainable structure and intensity of water use, inter-state disputes are common, especially over allocation questions. While India has a dedicated *legal mechanism to adjudicate inter-state water disputes*, the fundamental shortcomings of the system make it a rarely used forum.

¹⁰⁹ Ibid.

Chapter 4

The stability of transboundary water governance models to manage shared river basins: hydro-political resilience or vulnerability?

4.1 Introduction

This chapter outlines the main questions relating to the hydro-political stability of transboundary models, i.e. how do the governance systems described in Chapter 3 absorb the challenges outlined in Chapter 2? First, the factors that seem to be the key determinants of hydro-political resilience and vulnerability are summarised (Section 4.2). It is followed by an overview of the major studies on global hydro-political resilience and their conclusions (Section 4.3).

4.2 Hydro-political resilience or vulnerability: the key issues

As explained in Chapter 2 above climate change and other drivers have a strong potential to alter current hydro-political balances. But how can countries ward off the potential destabilising impacts and adapt to permutations in the complex geopolitical and environmental systems of shared river basins?

Based on the extensive study of the evolution of the politics of transboundary cooperation Wolf et al. concludes that “the likelihood of conflict rises as the rate of change within the basin exceeds the institutional capacity to absorb that change.” The *rate* (magnitude and rapidity) *of change* can relate to no matter which major physical or political stress indicators: environmental change, asymmetric economic growth, unilateral implementation of major projects or decline of political relations. Institutional capacity of river basins too should be interpreted broadly: water management bodies, treaties, generally positive international relations, etc. Almost 90% of all conflicts on record relate to *water quantity and infrastructure*.

The history of water disputes suggests that “*very rapid changes*, either on the institutional side or in the physical system, *that outpace the institutional capacity to absorb* those changes, *are at the root of most water conflict*”¹¹⁰. Therefore, the adequacy of existing transboundary arrangements can come into question, even in areas that have exemplified cooperation in the past¹¹¹.

4.3 Mapping of hydro-political resilience

The major studies

As water is emerging strongly as a major geopolitical driver, hydro-political resilience in the transboundary context has come into the focus of international organisations, governments and policy think tanks.

¹¹⁰ Wolf (2009), p. 12.

¹¹¹ De Stefano et al. (2012), p. 195.

The United Nations Environment Programme, together with the Oregon State University and the University of Dundee, undertook, in 2007-2009, a comprehensive analysis of the hydro-political risks in Africa, Latin America, North America, the Caribbean, Asia and Europe¹¹².

A comprehensive mapping exercise was commissioned by the World Bank and carried out recently by De Stefano et al. (2010) aiming to outline a global picture of hydro-political resilience and vulnerability.

A thorough multiannual assessment of global hydro-political stability has been carried out by the Strategic Foresight Group, based in Mumbai, India. Their results are broken down to individual river basins and countries¹¹³ and can be easily accessed through an interactive global water cooperation map¹¹⁴.

Numerous assessments have been made with regard to specific regions and individual basins that already are or may turn into political hotspots (Middle East, Sahel¹¹⁵, the Himalayas¹¹⁶).

Methodology

The various available assessments employ different methodologies and datasets. The most important indicators used include the existence of a formal basin or cooperation agreement, existence of a basin organisation, the degree of application of international water law, national and regional political stability, mechanisms to manage uncertainties (data collection and sharing, hydrological variability management, risk planning, etc.), environmental quality management, presence of major hydraulic infrastructure, geographical features of the basin, other linkages between riparians, etc.

The most common basic indicators appear to be those used by De Stefano et al (2012). These comprise the minimum *formal core elements* of multi- or bilateral water cooperation mechanisms that seem necessary to provide sufficient flexibility and adaptive capacity for riparians to manage changing hydro-political conditions. These include

- a) presence of a *water treaty*: water treaties are interpreted broadly. Any formal agreement among sovereign states that substantively covers water management issues is accounted for. These may be basin treaties, water frontier treaties, bilateral cooperation treaties that cover substantial water issues, etc.,
- b) mechanisms for *water allocation*: these include 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,
- c) mechanisms for *variability management*: variability management rules are designed to deal with climatic extremes, such as droughts, floods or other specific variations. Variability management can include substantive obligations and procedures. The former includes water allocation adjustments, stricter irrigation

¹¹² <http://www.unep.org/dewa/Assessments/Ecosystems/Water/tabid/6954/Default.aspx>

¹¹³ Strategic Foresight Group (2015).

¹¹⁴ <http://strategicforesight.com/water-cooperation-map/>

¹¹⁵ Milman et al. (2012).

¹¹⁶ Strategic Foresight Group (2011).

procedures, specific reservoir releases, etc., the latter covers immediate consultations, data sharing, transboundary warning systems, risk management planning, etc.,

- d) *conflict resolution mechanisms*: conflict resolution mechanisms address disagreements among signatories. These can include consultations, various mechanisms with the involvement of third parties, compliance mechanisms, arbitration or the acceptance of the jurisdiction of the International Court of Justice,
- e) *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 for the river basin¹¹⁷.

Results

Based on the juxtaposition of the various resilience indicators and the expected hydro-climatic changes all major studies come to similar conclusions: hydro-political vulnerabilities exist in all regions of the world, although Europe (especially the European Union) and North America.

De Stefano et al. (2012) identified 24 transboundary basins with high potential risk for hydro-political tensions associated with water variability. These are mainly concentrated in northern and sub-Saharan Africa. Today, the lowest-risk basin units are primarily found in western and central Europe, along the USA–Canada border and in Southeast Asia (Table 1). Even today, however, *one third of European population* lives in basins that are covered by a treaty of a score of two or one, in other words treaties of very basic content manifesting a very low level of resilience¹¹⁸.

Table 1: Distribution of treaties and river basin organisation components by continent (%)

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

Source: De Stefano et al. (2013), Table II., p. 200.

By 2050 areas at greatest potential risk will be spatially more dispersed in 61 international basins. Some of the potentially large impacts of climate change are projected to occur away from those areas currently under scrutiny. Notably, by 2050 only half of high risk basins will

¹¹⁷ De Stefano (2012), Table I, p. 199.

¹¹⁸ De Stefano (2012), p. 200.

in Africa, the rest being distributed between Latin America and Eastern Europe/Western Asia. Seven European basins, mostly in Central and Eastern Europe, will be in the highest risk level by 2050. One-sixth of the river basins identified to be studied for high potential risks by 2050 are in central-eastern Europe¹¹⁹.

¹¹⁹ Ibid p. 202.

Chapter 5

The stability of transboundary water governance in the European Union: a gap assessment

5.1 Introduction

This chapter aims to investigate the hydro-political resilience of European water law and water governance-related institutions. In this chapter the notion of *European Union* is interpreted broadly to encompass all existing member states as well as countries who are candidates to join the EU. Under *European water law* we understand all legal measures that apply with the European Union, including international water law, the UNECE transboundary water cooperation framework, the relevant horizontal and water-related legislation of the EU, multilateral basin and (a selected number of) bilateral cooperation treaties of its member states, regardless of whether the EU is a party thereto. The relevant *water governance-related institutions* include those international (supranational) organs that hold at least partial responsibility in the administration of European water law.

The analysis begins with an overview of Europe's river basins and a summary of the major possible impacts of climate change on European freshwater resources. Secondly, a brief account of the findings of the various assessments carried out to map future hydro-political risks in Europe is provided. It is followed by a detailed analysis of the hydro-political resilience of European water law and institutions by way applying an extended version of the hydropolitical resilience matrix outlined in Chapter 4 above to the emerging hydro-climatic risks in Europe.

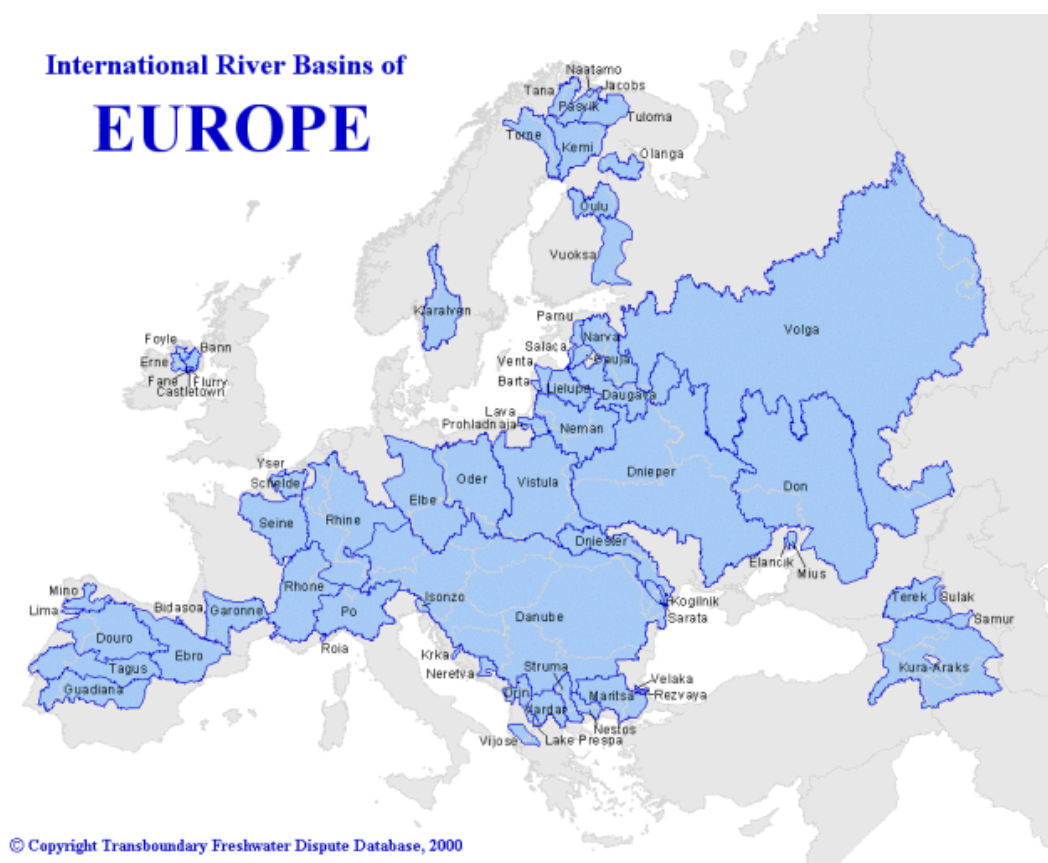
5.2 Europe's river basins

As mentioned in Chapter 2, the European continent has the highest number of international river basins among all UN regions in the world. These basins vary greatly in terms of size, hydrological conditions and political complexity. Out of the 69 transboundary basins 39 are shared only by two countries, while the Danube catchment area, considered as the most international river basin worldwide, comprises 19 countries, with 14 countries having more than 2000 square kilometres of the basin (Figure 4).

The geographical and political fragmentation of Europe results in a very high transboundary exposure for most countries. In 16 European countries more than 90% of the territory is located in an international river basin. Most European countries rely heavily on waters that originate outside their territories. Germany, Greece, Luxembourg and Portugal receive 40% of their surface waters from abroad, the Netherlands and Slovakia 80% while Hungary 95%¹²⁰!

¹²⁰ Rieu-Clarke (2009), p. 18.

Figure 4: International river basins of the European continent



Source: Transboundary Freshwater Dispute Database

5.3 The impacts of climate change on European freshwater resources

The possible impacts of climate change on European freshwaters are studied extensively by governments, international organisations and academia alike. For the purposes of this study we only refer to the relevant findings of the European Environment Agency (EEA), the environmental information agency of the European Union.

In its 2012 thematic report¹²¹ the EEA confirms that widespread existence and forecasts the acceleration of climate change in Europe. As regards the impacts of climate change on freshwater resources the report highlights that over the past decade precipitation has increased in northern and north-western Europe, but it has decreased in southern Europe. Parallel to that snow cover has been decreasing and the vast majority of glaciers in Europe have been receding¹²².

The most important water-related impact will be changes in the *availability of freshwater*, i.e. higher variability of river flows. River flows have already increased in winter and decreased in summer, but with substantial regional and seasonal variation.

¹²¹ EEA (2012).

¹²² Ibid p. 112.

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), and 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 are projected to further increase with prolonged and more extreme dry periods. Decreasing water availability is projected to exacerbate water stress, especially in *Southern Europe*¹²³.

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. Environmental flows, which are important for the healthy maintenance of aquatic ecosystems, are threatened by climate change impacts and socio-economic developments.

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), these *efficiency measures will not be sufficient to compensate for climate-induced increases in water stress*¹²⁴. At the same time floods and the economic loss due to floods are projected to significantly increase in large parts of Europe in the future. The most important existing and projected impacts are summarised in Table 2.

Table 2: Impacts of climate change on freshwater quantity and quality in Europe

Variable	What is already happening	What could happen
River flow	Climate change induced long-term trends in river flows are difficult to detect due to substantial natural variability and modifications from water abstractions, man-made reservoirs and land-use changes. Nevertheless, increased 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. The rise in the reported number of flood events over recent decades results mainly from better reporting and from land-use changes.	Global warming is projected to intensify the hydrological cycle and 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. However quantitative projections for flood frequency and intensity are uncertain.
Droughts	Europe has been affected by several major	Regions most prone to an increase in

¹²³ Ibid p. 114-116.

¹²⁴ Ibid p. 167.

	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 parts of Europe, in particular in southern Europe.	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 with 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 (phenology) 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 further projected 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: EEA (2012), on the basis of p. 112-127 and 213-216.

5.4 Europe's hydropolitical resilience: findings of existing studies

As mentioned in Chapter 4, Europe's hydropolitical resilience has been the subject of a number of comparative studies by international organisations and academics institutions (see Chapter 4). These studies surveyed the projected hydro-climatic changes in the main basins of the UN regions and juxtaposed them with existing basin treaty and organisational infrastructure.

The raw conclusion of these studies is that Europe, especially the European Union, – together with North America –, scores very well in terms of presence of water treaties, institutions and instances of cooperation (as opposed events of dispute). Other important socio-political factors are also assumed to contribute to Europe's ability to manage shared river basins such as the long history of peaceful handling of transboundary water issues, cultural similarities, relatively high and even level of socio-economic development, etc.¹²⁵

The UNEP's 2008 regional study identifies risks in Europe mainly outside the territory of the EU¹²⁶, despite the fact that the rich scientific and statistical apparatus employed shows significant disparities even within the EU in terms of major hydro-climatic impacts and institutional resilience. This approach is largely in line with the general perception of EU being a model of transboundary water cooperation¹²⁷.

¹²⁵ UNEP (2009a), p. 84.

¹²⁶ Ibid p. 85.

¹²⁷ Adephi (2014), p. 33.

The studies by De Stefano et al. (2010, 2013) depict a more nuanced picture. They remark that despite the relatively high treaty coverage in Europe, one third of the European population lives in basins whose treaties are of very basic content. The studies also project risks of significant vulnerabilities for Europe by 2030 and even more so by 2050, due to major climate change impacts and/or the lack of appropriate institutional framework. By 2030 a significant number of basins of the highest risk will be in Eastern Europe. Eastern Europe, together with Africa and Central Asia is expected to display the highest exposure to hydro-political vulnerability by 2050. The European river basins identified as potentially risky lie partly within the boundaries of the European Union¹²⁸.

It must be pointed out that while these studies constitute a good basis for a macro-comparison of hydro-political vulnerabilities of the various UN regions, the underlying research admittedly employed a number of well-justified methodological simplifications¹²⁹ that call for caution when making definitive conclusions of Europe's institutional fitness to tackle the consequences of hydro-climatic variability. First, given the vast amount and great variety of the treaties studied, the analyses have been limited to a quantitative verification of certain treaty components without any checking the actual effectiveness of the treaty measure concerned. Second, while the studies make various references to the EU's own supranational transboundary water regime, notably the Water Framework Directive, none of them subjects it to an in depth vulnerability assessment.

In conclusion, while *Europe's*, in particular the European Union's *comparative hydro-political advantages cannot come under question*, it does not however mean that there are not any actual or potential risks that may jeopardise such relative stability. The following analysis aims to identify those legal and institutional gaps that may give rise to increased vulnerability of inter-state water relations in the EU and its immediate neighbours.

5.5 Assessment of the hydro-political vulnerability of the European Union's transboundary legal framework

5.5.1 The scope of assessment

As mentioned in the introduction to this chapter, the term "European Union" and "European law" are interpreted broadly for the purposes of this study. Thus, the geographical scope of this analysis extends to all international river basins that are shared at least by one EU member state (i.e. where EU law properly applies at least partly). This includes the eastern river basins of the EU stretching out to Russia, Belarus, Ukraine and Moldova, the entire Balkan Peninsula as well as international water bodies of Switzerland (see Figure 4). The analysis does however not cover European river basins that fall completely outside the territorial scope of EU law, such as the Dnieper, Dniester, Don or the Volga. Throughout this study "Europe" and "EU" are referred to interchangeably in this extended sense.

Given that in the EU transboundary water cooperation is governed in parallel by two overlapping legal regimes – i.e. international law and EU water law – both corpuses of law are subjected to vulnerability assessment. This includes:

¹²⁸ De Stefano et al. (2010), p. 28.

¹²⁹ Ibid p. 8-10.

- international water law in general and the UNECE framework in particular,
- the most important European river basin treaties (lakes are omitted),
- EU law, including primary and secondary EU legislation as well as the jurisprudence of the European Court of Justice.

On the institutional side the analysis is extended to the UNECE, the European basin organisations and the European Commission that holds direct functions in the coordination and implementation of EU water legislation.

5.5.2 The assessment matrix

An extended hydro-political vulnerability matrix

In the following sections we apply an extended version of the hydropolitical vulnerability matrix by de Stefano et al (2010) to the body of European water legislation as follows:

- a) existence of a basin treaty,
- b) requirements on water allocation,
- c) water quality management,
- d) risk management cooperation,
- e) variability management,
- f) cooperation relating to water infrastructure development,
- g) conflict resolution mechanisms,
- h) institutional framework (existence of a supranational body)

The original assessment framework has been modified as follows:

- the following components have been added to the matrix:
 - o water quality management (point c)) is added as it constitutes an indispensable component of integrated water resources management,
 - o risk management (point d)) is included to assess the various countries' mechanisms to cooperate over emergency situations,
 - o cooperation relating to infrastructure development (point f)) is added for its role as a major precursor to water conflict;
- the assessment extends to the qualitative evaluation of the actual legislative provisions and institutional mechanism;
- the assessment covers not only basin treaties but also a critical assessment of international water law as well as EU' primary and secondary legislation relating to water.

The assessment matrix explained

- a) Existence of a basin treaty

The first step of gap assessment is to verify if a given river basin is covered by *specific* legal instruments designed to govern the most important aspects of transboundary water management. As numerous multi- and bilateral treaties have been drawn up in the past two centuries in Europe, only those – relatively modern – agreements are accounted for in this study that address water management in comprehensive or semi-comprehensive fashion. Consequently, single issue agreements covering only specific uses such as navigation, fishing,

hydropower are not taken into account. This point does not apply to general legal requirements flowing from horizontal international water law or EU legislation.

b) Requirements on water allocation

Requirements on water allocation are interpreted broadly. Thus, the mere mention, in a legal instrument (treaty or EU legislation), of river flow management (apart from flood defence cooperation) is taken into account. These include principles, mechanisms and substantive rules that determine how much water downstream riparians may have access to. Allocation rules can take several forms such as fixed quantities, percentage of flow, etc.

c) Water quality management

Water quality management is interpreted for this analysis to encompass all measures designed to control, reduce or eliminate the pollution of surface waters and/or to maintain or restore the favourable ecological status of the water bodies concerned.

d) Risk management cooperation

By risk management cooperation we understand any monitoring, early warning, mutual assistance mechanism, etc. in place among riparians that can be utilised *to prevent or contain water-related emergencies*, be it a pollution event, flash flood, etc. Against this background measures to address the structural causes of such emergencies (e.g. pollution prevention and control measures) or to eliminate their long-term consequences (e.g. drought management planning) are considered as water quality or variability management measures.

e) Variability management

Variability management includes mechanisms for dealing with the temporal variability of water availability as a result of hydro-climatic extremes (exclusive of emergency response measures under point d) above). As such, variability management is closely related to the subject of water allocation. The mechanism at issue may be immediate consultations among the respective states, mutual risk mapping and intervention planning, limits on certain water uses (irrigation, energy), water allocation adjustments, reservoir releases, etc.

f) Cooperation relating to water infrastructure development

These include procedures among riparians for the notification, assessment and consultations concerning planned major interventions into a transboundary water body.

g) Dispute settlement mechanisms

Dispute settlement mechanisms include any procedure or institution that is designed to channelize the differences of riparians over the interpretation or implementation of a water-related legal instrument. These are bilateral diplomatic negotiations, various mechanisms with the involvement of third parties, compliance mechanisms, fact finding commissions and, as a last resort, the optional or mandatory jurisdiction of an international tribunal or arbitration.

h) Institutional framework (existence of a supranational body)

The relevant institutions include treaty bodies, river basin organisations or any other supranational organisation that has direct functions in relation to a basin treaty or any other international legal instrument.

5.5.3 International water law and the UNECE Water Convention

The UNECE Water Convention constitutes the overarching legal and institutional framework of transboundary water cooperation in the European Union. While most EU member states are not parties to the UN International Watercourses Convention, it is nevertheless also considered here as a recognised codification of customary international law. In the following we assess the strengths and weaknesses of the relevant treaty provisions and of the UNECE in the context of water allocation, water quality management, risk management, variability management, cooperation over infrastructure development as well as dispute resolution.

Water allocation

Neither of the two conventions specifically address the issue of water quality allocation, let alone establish some kind of allocation criteria or mechanisms. Both conventions contain however important principles that are supposed to guide states' action when making decisions about how much water they use. First of all, the principle of equitable and reasonable utilisation implies the "optimal and sustainable" use of transboundary waters in such a way that allows all riparians to benefit equally. The inverse of this principle is the so-called "no harm" rule. This prevents states to consume such quantities of water that would cause significant harm to any downstream riparian, in particular a "real impairment of significant use"¹³⁰. The UNECE Water Convention defines "significant harm" broadly, while the UN International Watercourses Convention provides useful interpretive tools to evaluate the equitable and reasonable character of a particular use (see Chapter 3).

Even though important guidance materials have been developed to help investigate whether a particular use is equitable and reasonable or what constitutes significant harm¹³¹, neither principles have been broken down to operational requirements in any legally binding fashion.

Thus, the practical use of the two principles remains rather limited in the context of water allocations. An analysis of a large number of water allocation agreements by Wolf (1999) shows that the principle of equitable and reasonable utilisation is rarely invoked. Most water sharing treaties use simple allocation formulas, such as dividing waters (or their benefits) equally, fixing existing water rights or using a needs-based criteria for water allocations¹³². The principles do not mean much for states in conflict over an international river either¹³³. The non-implementation of the judgement of the International Court of Justice in the Gabčíkovo-Nagymaros case, which in its current state is essentially a water allocation

¹³⁰ McIntyre (2015a), p. 148.

¹³¹ UNECE (2013).

¹³² Wolf (1999).

¹³³ Dinar (2008), p. 41.

dispute, confirms that in the absence of precise authoritative interpretation the principle of equitable and reasonable utilisation remains dead letter¹³⁴.

In conclusion, while the reasonable and equitable utilisation principle and the no-harm rule provide important guidance for state conduct in cross-border water quantity management, they are unlikely to prevent or resolve disputes over water allocation.

Water quality

The strong ecological focus of the UNECE Water Convention is one of the unquestionable strength of European water law. All the more so, as the Convention serves as the basis of sophisticated environmental programme of EU's Water Framework Directive¹³⁵. Although incidental pollution events may occur any time in the future, due to the comprehensive European efforts to improve the status of all water bodies, general water quality is constantly improving in the EU. Consequently, transboundary water quality management is not likely to pose significant challenges in inter-state water relations.

Risk management cooperation

Both conventions address the rights and obligations of states in the case of water-related emergency situations¹³⁶. These include the immediate notification of affected riparians, prevention, mitigation, elimination of the harmful conditions, joint contingency planning, etc. Importantly, UNECE countries also cooperate under the UNECE Industrial Accidents Convention¹³⁷ that contains a range of obligations ancillary to those of the Water Convention¹³⁸. Thus, the existing legal framework can be regarded as providing the necessary framework of emergency cooperation over transboundary waters.

Variability management

When the two conventions were drafted climate-induced hydrological variability was much less of an issue than today, especially in Western Europe. Not surprisingly thus, none of the two instruments contain any direct reference to climate change induced hydrological variability. Importantly, however, the UNECE Water Convention embarked on a pioneer exercise to assist states in climate change adaptation by way of developing a guidance document on water and adaptation to climate change and through a series of practical pilot projects¹³⁹. Therefore, while the UNECE Water Convention arguably provides a good framework for adaptation to climate change¹⁴⁰, this is rooted more in the flexibility of the institutional system than the normative provisions of the Convention itself.

Water infrastructure development

UN International Watercourses Convention dedicates no less than nine articles to the cooperation of states over planned investments with potentially significant transboundary

¹³⁴ Baranyai & Bartus (2015).

¹³⁵ Baranyai (2015), p. 97.

¹³⁶ Article 28 and Article 14 respectively.

¹³⁷ Convention on the Transboundary Effects of Industrial Accidents

¹³⁸ McIntyre (2015b), p. 87.

¹³⁹ Bernardini (2015), p. 44.

¹⁴⁰ Tzatzaki & Tarlok (2015), p. 393.

impact. On the other hand, the UNECE Water Convention addresses the issue only indirectly, by way of referring the question to future basin agreements¹⁴¹. It must be pointed out however the UNECE member states also cooperate under the 1991 (Espoo) Convention on Environmental Impact Assessment¹⁴² that provides a detailed framework for the notification and assessment of and consultation over transboundary impacts. Water-related environmental impact assessments thus have two decades of established practice that demonstrates the robustness of the existing treaty framework relating to cooperation over planned water infrastructure development.

Dispute settlement

Both conventions address dispute settlement extensively. The UNECE Water Convention provides a conflict resolution scheme that is line with the general trend, including mechanisms with third party involvement and the optional jurisdiction of the ICJ or an arbitral tribunal¹⁴³. The UN International Watercourses Convention also provides for the mandatory procedure a fact-finding commission. Importantly, in 2010 an Implementation Committee was established for the UNECE Water Convention that, among others, can consider party-to-party submissions on compliance matters.

Institutional framework

The UNECE Water Convention has an institutional framework that has shown remarkable flexibility and innovation in the development of the original treaty framework. The Meeting of the Parties, the supreme decision-making body of the Convention, is vested with a very broad mandate to “undertake any additional action that may be required for the achievement of the purposes of [the] Convention”¹⁴⁴. The parties have taken full use of these powers through the adoption of additional protocols, guidance documents and recommendations, providing assistance to states, etc.¹⁴⁵ Such additional fields include flood protection, groundwater management, climate change adaptation, ecosystem services, compliance mechanism, etc. This proactive approach to the evolution of the treaty framework seems to guarantee that the Convention will remain an active instrument capable of responding to new challenges in a flexible manner.

Conclusions

International water law, in particular the UNECE Water Convention, provides a strong legal and institutional basis for transboundary cooperation in Europe. The dominant environmental focus of the Convention however leaves water allocation issues almost entirely left to the operationally rather weak principle of equitable and reasonable utilisation and the no-harm rule. The existing treaty framework does not address variability management either, even though the Convention has already proved to be an important platform to tackle climate change adaptation issues in a transboundary context.

¹⁴¹ Mccaffrey (2015), p. 56.

¹⁴² Convention on Environmental Impact Assessment in a Transboundary Context

¹⁴³ Tanzi & Contartese (2015), p. 319.

¹⁴⁴ Article 17.2.

¹⁴⁵ Bernardini (2015), p. 33.

5.5.4 European basin treaties

As already mentioned above, Europe boasts the highest number of the basin treaties and basin organisations in the world. Figure 5 below provides a visual summary of the presence of treaties and other forms of cooperation in the territory of the EU. While the colour codes and the various quantitative descriptions referred to above convey a truly positive picture, a detailed qualitative analysis of the actual basin treaties reveals important gaps both in coverage and content. In order to obtain a representative picture of the hydro-political resilience of European basin treaties the following international agreements have been brought under review (Table 3):

- Convention on Cooperation for the Protection and Sustainable use of the Danube River,
- Convention between the Federal Republic of Germany and the Czech and Slovak Federal Republic and the European Community on the International Commission for the Protection of the Elbe,
- Convention on the International Commission for the Protection of the Oder
- Convention on the Protection of the Rhine,
- Accord International sur la Meuse,
- Framework Agreement on the Sava River Basin,
- Convention on Cooperation for the Protection and Sustainable Use of Waters of the Portuguese-Spanish River Basins (Albufeira Convention).

Treaty coverage

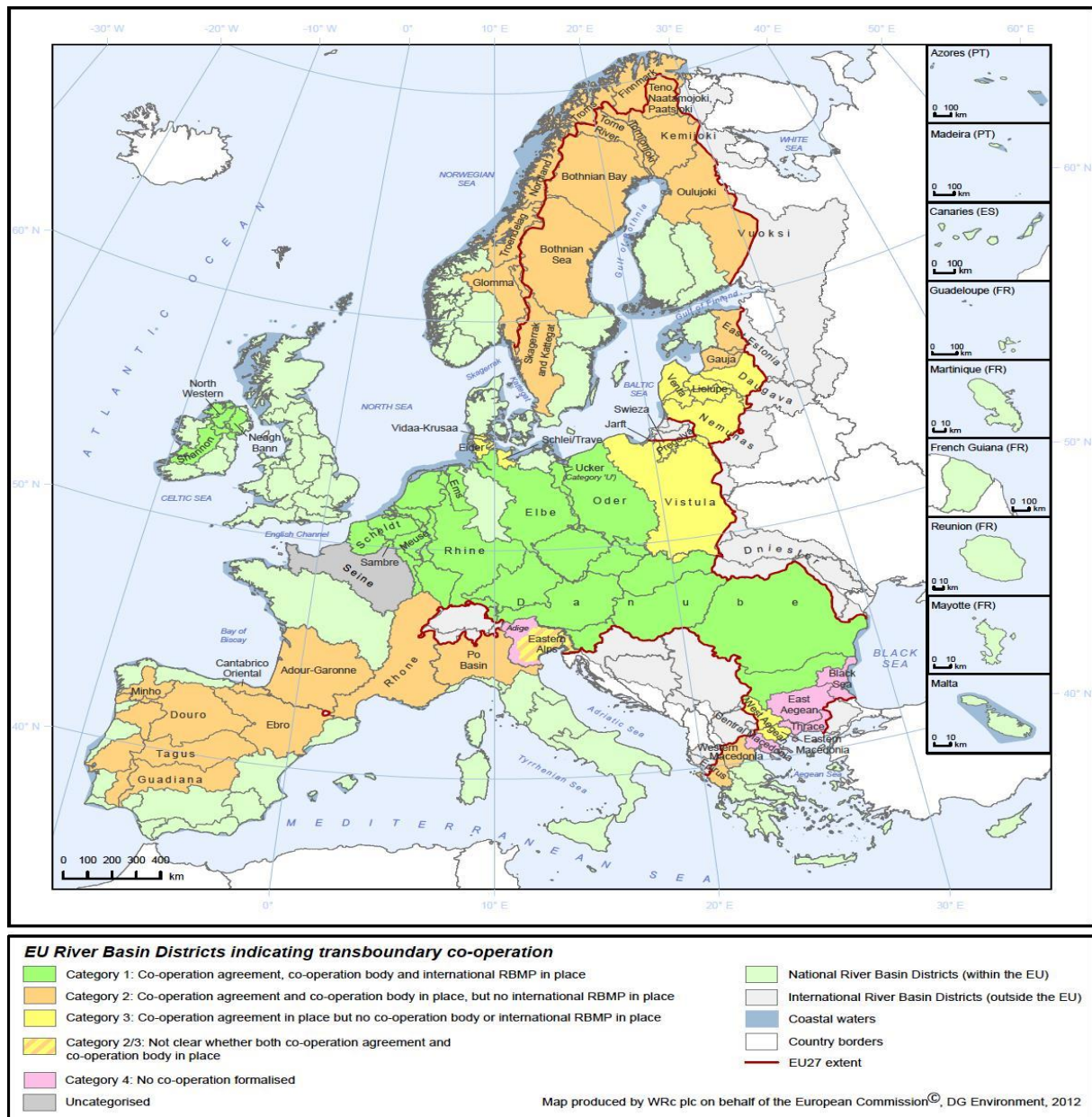
There are a number of international river *basins* in the territory of EU member states that are not covered by dedicated basin treaties¹⁴⁶. It does not necessarily imply that there are no legal instruments whatsoever to govern the bi- or multilateral activities of the riparians, but it does indicate that whatever is in place falls short, in scope or content, of a basin treaty. The most notable examples include the Daugava, the Maritsa, the Nemunas (Neman) and the Vardar basin.

Moreover, Europe has a large number of important *sub-basins* that display important hydro-political complexities. The available databases reveal that most of these sub-basins are not covered by specific legal instruments only by the general basin agreements or weak bilateral frontier agreements. (Again, the lack of a specific sub-basin treaty does not imply that there is no cooperation whatsoever by the riparians along these rivers). Importantly, the conflict potential of sub-basins has so far escaped the attention of hydro-political vulnerability studies as they have been deemed to be below scale, irrespective of their actual size and importance.

Among the major tributaries of the Danube only the Prut and the Sava rivers have dedicated cooperation agreements. Such important transboundary tributaries as the Inn, Morava, Tisza, Somes (Szamos) Drava, Mura, Drina etc. are not covered by specific instruments, even though these are themselves significant international rivers. Among the various sub-basins of the Rhine the Moselle, Sarre, Sure and the Lake Constance have some kind of specific treaties, although some of them are very basic and date back to the 1950s and 60s.

¹⁴⁶ I.e. no such treaties can be identified in international databases.

Figure 5: River basins and basin agreements in the European Union



Source: European Commission

http://ec.europa.eu/environment/water/water-framework/facts_figures/pdf/Transboundary-cooperation-%202012.pdf

Water allocation

Most European basin treaties have a biased ecological focus. This constitutes a major shortcoming as they leave new hydro-climatic and hydro-political challenges completely unaddressed. First, most of the treaties do not even mention *water quantity*, let alone contain detailed principles or rules on *water allocations*. Indirect references in various treaties to “sustainable development”, “rational use” or “equitable use” (see Table 3) can be construed as encompassing quantity issues. However, as explained above in the above section, these principles have very little normative value when it comes to a dispute over water allocation. Again, such absence of water allocation mechanisms stands out in broader

international comparison where treaty making was mainly driven by disputes over water allocation (see Section 2.5.2).

Against this background the 2002 Framework Agreement on the *Sava River* Basin, which became an international river (sub)basin following the disintegration of the Former Yugoslavia, is a major step forward as it lays down important principles on sharing water among the riparians. Importantly, the agreement applies a holistic approach to water regulating quantitative and qualitative aspects jointly under the umbrella notion of “water regime”¹⁴⁷. It specifies that all riparians are entitled to the “equitable and reasonable share of beneficial uses”¹⁴⁸ of the river and that sufficient quantity of water must be ensured for ecosystems and human uses, such as navigation¹⁴⁹.

The only major European framework agreement to contain proper water allocation mechanisms is the 1998 *Albufeira Convention* between Spain and Portugal that was drawn up in response to a rapid deterioration of river flows and water quality in the 1980-90s¹⁵⁰. The Convention, entrusts the joint river commission to define, in accordance with the principle of rational and economical use of waters, river flow regimes for each of the four affected transboundary rivers along a *precise methodology* laid down in the additional protocol to the Convention¹⁵¹.

Water quality

All studied European basin treaties were negotiated and (with the exception of the Sava and Meuse treaties) adopted in 1990s. Treaty-making in most cases 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 felt much less. Moreover, some of the treaties reflect a post-cold war or even post-war political realities, where the introduction of even very basic environmental and institutional provisions constituted a major development.

In the global context in it must be pointed out however that the strong environmental quality focus of the European basin treaties was very progressive at the time when international freshwater treaties were still negotiated mainly around water allocation and infrastructure development¹⁵².

Risk management cooperation

All studied basin treaties contain some kind of emergency response and cooperation mechanisms. Some of these treaty provisions are very basic (e.g. Elbe, Oder) but further elaborated in the framework of the basin organisations, some treaty mechanisms are already quite detailed (e.g. Albufeira Convention). Importantly, among EU member states

¹⁴⁷ Article 1.3.

¹⁴⁸ Article 7.

¹⁴⁹ Article 11.

¹⁵⁰ Here, the evolution of treaty focus is the opposite as elsewhere in Europe. Cooperation on water allocation for human purposes between Spain and Portugal has centuries of tradition. The novelty of the Albufeira Convention was to integrate all such uses into a comprehensive framework. See: Albiac et al. (2014), p. 152.

¹⁵¹ Article 16 and Additional Protocol.

¹⁵² Wolf (1999).

UNECE and EU law also provides for certain risk management cooperation mechanisms that would render comparable provisions in basin treaties superfluous.

Variability management

Except for the Albufeira Convention, European basin treaties do not specifically address the issue of *hydro-climatic variability* (although the Meuse Agreement makes reference to future cooperation on droughts). On the other hand, the Albufeira Convention sets out important guiding principles and mechanisms to handle extreme river flow conditions. First, it lays down detailed principles and procedures for the handling of extreme situations, such as accidents, floods, droughts and water scarcity¹⁵³. As regards droughts the Convention enumerates a number of measures that have to be taken gradually, including water abstraction and use limitations. Finally, the mechanisms for the river flow regime are designed to guarantee some minimum flows that have to enter Portugal, adapted to exceptional hydrological conditions.

Water infrastructure development

Except for the Rhine Convention all basin treaties contain some kind of cooperation mechanisms over planned development projects with likely significant transboundary impacts. Here again, the Sava Agreement and Albufeira Convention stand out for their detailed rules on notification, assessment and consultation. It must be pointed out that among EU member states UNECE and EU law imposes even more stringent and detailed requirements thus the treaty provisions on infrastructure development mainly come into play vis-à-vis non-EU riparians.

Dispute settlement

In terms of dispute settlement, most agreements only contain basic dispute settlement formulas that do not go beyond the comparable solutions offered by general multilateral agreements (such the 1992 UNECE Water Convention). Here again, the Sava agreement and the Albufeira Convention constitute an exception. The Sava agreement calls for the establishment of independent fact finding expert committee that provide a solid evidential basis for legal adjudication (this reflects the influence of the UN International Watercourse Convention). The Albufeira Convention too refers technical matters first to an investigation committee, rather than engaging directly the political dispute settlement mechanisms. It must be pointed out that where the EU is also a party to a given basin treaty (e.g. Danube, Rhine) EU member states cannot refer their disputes to the judicial mechanisms established by the basin treaty, but exclusively to the Court of Justice of the European Union (see below).

Institutional framework

All the basin treaties establish river basin organisations or some kind of supranational body (see Albufeira Convention) to oversee the implementation of the agreement and to provide a further platform of cooperation. The basin organisations can, and often do, play a key role in addressing issues not directly covered by their founding treaties, such as climate change,

¹⁵³ Article 17-19.

sediment transport,¹⁵⁴ etc. Several of them actively participate in the implementation of EU's Water Framework Directive, occasionally as a dedicated competent authority for the entire river basin. Consequently, basin organisations can provide critical impetus to expand the cooperation of riparians on emerging issues with direct hydro-political implications. The room for progressive action by basin commissions, however, can be constrained by the political will of the state members, budget restrictions or lack of expertise.

Conclusions

The most important finding of above analysis of the major European basin treaties is the absence of water allocation principles and mechanisms as well as the lack of provisions addressing hydro-climatic variability (except for the Albufeira Convention). Among all treaties studied the Albufeira Convention and the Sava River Framework Agreement stand out for their comprehensive coverage of all major transboundary water issues. This is not at all surprising if one considers the long history of water allocation disputes between Spain and Portugal or the sensitive political constellations arising following the disintegration of Yugoslavia. On the other hand, the major western European basin agreements reflect a less conflictual political background and the historic abundance of water resources. The latter treaties were surely an adequate response to the challenges of their era. They however would perform very poorly under significantly different hydro-climatic conditions as they lack the fundamental mechanisms to address major changes in river flow.

5.5.5 The laws and institutions of the European Union

As described in detail in Chapter 4, the European Union has developed an extensive body of water legislation over the past four decades. The EU's water law grew out of individual political responses to specific water-quality related problems, common to all or most Member States, such as water pollution by hazardous substances, urban waste water, nitrates of agricultural origin, etc. The EU adopted an overarching water policy concept only in 2000 in the form of the Water Framework Directive (WFD) that has been followed by a gradual revision of much of European water law. What follows is a critical review of the existing European legislative framework in the context of hydro-political challenges.

The WFD as a comprehensive transboundary cooperation framework?

Some of the underlying principles and institutional solutions of the WFD carry the promise of a model transboundary cooperation framework. EU member states have to improve (or preserve) the status of all freshwater water bodies in their territories, planning and implementation of measures must take place at the level of the river basin, in the case of international river basins member states are required to collaborate with a view to producing a single river basin management plan (RBMP).

¹⁵⁴ See e.g. the activities of the International Commission for the Protection of the River Danube (ICPDR) at <http://icpdr.org/main/activities-projects>

Table 3: Core elements of major European basin treaties

Basin	Year (adoption)	Water quantity and allocation	Environmental quality	Risk management	Variability management	Infrastructure development	Basin organisation	Dispute settlement
Danube*	1994	Only <i>sporadic references</i> to water quantity (a subject of joint water balance monitoring - (Art. 1. g-h, 9) and basic principles of <i>equitable</i> and <i>rational water use</i> (Art. 2.1. 2.3, 5., 6). No specific reference to water rights or allocation.	Cooperation over water quality issues <i>are at the core of the convention</i> . Principles, concrete measures, further cooperation programme, joint monitoring, etc. (Art. 1, 2, 5, 6, 7, 8, 9, etc.)	Preventing and controlling hazards from and mutual assistance in the case of accident, other pollution events, floods and ice is a core commitment of the parties (Art. 2.1, 3, 9, 16, etc.)	Only as regards risk management. No reference to hydrological variability in general or drought.	Prior information and consultation. (Art. 3, 11)	International Commission for the Protection of the River Danube (ICPDR)	Negotiations first, if needed, through the ICPDR. After 12 months of notification to ICPDR mandatory submission to ICJ or arbitration (24, Annex V)
Elbe**	1990	Water quantity and allocation are not mentioned. Mapping of main impacts on water (Art. 2.1 i) and consultation on planned works (Art. 2.1 k) have distant relevance. No specific reference to water rights or allocation.	Pollution prevention, control, monitoring are the main measures to be developed under the convention (Art. 1, 2)	Uniform warning and alert system to be developed (Art.2.1.h)	None	Planned new works to be “discussed” by RBO (Art. 2.1 k)	International Commission for the Protection of the Elbe	None
Oder***	1996	Measurements of water quantity forms part of the	Pollution prevention, control,	Uniform warning and alert system to be developed	None	Planned new works to be “discussed” by	International Commission for the Protection of	None

		overall assessment programme (Art. 2.1 d). No specific reference to water rights or allocation.	monitoring are the main measures to be developed under the convention (Art. 1, 2.1)	(Art.2.1.h)		RBO (Art. 2.1 j)	the Oder	
Rhine****	1998	Reference to “sustainable development” and “rational management” (Art. 3.1 e). No specific reference to water rights or allocation.	Pollution prevention, control, monitoring are the main measures to be developed under the convention (3.1, 4 etc)	Alert in case of accidents (Art. 5.6) Coordinate national alert systems (Art. 8.1.c)	None	None	International Commission on the Protection of the Rhine (ICPR)	Negotiations or arbitration (Art. 16, Annex)
Meuse*****	2002	Reference to sustainable and integrated water mgmt. (Art. 2) No specific reference to water rights or allocation.	Cooperation under the WFD, one single RBMP (Art. 2)	Cooperation in the fields of floods and accidents (Art. 2), coordinate national alert systems (Ar4 4.4)	Future cooperation on drought prevention (Art. 4.4.d)	Future cooperation on major works of transboundary impact (Art. 4.4.g)	International Commission of the Meuse	Negotiations or other acceptable means (Art. 8)
Sava*****	2002	The convention covers transboundary impacts of both quantitative and qualitative nature, i.e. “water regime” (Art. 1.3). “Equitable and reasonable share of beneficial uses” (Art. 7).	Art. 2., 3 and reference to the implementation of the WFD.	General exchange of information on all hazards (Art. 4)	The convention addresses in a general manner extraordinary impacts on the water regime (Art. 13).	Detailed rules in Protocol (Art. 8)	International Sava River Basin Commission	Detailed rules for dispute settlement: - negotiations - third party involvement / ICJ or arbitration - fact finding expert committee (Art. 22-24,

		Provision of sufficient water quantity for ecosystems and navigation (Art. 11)						Annex II)
Albufeira Convention (Miño, Duero, Tajo, Guadiana) *****	1998	The convention covers all transboundary aspects (Art. 1 d). It establishes principles and contains detailed provisions on water sharing between Spain and Portugal (Art. 16, Additional Protocol)	Art. 13,14 cover water quality and ecological aspects	Detailed cooperation on all transboundary risks (Art. 11), including alert mechanisms.	Art. 17-20 cover exceptional situations in detail for pollution accidents, floods, droughts and water scarcities, including measures for adapting to the situation.	Detailed provisions on mutual information, impact assessment and suspension of implementation of the planned works (Art. 8-9). Important obligations on the safety of water infrastructure (Art. 11)	Comisión de Ríos Internacionales	First, negotiations. If the matter is of technical nature: Comisión de Investigación. Otherwise: arbitration (Art. 26).

* Convention on Cooperation for the Protection and Sustainable use of the Danube River

** Convention between the Federal Republic of Germany and the Czech and Slovak Federal Republic and the European Community on the International Commission for the Protection of the Elbe

*** Convention on the International Commission for the Protection of the Oder

**** Convention on the Protection of the Rhine

***** Accord International sur la Meuse

***** Framework Agreement on the Sava River Basin

***** Convention on Cooperation for the Protection and Sustainable Use of Waters of the Portuguese-Spanish River Basins (Convenio sobre cooperación para la protección y el aprovechamiento sostenible de las aguas de las cuencas hidrográficas hispano-portuguesas)

Despite all these progressive achievements, the *WFD falls short of a comprehensive transboundary cooperation framework*. First, the WFD follows a typical EU approach to environmental policy as it imposes *parallel obligations* on member states to do the same thing at the same time, instead of requiring them doing things together. This is based on the assumption (hope) that parallel action of states will also eliminate transboundary effects. Undoubtedly, in the case of several environmental problems (e.g. point source pollution) this approach may lead to the desired results. Many water-related problems are however beyond the control of individual countries by their very nature, thus even impeccable compliance by member states with such parallel obligations may fail to deliver the envisaged outcomes. Second, the *procedural obligation* to cooperate over RBMP is a duty of conduct, rather than a duty of result: the fact that member states do not cooperate at all or fail to produce a single plan triggers no legal consequences whatsoever. Further, the joint planning process is not broken down to procedural steps (timetables, milestones) and not supported by established platforms for consultation (although the European Commission may be invited to help). While basin organisations often play an important role in coordinating the planning processes of riparians, they have powers neither to vigorously coordinate, nor to compel countries to participate in the process. In view of the lack of common procedural guidelines and the absence of sanctions, the coordination of RBMPs shows a very mixed picture¹⁵⁵.

Third, as described below, the WFD (almost) completely ignores the *quantitative aspects* of surface water management.

Finally, the WFD, in fact EU water law in general, contain hardly any *substantive obligations* on states' conduct vis-à-vis other riparians. Even, the few concrete obligations that exist¹⁵⁶ do not go beyond a specific adaptation of the "no-harm" rule laid down by the UNECE Water Convention and the UN International Watercourses Convention.

Water quality

The environmental obligations under the EU's internal water regime constitute a very high level of policy ambition and regulatory complexity in global comparison. The EU defines a

¹⁵⁵ Interview with Mr István Láng, deputy director-general of the National Water Directorate of Hungary, 25 June 2015.

¹⁵⁶ These include:

- WFD, Article 4.8: member states can only apply the permanent or temporary derogations from the environmental objectives of the WFD, if it "does not permanently exclude or compromise the achievement of the objectives of [the WFD] in other bodies of water within the same river basin district". This applies to water bodies in other member states within the same international river basin district.
- Floods Directive, Article 7.4: the Floods Directive contains a water-down version of the no harm rule. Article 7.4 calls on member states not to *deliberately* plan and implement flood control measures that flood risks upstream or downstream in the same river basin or sub-basin, unless it has been agreed upon by the affected other states.
- Urban Waste Water Directive, Article 9: the directive contains an indirect formulation of the no-harm rule. When transboundary pollution by urban waste water discharges are identified the states concerned must coordinate to identify measures how to ensure compliance (i.e. reduce or eliminate the transboundary impact).
- Priority Substances Directive, Article 6.1 a): the directive contains an inverse formulation of the no-harm rule in so far as it exempts member states from the consequences of non-compliance if it can be demonstrated that the source of pollution is outside its national jurisdiction.

sophisticated set of ecological, chemical (and in the case of groundwater: quantitative) objectives, strict pollution prevention and control measures broken down by pollution sources, activities, pollutants, etc. It also promotes the protection of terrestrial ecosystems closely linked to water.

Moreover, in the context of the so-called priority hazardous substances, the Priority Substances Directive contains rules that govern the responsibility of member states in case of transboundary pollution and calls for consultations with the member state affected and the Commission¹⁵⁷.

Consequently, the elaborate set of environmental objectives, the iterative planning process, the detailed reporting requirements and the supervision of compliance by the Commission suggest that transboundary water quality impacts are not likely to be a major source of conflict in the EU.

Water allocation

Water quantity issues are addressed only superficially in EU water law (save groundwater quantity under the WFD and some policy efforts to reduce water demand). In particular, EU law does not contain any norm whatsoever to guide the allocation of water among riparians of transboundary water courses.

This obvious shortcoming is largely due to the constitutional difficulties of the EU to adopt “measures affecting the *quantitative management of water* resources or affecting, directly or indirectly, the availability of those resources” (see Chapter 3 above). However, it also reflects a political complacency of the European institutions to address an issue that has, to date, been mainly seen as an Iberian problem (that is otherwise already solved on bilateral basis)¹⁵⁸.

There have been some modest efforts recently to close this gap by way of re-labelling water quantity as an environmental quality issue. The current water policy document of the EU, the 2012 Blueprint for Europe’s Waters¹⁵⁹, recognises the interlinkages between quality and quantity, considering the latter as an important factor in the achievement of good water status. This purely ecological approach is further elaborated in a guidance document issued by the European Water Directors entitled “Ecological flows in the implementation of the Water Framework Directive”¹⁶⁰. The ecological flow concept however completely ignores the water demand of sectors other than the natural environment.

The EU’s self-restraint in relation to water quantity management constitutes a *major vulnerability gap* should member states face serious river flow shortages as a result of intensifying climate change or human interventions (e.g. expansion of irrigation to make up loss in flow quantities).

¹⁵⁷ See supra note 156.

¹⁵⁸ Albiac et al (2014), p. 144.

¹⁵⁹ European Commission (2012).

¹⁶⁰ European Commission (2015).

Risk management cooperation

The EU has an elaborate system of risk management cooperation system for all natural or man-made disasters (EU Civil Protection Mechanism). The mechanism is backed by the Emergency Response Coordination Centre which monitors emergencies in Europe (and outside Europe) 24 hours per day. In addition, the EU has a specific fund that reimburses member state governments for certain public expenditures incurred in relation to cross-border disasters (EU Solidarity Fund, EUSF). The EUSF was established in 2002 after the devastating floods in Central Europe and its main focus area still remains water-related disasters.

The EU also has a dedicated legal framework – the Floods Directive – that calls for the assessment and identification of flood risks and hazards and the development of flood risk management plans. Such plans must be coordinated by member states in international river basin districts with a view to adopting a single flood risk management plan.

Variability management

The EU has developed a broad range of policy and legal measures to address the phenomenon of climate change, including the adoption in 2013 the EU adopted a climate adaptation strategy. In the context of water management the most specific measure has been the adoption in 2009 of guidance document entitled “River basin management in a changing climate”¹⁶¹.

EU law does however *not* contain any specific *mechanisms or procedures* to address significant *variations in the quantity of water available* (let alone adjustment of allocations). This, of course, is not surprising in view of the low status of water quantity questions under contemporary EU water policy. Thus, even though the above guidance document outlines very clearly the quantitative challenges member states face or likely to face in the future, apart from flood management (that is already covered by EU law) it does not address transboundary problems in any significant way.

Water infrastructure development

The EU has *well-established and well-functioning procedures and mechanisms* for the notification, prior assessment of projects with likely transboundary environmental impacts under the Environmental Impact Assessment Directive. This directive also contains mandatory consultation mechanism and provide for judicial review of the decision if the comments made in the context of cross-border consultation are not taken into account. The European Court of Justice has developed an extensive jurisprudence that guarantees the rigorous application of the consultation requirements under the directive.

Dispute settlement

The EU has the most effective supranational legal enforcement mechanism in the form of the so-called *infringement procedure*. It can be initiated by the European Commission for any given infraction of EU law by any member state. The procedure may lead to the condemnation of the erring state by the European Court of Justice and the eventual

¹⁶¹ European Commission (2009).

imposition of significant financial penalties¹⁶². The infringement mechanism however works top-down between the Commission and the member state concerned and is not designed to adjudicate intra-EU disputes. While member states may also signal to the Commission issues of non-compliance by other member states, the Commission has no obligation to take up the matter. Consequently, the most important EU enforcement procedure does not constitute an adequate dispute settlement mechanism for transboundary water issues.

A member states 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 also report to “any other member state concerned” under *Article 12* of the *WFD*. But the “other member state” addressed is not obliged to engage in any meaningful dialogue to resolve the problem. Instead, the *WFD* and some other EU water legislation encourage member states to refer all potential interpretative or implementation differences to the European Commission. Under a quasi “good offices” procedure member states may report – individually or jointly – their problems to the Commission. However, all what the Commission is obliged to do is to “respond” to such a submission within a timeframe of six months. This procedure has been rightly criticised as lacking any enforcement power,¹⁶³ with no reported instance of recourse to it as yet. Given the European Commission’s well-known reluctance to engage in the bilateral disputes of EU member states, it is unlikely to fulfil the role of a meaningful dispute settlement mechanism.

Regardless of the above avenues the affected member state can also *sue* the non-compliant *other member state directly* before the European Court of Justice¹⁶⁴. This procedure however suffers from a series of structural shortcomings that render such avenue of enforcement almost completely ineffective. First of all, prior to referring the case to the Court, the applicant member state must submit the matter to the Commission for a pre-litigation evaluation. If the Commission fails to take over the case within three months, it is only then that the applicant member state may refer the matter to the Court. This implies however that the Commission is not convinced of the legal (or political) merit of the case, so it is likely to intervene in the court 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: in the EU legal order launching direct legal action between member states is a truly exceptional step. Therefore, not only are such cases extremely rare¹⁶⁵, they are also regarded as politically unfriendly gestures and a legally risky enterprise¹⁶⁶.

Finally, *EU law* effectively *deprives member states* from the option of judicial settlement under multilateral treaties to which the EU is party (these include the UNECE Water Convention as well as those basin treaties extending beyond the borders of the EU). While under most of these treaties parties may accept the ultimate jurisdiction of the International Court of Justice or an arbitral tribunal, these submissions are recognised under EU law only vis-à-vis third (i.e. non-EU) countries. The reason for this is the expansive jurisprudence by

¹⁶² TFEU Article 258, 260.

¹⁶³ Keesen et al. (2008), p. 45-47.

¹⁶⁴ Article 259 TFEU.

¹⁶⁵ Since the entry into force of the Treaty of Rome in 1958 (the predecessor of the TFEU) only six (!) cases have been initiated by a member state against another one before the European Court of Justice. See Horspool & Humphreys (2012), p. 240-241.

¹⁶⁶ Baranyai (2015), p. 99.

the European Court of Justice, aiming to safeguard its monopoly to interpret EU law. In a landmark decision concerning the settlement of a dispute between Ireland and the United Kingdom relating to the UN Convention on the Law of the Seas the Court of Justice established that EU member states cannot have recourse to the dispute settlement system of an international convention that forms part of the EU legal order. Recourse to an extra-EU settlement mechanism – 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”¹⁶⁷.

The overall assessment of bilateral dispute settlement therefore is not entirely positive: general EU law deprives member states from an important dispute settlement mechanism under international law and what it offers instead is a set of procedures almost completely left to the initiative and judgement of the European Commission.

Institutional framework

The EU does not have a specific water agency, let alone any transboundary water organisation. The fact that the European Commission is in charge of both policy development and legal enforcement has a number of advantages and disadvantages for hydro-politics in Europe.

European water law has benefited enormously from the wealth of expertise, organisational capacity and funding available for the Commission. The various working bodies, in particular the meeting of European Water Directors provide an important platform for addressing new challenges, such as climate adaption.

Nevertheless, it must also be kept in mind that the European Commission tends to pursue its own political and policy objectives that may not necessarily reflect those of the member states. Very often political considerations that are outside the water policy box have direct influence on water policy decisions. Moreover, as noted above, the Commission is strongly disinclined to get engaged openly in the bilateral issues of member states, even in rather clear situations. This has significant implications for the future status of water allocation matters (a bilateral political hot potato par excellence) or non-judicial conflict resolution mechanisms under EU law, two critical hydro-political vulnerability gaps.

Conclusions

The above analysis shows that while the EU has one of the most extensive and sophisticated supranational water policy, its governance framework has certain structural deficits that may turn into significant hydro-political vulnerability gaps.

First, even though the EU’s overall water policy framework provides for the close cooperation of member states in the development of river basin management plans and flood risk management plans, the obligations are non-enforceable and the record of actual cooperation appears to be mixed.

Second, EU water policy has a one-sided ecological approach that fails to properly address the quantitative implications of water use and its transboundary impacts. Consequently,

¹⁶⁷ C-459/03 Commission v Ireland (MOX-Plant) [2006] ECR I p. 4635.

water allocation issues are completely missing from EU water law and institutional practice. This is particularly problematic as the effects of climate change are primarily expressed in increased variations in river flow.

Third, the EU does not have legal or institutional mechanisms in place to manage increased hydro-climatic variability, despite the high priority climate change enjoys in European politics.

Fourth, the bilateral dispute settlement mechanisms available for EU member states have serious structural shortcomings: no readily-available mechanisms are in place to address and assist bilateral compliance issues, the infringement procedure is not designed to handle bilateral disputes, direct action before the European Court of Justice is politically unrealistic and recourse to international treaty based forums is considered a violation of EU law.

Finally, the independent political agenda of the Commission and its traditional complacency to get engaged in the bilateral issues of member states can become important institutional obstacles to overcome the above shortcomings.

Chapter 6

Conclusions and recommendations

6.1 Conclusions

This study has investigated the resilience of the transboundary water governance regimes that exist in the European Union 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 findings of the assessment are as follows:

- The European Union and its member states have one of the most extensive and elaborate system of transboundary water governance in global comparison. The UNECE regional regime, the basin treaties and the EU's own water legislation stand out as regards comprehensive geographical coverage, strong ecological focus, cooperation over planned water-relation projects as well as transboundary risk management.
- Nevertheless, important vulnerability gaps have been identified that may pose significant difficulties in intra-EU water cooperation if not addressed early. These include:
 - *the absence of water quantity management* from European treaty framework and EU law, apart from such basic principles as equitable and reasonable utilisation or the no-harm rule. While the one-sided ecological focus of these governance frameworks can be explained by the relative abundance of freshwater resources in Europe and the dominance of environmental quality considerations in the 1980 and 1990s, this lacuna means that the EU has no legal framework to address in a transboundary context 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 a small number of bilateral treaties, no rules and mechanisms are in place in Europe to govern water allocation between riparians. 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 increase as projected,
 - *variability management* is almost completely limited to flood prevention and control. Neither substantive rules, nor procedures are in place to address the impact on freshwater availability of other hydrological extremes whose frequency is expected to increase significantly,
 - *the dispute settlement mechanisms of the EU are inadequate* to channelize and resolve significant water disputes among European riparians. The EU legal system puts the European Commission at the centre of law enforcement, which, however, investigates parallel violations of member states and avoids any engagement in bilateral disputes. Consequently, there are no readily available, easy-to-access platforms in place to handle bilateral disputes.

Moreover, EU law generally prohibits arbitration or recourse to the International Court of Justice in the context of major basin treaties. The option of member state-to-member state litigation before the European Court of Justice does not offer a viable alternative due to a series of political and institutional constraints.

6.2 Recommendations

In order to ensure the long term stability of transboundary water relations in the European the following measures are recommended:

- *Address hydro-political vulnerability in a comprehensive manner:* the European institutions and member states should address hydro-political vulnerability in a comprehensive manner. The EU's relatively strong global rating does not mean that there are no significant gaps in European water governance.
- *Address transboundary water quantity management and water allocation:* the constitutional limits to adopting water quantity management measures should not be used as a justification for inaction. Despite the popular perception, the Treaty on the Functioning of the European Union does delegate the EU powers to address transboundary water quantity management (allocation included), 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 water allocation issues in a transboundary manner. 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.).
- *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.
- *Review dispute settlement and enforcement mechanisms in the EU:* one of the major lessons of federal water governance is that the availability and effective use of mandatory dispute settlement mechanisms is a major guarantee of the stability of inter-jurisdictional relations. The EU should also make use of the existence of a strong supranational legal and institutional framework. Institutional options for bilateral dispute settlement should be investigated without prejudice to the judicial monopoly of the European Court of Justice. Existing examples within and outside the EU include mediation, fact finding commissions, compliance mechanism, mutual evaluation, etc.
- *Strengthen the effectiveness of the existing 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 the structure of member state cooperation,

enhanced supervision by the Commission, strengthening the role of basin commissions, etc.

- *Active engagement of the European Commission in transboundary water cooperation:* federal experience shows that tensions over shared river basins are resolved best where the central government plays an active facilitative role. The Commission too can play a more active role making use of the diversity of its powers and its multi-faceted relationship with member states.

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