

# Chapter 18

## Ensuring Long-Term Cooperation Over Transboundary Water Resources Through Joint River Basin Management



Susanne Schmeier and Birgit Vogel

### 18.1 Introduction

Water resources are the basis for human well-being and development all over the world. At the same time, in their use and protection, they face numerous challenges stemming from different interests of different actors. Meeting these challenges requires integrated management that reconciles different interests in the use and protection of water resources and ensures the sustainable development of a river or lake basin as a whole. As soon as rivers and lakes<sup>1</sup> cross international borders and transboundary basins emerge, these challenges and the need to address them in a coordinated manner become even more complex. The links between interests in the use of their resources and the interests of nation-states add an international political dimension to the previously rather technical challenge of water resources management.

Such shared basins—more than 270 worldwide—cover more than 45% of the world's surface where more than 40% of the world's population resides (Delli Priscoli and Wolf 2009) (see Fig. 18.1). In total, 145 countries share basins with neighboring states (with 21 such states—including Hungary, Bangladesh, or Zambia—lying entirely in such international basins; Delli Priscoli and Wolf 2009).

---

<sup>1</sup>Transboundary watercourses refer to both river and lakes (as well as groundwater bodies) that transcend the boundaries of nation-states. However, for the sake of readability, we will refer—throughout this chapter—to rivers, nonetheless including lakes as well.

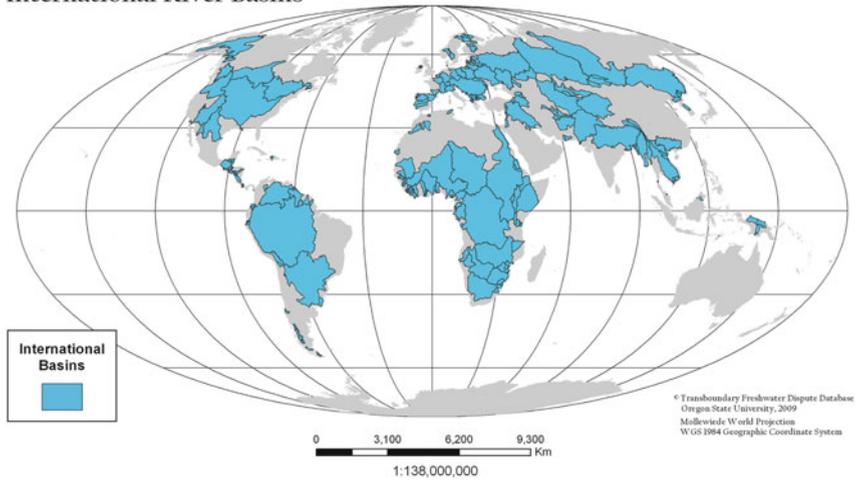
S. Schmeier (✉)

Transboundary Water Management, Gesellschaft für internationale Zusammenarbeit (GIZ),  
Eschborn, Germany  
e-mail: [susanne.schmeier@giz.de](mailto:susanne.schmeier@giz.de)

B. Vogel

RBM Solutions – River Basin Management e.U., Vienna, Austria  
e-mail: [birgit.vogel@rbm-solutions.com](mailto:birgit.vogel@rbm-solutions.com)

### International River Basins



**Fig. 18.1** International basins

Interests in the use and the development of these internationally shared basins naturally vary among riparian states. While one state might be interested in exploiting a river's hydropower potential, another state might fear a dam's negative impacts on the river's flow or its sediment load on its own agricultural development potential. Furthermore, while one state might use the river as an effluent for pollutants from its industries, another state might see its drinking water supply threatened by river pollution. As a consequence, disagreements and conflicts often emerge between riparian states, especially if states perceive the use of river's resources by their neighboring state (and the potential environmental and socio-economic impacts that come with it) as a threat to its own water security. Examples include the recent disputes over hydropower projects in Central and Southeast Asia on the Syr Darya and the Mekong, respectively, as well as in Africa on the Nile River, but also less fierce conflicts such as the one over a navigation channel (the Bystroe Canal) in the Lower Danube Basin or on salmon migration in the Rhine.

Such disagreements—or even full-fledged conflicts—are increasingly on the agenda of politicians and the media. The Uzbek President, for instance, has threatened to go to war against upstream Tajikistan over the Rogun Hydropower Project, and the former Egyptian President Mohamed Morsi has emphasized that Egypt would be willing to confront any threats to Egypt's water security caused by the Grand Ethiopian Renaissance Dam (GERD). Likewise, international media have warned of water conflicts—either generally as a consequence of global climate change or with regard to a particular region—and expressed their fear that “water wars between countries could just be around the corner” (The Guardian 2012) and that “the world will soon be at war over water” (Newsweek 2015, similarly, Reuters 2012 or Spiegel 2012).

In reality, cooperation prevails in most basins shared between different states with their respective interests in the river's resources. Riparian states very often

acknowledge that their interests in water resources management and development are better met through cooperation than through conflict (Wolf et al. 2003; De Stefano et al. 2010). This is because the benefits of cooperation in a shared basin tend to outweigh the gains of short-term unilateral action, which often come with considerable economic or political costs over the long term.

The mere acknowledgment of the benefits of cooperation does not, however, ensure cooperation over time. Nor does it allow for harvesting these benefits in the form of better water resource availability, strengthened socioeconomic development, or increased resilience to change. But it is these benefits that make states commit to cooperation over time. Therefore, riparian states in many international basins have committed to joint river basin management.

In this context, we understand “river basin management” in a broad sense, including not only river basin management plans themselves, but all actions and measures taken that aim to avoid or mitigate conflict over shared water resources, while increasing the benefits of cooperation and sharing them across the basin. In order to do so, they have established international water treaties and created river basin organizations as institutions that operationalize the principles of international water law and management and provide the platforms and instruments for joint river basin management.

The remainder of this chapter will focus on how riparian states to shared watercourses ensure their commitment to cooperation over time and implement joint activities that ensure that the benefits of cooperation outweigh potential short-term gains from unilateral action, thus also avoiding or mitigating conflicts among them. It does so by, firstly, taking a brief glance at the global level and at how specific principles for shared water resources are encoded in international water law and other instruments (Sect. 18.2). It then, secondly, moves to the basin level and provides an overview of basin-specific arrangements for cooperation over shared water resources (Sect. 18.3). It then digs deeper into basin management at the basin level by focusing on specific approaches and methods for basin management—namely, the development and implementation of river basin management plans (RBM plans), the management of data and information as a basis for informed decision-making, and the application of prior notification and consultation in the case of hydropower development (Sect. 18.4). The chapter then concludes with an outlook on how successful river basin management can be ensured under current conditions of environmental, climatic, and socioeconomic change (see Sect. 18.5).

## **18.2 The Global Legal Framework for Managing Shared Watercourses**

International efforts to provide the global bases for managing water resources and river basins as constituted by international (water) law have only been established in the past century. Developed over time at different governance levels and in different regions and codified in international and regional conventions and agreements, the

most important norms of international water law are the principle of equitable and reasonable utilization, the obligation to cooperation, and the obligation not to cause significant harm. They are based themselves on or are included in more general norms of international law, namely, prohibition of the use of force and the obligation to cooperate with other states, as well as more environment-specific norms, such as the principle of sustainable development.

Two important international instruments—the 1997 UN Convention on the Law of the Non-Navigational Uses of International Watercourses (UN Watercourses Convention) and the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki Convention/UNECE Water Convention)—codify the aforementioned principles in a legally binding manner (see Chap. 20 for more details on these conventions).

The principle of equitable and reasonable utilization is the basis for managing shared water resources. In order to establish equitable and reasonable utilization in a given context, a number of criteria can be applied (as established in Art. 6 of the UN Watercourses Convention). Equitable and reasonable utilization of shared water resources—as well as the general commitment toward sustainable development and the obligation not to cause transboundary environmental harm—implies the water-specific provision not to cause significant harm to co-riparian states. This is enshrined in Art. 7 of the UN Watercourses Convention. In order to comply with these substantive principles, riparian states of a shared watercourse have to cooperate (Art. 8 UN Watercourses Convention—namely, through the establishment of so-called joint bodies) (Art. 9 (2) UNECE Water Convention, United Nations 1992). Some guidance on how to ensure the implementation of these high-level principles in specific watercourses is provided in the form of procedural principles of international water law. They include, most importantly, the obligation to share data and information among riparian states (Art. 9 UN Watercourses Convention and Art. 6 and 13 UNECE Water Convention) and the obligation to notify co-riparian states of possible adverse effects of planned measures on a shared watercourse (Art. 11–19 UN Watercourses Convention, Art. 13 UNECE Water Convention).

The provisions in these global legal instruments only bind their respective parties. However, a number of norms for the management of shared water resources—including the ones mentioned above—have achieved the status of international customary law. Hence, they bind the entire international community. This has not only been confirmed by state practice in all regions of the world but also by international adjudication. Especially in recent years, international courts and tribunals—such as the International Court of Justice (ICJ) and the Permanent Court of Arbitration (PCA) in the 1997 Gabčíkovo-Nagymaros (Danube River), the 2010 Pulp Mills (Uruguay River), or the 2013 Kishenganga (Indus River) cases—have confirmed the importance of certain international water law norms, namely, the principle of equitable and reasonable use and the obligation not to cause transboundary harm, combined with the principle of prior notification (McIntyre 2011; Rieu-Clarke 2013). Moreover, they indicate how international water law and state practice itself develop toward more cooperation over shared rivers and lakes. This reflects an increasing global consensus that shared water resources can only be

managed in a cooperative and coordinated manner to the mutual benefit of all riparians. Cooperative river basin management is part of this emerging consensus and is itself a means for ensuring it.

International water law norms thus provide a viable basis for the sustainable management of shared water resources. As with all international law norms, they do, however, face an enforcement challenge. That is, other than at the national level, the compliance of states with these norms cannot be enforced. Consequently, the key question currently is not whether and how a state will ensure that its use and development of water resources does not negatively affect another state in the basin. Rather it is whether the benefits of joint water resources management will be clear to all actors in the basin such that they emerge entirely from the interest of each state in such cooperation. River basin management is the means for ensuring such interest of riparian states by avoiding conflict (and the costs related to it) and increasing the benefits from water resources management through joint approaches, ultimately demonstrating the benefits of cooperation to riparian states.

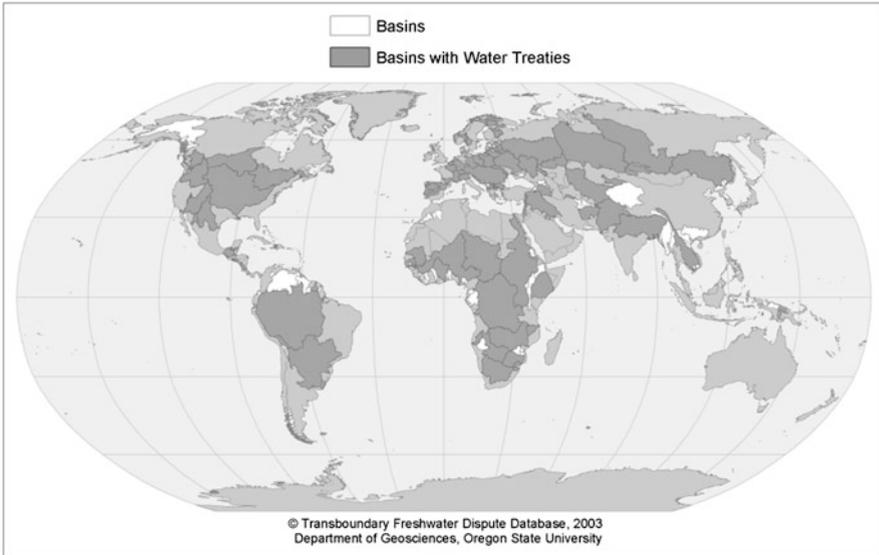
In the next two subchapters, we will focus in more detail on the institutions that riparian states in different basins have established for ensuring long-term cooperation and the methods and approaches they apply for joint river basin management.

### **18.3 International Water Treaties and River Basin Organizations: Institutionalizing Cooperation Over Shared Watercourses at the Basin Level**

In order to ensure the implementation of principles of water resources management over time in specific basins while taking into consideration their specific hydrological, environmental, socioeconomic, political, and cultural specificities, riparian states of many shared basins have signed international water treaties and established River Basin Organizations (RBOs).

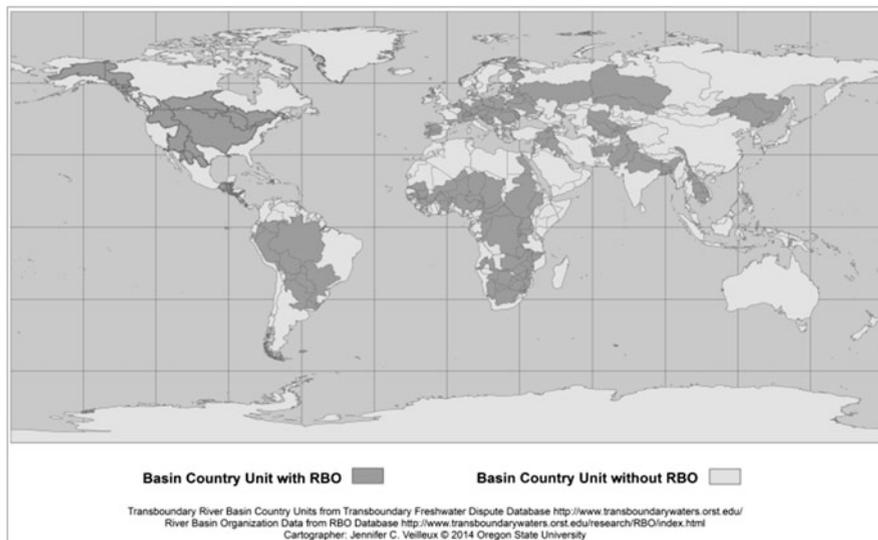
The last 20 years have seen an increasing number of international water treaties being concluded in all regions of the world (TFDD Treaty Database)—with more than 100 agreements signed since the 1992 Rio Conference. Moreover, on average such treaties also seem to engage an increasing number of states (Fig. 18.2).

These treaties vary considerably in scope and content (TFDD Treaty Database). Some treaties have been concluded between two states only—either because they cover a bilateral river basin only or because compromise could only be achieved between a subset of riparians to a larger basin. The latter constellation is not uncommon. The Jordan River Basin, for instance, is largely covered by a set of bilateral agreements between Israel and Jordan, Israel and Palestine, Jordan and Palestine, and Jordan and Syria, respectively. Such situations, however, can lead to severe challenges in terms of integrated water resources management. Other treaties, on the other hand, have managed to commit a large number of riparian states to a basin, such as, for instance, the Danube River Protection Convention (ICPDR 1994), establishing the legal basis for joint river basin management between 14 states and the European Union.



**Fig. 18.2** International river basins with basin-specific international water treaties

International water treaties also vary in their content. Some treaties address water quantity challenges by clearly allocating specific amounts of water to the respective parties. Examples include the 1996 Ganges Treaty between India and Bangladesh or the 1959 Nile Waters Treaty between Egypt and Sudan (Agreement for the Full Utilization of the Nile Waters 1959), today the source of major conflict between these and the other Nile riparian states. Other treaties focus on similarly specific, yet rather narrow, issues at stake. The 1986 Lesotho Highlands Water Treaty, for instance, sets the legal basis for the development of a water infrastructure scheme between Lesotho and South Africa Treaty on the Lesotho Highlands (1986). Likewise, the 1992 Treaty on the Development and Utilization of the Water Resources of the Komati River Basin between South Africa and Swaziland defines the grounds for a basin development project consisting of one dam in each country. Similarly, but with a focus on water quality, two agreements between the USA and Mexico set specific standards for decreasing the salinity level of water entering from the USA into Mexico. Yet other treaties pursue an integrated approach and combine various interlinked water resources management issues in one legal document. Sometimes, these treaties even go beyond water resources management itself and focus on regional cooperation and integration more generally, with water being one of the driving forces. An example is the 1972 Convention concerning the Status of the Senegal River between Mali, Mauritania, and Senegal, aiming at promoting and intensifying economic cooperation and exchanges and joining efforts for economic development by developing the resources of the Senegal River (Senegal River Convention 1972).



**Fig. 18.3** Transboundary river basins with River Basin Organizations (RBOs)

Establishing and ensuring long-term cooperation that allows for implementing the legal and political commitments made in international water treaties often requires the establishment of institutions such as RBOs.<sup>2</sup> Worldwide, riparian states of more than 100 shared watercourses have opted to establish such RBOs (Schmeier 2013) (see Fig. 18.3). Interestingly, the distribution of RBOs varies considerably across continents: the coverage of basins by RBOs is highest in Africa and Europe (Schmeier 2013; Schmeier et al. 2015). In Asia and the Middle East/North Africa, however, a lot of transboundary basins remain without any institutionalized cooperation mechanism. This is due to a number of different reasons, including the nature of the collective action problem states face and to what extent it lends itself to institutionalized cooperation, the general level and intensity of regional cooperation and integration that can foster cooperation over water as well, and, not least, the support of RBOs by the international donor community.

RBOs fulfill a number of important functions that provide the basis for cooperation and thus joint river basin management: RBOs provide negotiation and exchange platforms for states, allowing them to exchange on their interests in a predefined and constructive manner. This is done, for instance, through meetings at the ministerial or technical level—such as in the Mekong River Commission (MRC)’s Council and Joint Committee or the Orange-Senqu River Commission

<sup>2</sup>Most research on institutionalized cooperation and RBOs does not rely on a sound definition of what an RBO actually is. It therefore remains contested which institutions established for managing shared water resources can be considered as RBOs. In this chapter, we adopt a very broad approach, including a wide range of institutions most commonly figuring as RBOs, even if they do not meet all constitutive elements of RBOs as defined in Schmeier et al. (2015).

(ORASECOM)'s Council and Task Teams. This political and technical exchange in a regular and predefined manner ensures the basis for all cooperation—a constant dialogue between riparian states on their interests in the use and the development as well as the protection of the shared resources.

In this context, RBOs also ensure joint decision-making on how to use, develop, or protect shared water resources through specific decision-making mechanisms (Mostert 2003; Schmeier 2013). The ability of an RBO to ensure joint decisions of its member states on the shared resource is a key element of its success (Schmeier 2013). That is, if joint decision-making fails—in spite of required mechanisms being in place—an RBO easily turns into a paper tiger or eventually loses its legitimacy and potentially even ceases to exist. When the Joint Technical Committee on Regional Waters (JTCW) on the Euphrates-Tigris River failed to come to any consensus decision on the principles of water resources management between Turkey, Syria, and Iraq, it eventually ceased to exist (Islar and Ramasar 2009; Leb 2010).

And RBOs are crucial for mitigating disputes among riparian states (Giordano and Wolf 2003; Sohnle 2005; Blumstein and Schmeier 2016), which tend to (re-)emerge over time even if legal and institutional frameworks for cooperation exist. Recent severe conflicts over hydropower projects illustrate this, e.g., the Rogun Dam in Central Asia (Economist 2012) or the GERD on the Nile, but also less severe yet important conflicts on the Colorado River between the USA and Mexico or on the Indus between India and Pakistan. Examples of active RBO engagement in mitigating diverging interests and avoiding or resolving conflicts include the International Commission for the Protection of the Rhine (ICPR) in the Haringvliet sluice disagreement (ICPR 2011) and the International Commission for the Protection of the Elbe (ICPE) in a dispute between the Czech Republic and Germany over a barrage to be constructed just upstream of the German border (Sächsische Zeitung 2016; WSV 2016).

In addition to these basic functions of RBOs, providing the basis for any long-term, stable cooperation, cooperation needs to move to the next level—the level of joint management of the shared basin—in order to produce or increase joint benefits for all riparian states. The next and main part of this chapter will therefore focus on specific river basin management methods, approaches, and mechanisms.

## **18.4 Specific Mechanisms for River Basin Management: Implementing Cooperation Over Shared Rivers**

International water treaties and RBOs do not only provide the legal and institutional basis for cooperation but also allow for the development and implementation of specific mechanisms, measures, and joint activities for river basin management. Through those mechanisms they reinforce cooperation over time by ensuring sustainable use and development of a basin's resources and creating benefits that transcend national boundaries and considerations. Below we focus on three specific

mechanisms that are critical for the sustainable development and management of shared water resources: the sharing of data and information and their use for informed decision-making in a shared basin, the development and implementation of river basin management plans as the key tool for joint management, and the instrument of prior notification and consultation as a means for ensuring compliance with the obligation not to cause significant transboundary harm and its procedural element of prior information.

### ***18.4.1 Data and Information Management and Sharing for River Basin Management***

Data and information management, including the design and implementation of joint monitoring programs and networks and the sharing of data and information across riparian states, is a crucial prerequisite for river basin management and transboundary water cooperation more generally (Chenoweth and Feitelson 2001; Burton and Molden 2005; Pietersen and Beekman 2008). This prerequisite can keep cooperating countries well informed on general conditions in river basins they share as well as support objective impact assessment. Further, well-established systems of monitoring and data sharing can also support the effective operation of alarm systems for accidental pollution and flood events, supporting integrated responses across entire basins that benefit both humans and the environment in all riparian states involved. The UNECE Water Convention (United Nations 1992), for instance, foresees the establishment of monitoring programs to assess the conditions of transboundary waters and inform the public accordingly. Despite wide acknowledgment in international river basin management discourse, the actual implementation of joint monitoring and data sharing is still insufficient in many basins. This is largely due to three key challenges—the persistence of data gaps, incoherence across datasets, and a lack of willingness among riparian states to a basin to share data and information with the respective co-riparian states. As a consequence, insufficient transboundary monitoring and a lack of transparency in information sharing can significantly hamper river basin management and cooperation. Below we address these key challenges in data and information management.

*Data gaps* can significantly challenge river basin management and cooperation. Targeted assessments on the local, national, and basin-wide levels are often not or only partially undertaken, and the lack of evidence may cause critical tensions between riparian states. Sources of data gaps can vary and stem from personnel, technical, and/or financial capacity shortcomings but may also exist due to conflicts and political reasons. After the 2003 Rose Revolution separated the Republic of Georgia from Soviet leadership, the resulting political changes also affected monitoring and assessment of water resources, despite comprehensive reforms in the environmental sector. These effects included a substantial reduction in the number of

monitoring sites and, hence, caused significant data gaps in the time series and assessment of water quality and hydrological conditions.

Today, Georgia sees energy generation through hydropower as a key political target, and related development is taking place rapidly (Vogel and Schmutz 2015). As a number of Georgia's rivers—e.g., the Kura River—are shared with neighboring countries, the aforementioned data gaps are particularly problematic. Existing data gaps, the lack of monitoring, and environmental baselines regarding water status hinder the comprehensive assessments of possible impacts from hydropower at both the national and transboundary levels. In addition, the development of Environmental Impact Assessments (EIAs) that are aligned to internationally recognized best practices also becomes a challenge. Data gaps and incomplete assessments result in hydropower development that is more based on assumptions than data and analysis. This increases possible risks of negative impacts on water resources and socioeconomics and of ineffective measures. Accumulation of negative impacts at transboundary scales that cause disputes with basin-sharing countries has so far not been sufficiently taken into account. Considering these challenges, Georgia is currently undertaking steps to close data gaps and to assess hydropower impacts more comprehensively (Vogel and Schmutz 2016). These activities aim to increase knowledge and minimize risks that might otherwise be irreversible. Another data gap example occurs currently in the Congo River Basin, where only nine functioning monitoring stations still exist. In this context, data gaps, ostensibly due to a lack of willingness and interest of riparian states, may ultimately result from lacking technical and financial capacity.

*Incoherent datasets* pose another challenge. Cooperating countries in transboundary basins often use different methodologies and independent monitoring approaches to collect and assess data (e.g., regarding water status, aquatic ecosystem health, socioeconomics). This usually leads to un-harmonized, incoherent assessment results that cannot be compared between the countries in a basin. This can cause misunderstandings between different countries concerning the interpretation of results—for instance, in interpreting potential transboundary impacts of projects in one country on another riparian country. As a consequence, this often affects cooperation between basin states as a whole.

A comparative study by the European Commission on coordination mechanisms in international river basins in Europe beyond EU territory (2012) showed that out of 75 European transboundary river basins, joint monitoring is fully or partially in place in 51 basins and joint databases are operated in 30 basins (European Commission 2012). In the remaining basins, monitoring and databases are either not jointly coordinated or not in place at all. In other parts of the world, data and information sharing also differs considerably across basins. While in some basins—for instance, in basins shared by Canada and the USA—data information sharing (e.g., through joint monitoring) is well advanced, many basins in the developing world do not have such mechanisms in place.

To tackle these challenges, many RBOs aim for and implement jointly agreed monitoring programs. Some also conduct joint river surveys, constituting a particularly advanced way of joint monitoring. For example, the Danube countries agreed,

on the basis of the provisions of the Danube River Protection Convention (ICPDR 1994), to develop and implement transboundary monitoring through a Transnational Monitoring Network—TNMN (ICPDR 2007a, b). The TNMN also ensures regular quality assurance tests regarding monitoring results. This quality assurance aims to establish a solid basis toward trustworthy data that would also support objective discussions in case of transboundary impacts. As part of joint monitoring, the International Commission for the Protection of the Danube River (ICPDR) also organizes and implements Joint Danube Surveys since 2001 every 7 years (ICPDR 2002, 2008a, 2014). During these river surveys, a selected core team undertakes monitoring and sampling along the mainstream of the Danube, fully involving national teams of the 14 Danube countries. The implementation of coherent and commonly agreed sampling and assessment methods regarding chemical, hydro-morphological, and biological water status at all monitoring sites allow for full comparability of results and eases their interpretation. Besides the positive effect of capacity building in the field of monitoring, joint river surveys have the potential to increase trust between cooperating countries due to joint monitoring implementation, full transparency, and consolidation regarding assessment results (see Chaps. 15, 16, and 22 for how joint and participatory cooperation can build trust in river science and management).

*A lack of willingness of riparian states to share data* is a third challenge to joint river basin management. Data sharing becomes specifically challenging or even impossible when countries are not willing to exchange information—most often for political reasons situated outside of the water sector itself. Insufficient data and information sharing due to a lack of willingness of at least one riparian state often further intensifies differences between riparian states and easily leads to conflicts among them. An example can be found in the Mekong River Basin: China, as the most upstream country in the basin, is not a member to the Mekong River Commission (MRC) and, hence, does not participate in the MRC's river basin management activities. Moreover, China has only very limited data-sharing arrangements with its downstream neighbors, the MRC member states. When a severe drought hit the countries of the Lower Mekong Basin in 2010 (and again in 2012), China was quickly blamed for holding back water in its reservoirs behind large hydropower dams on the upper Mekong (Asia Times 2010; Vientiane Times 2010; Radio Free Asia 2012). This led to a significant conflict between China and some of its downstream neighbors. The conflict slowly de-escalated only when China started to share hydrological information on its share of the river and MRC, and Chinese hydrologists came together to exchange data and conduct analyses (MRC 2010). Up to the present, however, such cooperation has not been institutionalized, and regular formal data exchange remains extremely limited—not least due to a lack of interest on the Chinese side. Repeated accusations against China in the recent drought in mainland Southeast Asia have demonstrated once again that insufficient data sharing easily exacerbates existing disagreements or even conflicts (Voice of America 2016).

## ***18.4.2 River Basin Management Plans***

River basin management plans (RBMPs) provide the mechanisms and tools for countries to identify and jointly aim for strategic visions and to achieve defined management objectives regarding water resources and, hence, the sustainable management of shared water resources. RBMPs also form the basis of strategic and transparent planning, ideally involving the public, relevant stakeholders, and sectors. Most importantly, RBMPs address an entire river basin, leaving administrative borders aside in order to ensure integrated planning and management.

RBMPs define water resources management objectives to be achieved within a certain time frame. In some cases—especially in many basins in the developing world—RBMPs go beyond water resources management objectives and include coordinated efforts to develop water-related infrastructure (e.g., hydropower, irrigation schemes, water supply) as well as socioeconomic aspects. In addition to the objectives to be achieved, RBMPs have to include all steps of a river basin management cycle. This includes a basic characterization of river basins and the identification of pressures and impacts on water resources, followed by the validation with monitoring results and the definition of measures to achieve the objectives.

Globally, the development of RBMPs is increasingly becoming a best-practice approach, and RBMPs have been developed in a number of transboundary basins, especially in Europe and in Africa. At the same time, it has to be acknowledged that each basin is characterized by particular ecological, historic, socioeconomic, and political conditions, different water uses, and different impacts of such water uses. RBMPs, therefore, have to be adapted to the needs of each basin. Consequently, no single blueprint approach exists for RBMPs. In addition to the different characteristics of each basin, other dimensions also challenge the successful development and implementation of RBMPs. One challenge is related to different legal frameworks at both national and basin level (and potential incompatibilities between them). In the case of the EU, the development of national and international RBMPs is legally binding, according to the European Water Framework Directive (European Commission 2000). In other countries, however, the development of such plans—especially at the basin level—is often not foreseen in national and regional legal frameworks. The lack of a legal basis for joint basin planning often impedes the development of RBMPs and their implementation, including their translation into more specific regulatory acts concerning, for instance, permits and related monitoring and enforcement mechanisms, and their financing out of a national budget (GIZ 2017). And the existence of different legal bases in different basin states tends to further complicate matters. Another challenge is related to the effectiveness of river basin organizations and other joint bodies and, in particular, their respective technical bodies with regard to developing and implementing RBMPs at the different governance levels. And a third challenge is related to the timing of RBMP implementation, including the definition of clear implementation milestones and objectives along the river basin management cycle. The next paragraphs will address these

challenges on the basis of one specific example—the Danube River Basin Management Plan (Danube RBMP), developed by the ICPDR.

#### **18.4.2.1 Case Study: Danube River Basin Management Plan**

So far, two Danube RBMPs have been developed under the coordination of the International Commission for the Protection of the Danube River (ICPDR) and have been published in 2009 and 2015, respectively. Danube RBM Plans guide and support the Danube countries that consist of EU and non-EU member states in their joint river basin management. The Danube RBMPs are management documents for achieving environmental objectives and protecting the aquatic environment as well as tools that provide orientation for the Danube River Basin's water sector and its actors.

The cooperation of the 14 countries under the Danube River Protection Convention (ICPDR 1994) is based on a high level of commitment, will, and trust. In addition, regulated cooperation and coordination mechanisms are essential tools for effective Danube river basin management. And the coordination between the national and international levels in the Danube River Basin is crucial to ensure the involvement of all contracting parties and stakeholders to the best possible extent. Specifically, for the coordination of the Danube RBMP, the basin-sharing countries follow an agreed, top-down/bottom-up approach. This approach ensures clear and functioning linkages between the national and international levels for the entire process of developing and implementing the plan. For example, most of the measures in international RBMPs are implemented at the national level and through national legal regulations. Therefore, the measures that are identified in the international Danube RBMP need to be reflected in the national RBMPs of the basin countries to ensure adequate implementation. If linkages between the national and international levels are lacking, the implementation of international RBMPs and actions may be at high risk.

The development of international RBMPs usually spans over longer periods of planning cycles and so requires well-coordinated planning. Therefore, for the compilation of the Danube RBMPs, aligned clear timelines were set, supporting the countries to jointly move toward the related aims in a strategic and coordinated way. Overall, according to the WFD objectives, the cooperating countries aim to achieve good status for all waters by 2027 through implementing four river basin planning cycles (ICPDR 2009, 2015). The first Danube RBMP has been developed within a period of 9 years until its adoption on the ministerial level. The second one has been compiled within 6 years.

The variety of technical aspects and their meaningful coordination and reflection in international RBMPs is demanding. The coordinated work of joint technical bodies can significantly facilitate the work of basin-sharing countries toward a final and consolidated RBMP. In this context, the ICPDR has seven permanent Expert Groups (EG) in place that consist of nominated country representatives and

ICPDR observers. Technical experts from the ICPDR Secretariat coordinate these EGs. The EGs have terms of reference and mandates adopted by each country cooperating within the ICPDR framework and meet several times a year. The Expert Groups discuss issues related to their terms of reference (ICPDR 2016) and prepare reports and recommendations for coordinated action toward the final Danube RBMP. On demand, time-limited Task Groups (TGs) may also be established for specific actions and in which not necessarily all countries are represented. In practice, the River Basin Management EG coordinates the overall development of Danube RBMPs, steering the other relevant EGs and compiling all information into one final plan. Draft versions are shared with all EGs as well as presented and consolidated at the ICPDR's plenary meetings that take place twice a year, until the final Danube RBM Plan is adopted for implementation. In the end, the coordinated technical work and joint management efforts of the EGs and TGs support countries in consolidating the content of the Danube RBMPs due to their full involvement during the entire development process.

Besides the coordination aspects that need to be in place to develop international RBMPs, the achievement of defined milestones that are aligned to a river basin management cycle is important. The Danube Basin Analysis (ICPDR 2005), which is equal to State of Basin Reports, was the first milestone within the Danube RBM Plan development. Four basin-wide Significant Water Management Issues (SWMI) have been identified, which can directly or indirectly affect the status of both surface waters and transboundary groundwaters. The SWMIs address pollution by organic substances and nutrients, pollution by hazardous substances, as well as hydromorphological alterations. The identification of these SWMIs has been an important step within Danube RBM planning. Over one and a half years, a joint process of the ICPDR and its River Basin Management Expert Group elaborated a strategic document on the four SWMIs. The SWMI document includes visions and management objectives for each SWMI (ICPDR 2008b, 2009, 2015) that have been adopted by the contracting parties in the ICPDR's Ordinary Meeting.

The SWMI visions and, specifically, the management objectives describe the basin-wide implementation steps toward the environmental objectives that need to be achieved by 2027 at the latest. The management objectives guide the Danube countries toward agreed joint aims. Basically, the management objectives for the SWMIs describe the measures that need to be taken to reduce or eliminate existing pressures for each SWMI on a basin-wide scale. In addition, the management objectives help bridge the gap that can exist between the national level and their agreed coordination on a basin-wide level to achieve the environmental objectives. Although SWMIs and their management objectives can be flexibly adjusted to the needs of the Danube River Basin from RBMP to RBMP, their adoption by the contracting parties of the ICPDR is crucial to ensure fixed joint aims and, hence, a solid implementation basis.

As a next milestone, a specific and coordinated analysis has been undertaken for each of the identified SWMIs within the Danube RBMP that enables targeted management on the basin-wide scale. For each SWMI, pressure types that may

impact the water status are presented, which are then addressed with corresponding monitoring programs and measures as part of the Danube RBMP's Joint Programme of Measures. The Pressure and Impact Analysis for each SWMI is based on the Driver-Pressure-State-Impact-Response approach that is integral part of the Guidance Document No 3 (Analysis of Pressures and Impacts) of the Common Implementation Strategy for the EU WFD (European Commission 2003) and which includes the steps below:

1. Water uses that may have environmental effects are allocated to each SWMI.
2. Pressures that can stem from each driver are identified and clearly allocated to surface water bodies and groundwater bodies.
3. Identified pressures are assessed for their significance in possibly putting the respective water bodies at risk of failing the environmental objectives. The significance of pressures and the risk assessment is based on the application of clear criteria that have been developed and agreed upon by all 14 Danube countries. The agreement on criteria is an essential step to achieve results on a consolidated basis that is also aligned to the national river basin management in each country. This consolidation creates a common understanding from the beginning between all Danube River Basin (DRB) countries and applies one, single assessment approach for all Danube basin-wide purposes. Further, consolidation ensures a harmonized, transboundary approach that allows comparability of results across borders and, hence, facilitates the discussion of assessment results and counteracts potential areas of conflict from the beginning.
4. In a final step, the results of the risk assessment are responded to with the development of tailor-made, comprehensive monitoring programs in order to validate the findings with real water status assessment. The monitoring programs in the DRB and, therefore, the Danube RBMP are based upon (1) monitoring data of the ICPDR's Transnational Monitoring Network (TNMN—ICPDR 2007a, b), (2) on specifically collected national data provided through the Danube countries, as well as (3) on monitoring assessment results from the Joint Danube Surveys (ICPDR 2002, 2008a, 2014). All data is compiled in a joint database (DanubeGIS) and used for the analysis as well as GIS mapping within the Danube RBM Plan.

In case good water status is at risk or assessed to fail, measures as part of the DRB Joint Programme of Measures (JPM; ICPDR 2009, 2015) are developed to eliminate or at least limit the negative impacts. The JPM is a core piece of each Danube RBMP and is adopted by all contracting parties of the ICPDR for implementation. The JPM aims to ensure the basin-wide achievement of the joint management objectives, even in the case of future infrastructure development that could potentially deteriorate the state of the river again. The JPM outlines what steps need to be taken to achieve environmental objectives on a basin-wide scale, making fully coordinated use of national activities. Interim assessments on the effectiveness of the JPM are undertaken regularly for the basin-wide and the national scales. However, the implementation of the JPM is still a challenging task, and it is clear that high efforts by all Danube countries will be needed to achieve the aims at the latest by 2027.

### ***18.4.3 Prior Notification and Consultation Mechanisms***

As it has been mentioned already in the previous subchapter, the obligation not to cause significant harm to co-riparian states is a key element of international water law. It is not only embodied in global conventions and regional agreements (such as the SADC Protocol on Shared Watercourses 2000) but also in a considerable number of basin-specific treaties.<sup>3</sup> Its implementation is, however, challenging—as is its enforcement.

In order to ensure that measures taken in one riparian country do not have negative transboundary effects on other riparian countries, countries potentially affected by such measures have to, first and foremost, be informed about the respective measures and be enabled to evaluate its potential impacts. This is done through prior notification and consultation mechanisms. Such mechanisms are foreseen in some basin-specific treaties<sup>4</sup>—although the majority of treaties remain silent on this rather complex matter. This is largely due to the fact that the establishment of a prior notification mechanism is often perceived as a significant limitation to unilateral national development interests, since it implies the inclusion of other states' interests in the planning and development of water resources development projects.

Most often, treaty provisions follow general guidance provided by international conventions, the adjudication of international courts, and, more generally, customary international law. The process then consists of a first notification about a planned measure, the provision of relevant information (such as the environmental impact assessment (EIA) and related documents), a certain time frame during which a potentially affected state can respond to the information received (6 months according to Art. 13 of the 1997 UN Watercourses Convention), and a response by the respective state, potentially leading to consultations and negotiations or any other following action. The process does, however, not imply a veto right for the potentially affected state.

While international- and basin-specific agreements already provide detailed guidance on the process of prior notification, its implementation remains challenging

---

<sup>3</sup>Examples include the 2002 Framework Agreement on the Sava River Basin; the 2003 Convention on the Sustainable Management of Lake Tanganyika between Burundi, DR Congo, Tanzania, and Zambia; and the 2004 Agreement on the Establishment of the Zambezi Watercourse Commission between eight Southern African states.

<sup>4</sup>Provisions on prior notification and/or consultation (or similar means for informing co-riparians about planned measures and their potential transboundary effects) are included, for instance, in the 1975 Statute of the River Uruguay, an international water treaty governing the Uruguay River between Uruguay and Argentina; Annex II to the 1994 Treaty of Peace between the State of Israel and the Hashemite Kingdom of Jordan, which governs their relations concerning the Jordan River; the 2003 Protocol for Sustainable Development of the Lake Victoria Basin between Kenya, Tanzania, and Uganda; and the 1960 Indus Waters Treaty between India and Pakistan (for more details, refer to the TFDD RBO Database and Schmeier 2013).

(Farajota 2005; Rieu-Clarke et al. 2012, 135–163; Rieu-Clarke 2013; Blumstein and Schmeier 2016). This is largely due to a number of questions that remain open or tend to be interpreted differently by different riparian states in line with their respective interests. The first such challenge concerns questions under which conditions a potentially affected state has to be notified of a planned measure. It relates to the broader question of what actually constitutes significant, transboundary harm. A second challenge relates to the question as to when a notification is to be made—at the planning stage of a project or later during its implementation. And, third, challenges often relate to how to treat the results of a notification and consultation process—both with regard to when such process is finished and developments can go ahead and with regard to what happens if disagreements prevail.

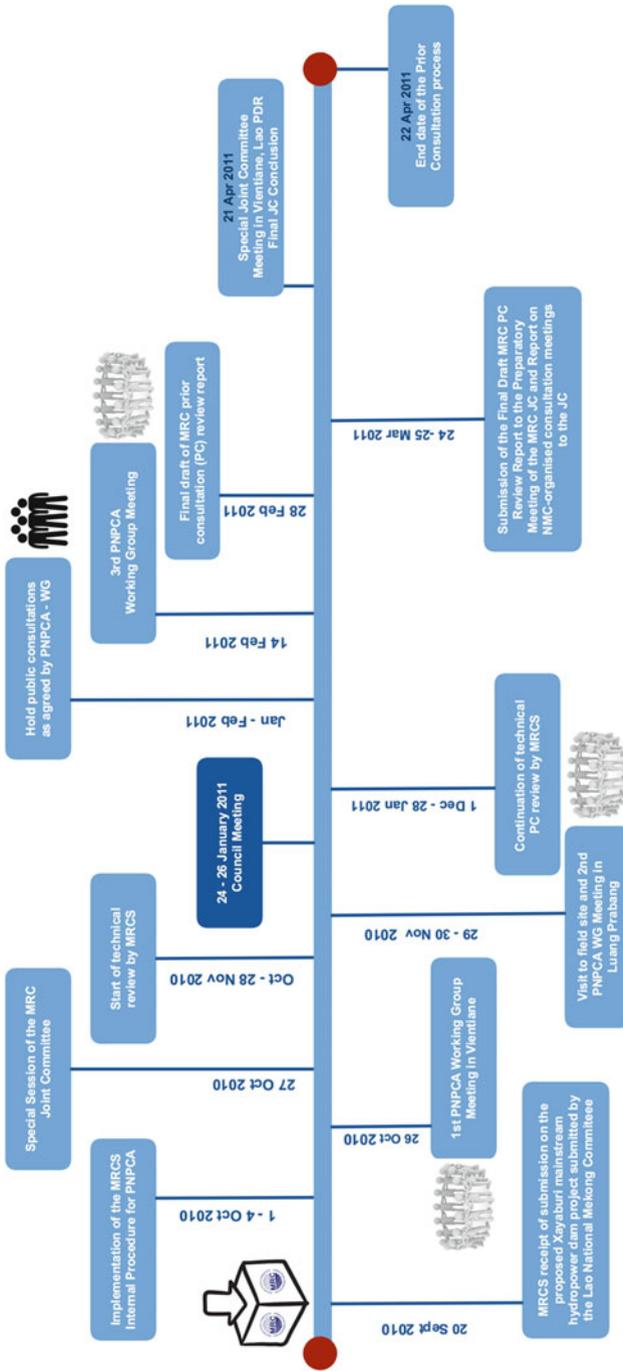
#### **18.4.3.1 Case Study: Xayaburi Hydropower Project in the Mekong River Basin**

A particularly interesting case for prior notification and consultation mechanisms relates to how the Mekong River Commission (MRC) handled the Xayaburi Hydropower Project (XHP) in the Mekong River Basin: based on the 1995 Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin (Mekong Agreement), signed by Cambodia, Laos, Thailand, and Vietnam, specific principles and provisions for water resource use and development have been defined (Mekong Agreement, Art. 5–7). They relate largely to intra- and inter-basin use of the Mekong’s water, related harmful effects, and when and under which conditions these are to be discussed with co-riparian states. In order to implement these principles and provisions, Procedures for Notification, Prior Consultation and Agreement (PNPCA) have been developed. These PNPCA foresee notification of consultation with or agreement by other riparian states on water resources projects developed by one of the MRC member states, depending on its respective influences on the river.

The PNPCA were brought to a serious test in 2010, when the National Mekong Committee of the People’s Democratic Republic of Lao submitted the XHP for notification and consultation to the MRC. The XHP was the first mainstream hydropower project submitted to the MRC for consideration. It was therefore the first instance at which the consultation dimension of the PNPCA—and hence a rather complex process—was triggered.

With the official notification by Laos, a period of 6 months was open for analyzing the documents submitted by Laos and gathering additional information that would allow to come to a conclusion concerning the potential impacts of the project on the Mekong River and other riparian states (and thus the question of potential transboundary harm) and determining the responsibility of Laos for such harmful transboundary effects (Mekong Agreement, Arts. 7 and 8).

The MRC Secretariat facilitated this process (for the roadmap see Fig. 18.4) leading to a Prior Consultation Review Report (MRC 2011a). The process was led by the PNPCA Task Group, bringing together the MRC Secretariat and MRC



**Fig. 18.4** Road map of procedures for notification, Prior Consultation and Agreement (PNPCA) regarding the Mekong mainstream hydropower scheme of Xayaburi—Lao PDR (MRC 2011c)

Programs in their work on the report. The Task Group was supported by external Expert Groups comprising regional and international experts, focusing on fisheries and sediments—the most critical issues—respectively. MRC and external experts based their assessment on the *Preliminary Design Guidance for Proposed Mainstream Dams in the Lower Mekong Basin* (PDG; MRC 2009). As endorsed by the MRC Joint Committee in 2009, the PDG allowed an objective cross-check regarding possible impacts of the XHP on the key elements of (1) hydrology; (2) fish passage and fisheries ecology; (3) sediment transport, morphology, and nutrient balance; (4) water quality, ecosystem health, and environmental flows; (5) navigation; and (6) safety of dams. In addition, social aspects as well as the dam design itself have been investigated, reviewed, and analyzed regarding eventual impacts. The PNPCA process also ensured the involvement of MRC member countries as well as a consultation of public stakeholders (in all but one countries).

The resulting Prior Consultation Review Report aimed to provide support and technical information on the project and its potential impacts on the river to the MRC's Joint Committee (JC), which is responsible for reaching a joint conclusion regarding the outcome of the notification process and, thus, the project. It presents a comprehensive analysis of all dimensions of potential transboundary impacts—including areas that could not be studied sufficiently and thus require further investigations. The report came to the conclusion that there were significant shortcomings of the XHP with regard to various dimensions. This included, for instance, bypasses for fish migration, mechanisms for ensuring sediment transport, dam safety, and other issues relating to the design of the dam. The report also identified significant data gaps and recommended the establishment of environmental baselines and continuous monitoring of the project's impacts before, during, and after its potential construction.

During its development, the report was discussed in three MRC JC Working Group Meetings before becoming part of the JC's formal meeting in April 2011. The JC could, however, not come to a joint decision in line with the procedural requirements of the MRC's PNPCA. Specifically, the JC did not jointly decide on whether to agree to the project, decline it, or extend the consultation process. It therefore transferred the decision to the MRC Council, the MRC's highest governing body. The Council, at its meeting in December 2011, could also not come to a conclusion. Since then, the process has neither been officially terminated nor did it continue to actively exist. This left both the process itself as well as much of MRC in a limbo situation.

Laos did, however, consider the process as completed and initiated the construction of the project in November 2011. This led to severe protest from other riparian states, namely, Cambodia and Vietnam. Vietnam had already stated in its official reply to the Prior Consultation Review Report that it “strongly suggests that the decision on the XHP as well as other planned hydropower projects on the Mekong mainstream [should] be deferred for at least 10 years” (MRC 2011b) and continued to raise this issue repeatedly since then.

Until today, the process has not been terminated, and the MRC member countries have not reached a formal decision yet. Instead, Laos drew its conclusion and

continued the construction of the dam (with finalization expected for 2019), and Cambodia and, in particular, Vietnam continued their protests and engaged in other activities trying to assess and potentially mitigate the negative transboundary effects they expect. This clearly demonstrates the third challenge that prior notification and consultation processes often have to cope with. That is that the perceptions of the conclusions from a notification and consultation process (often not even officially terminated) tend to vary considerably across the countries involved. This is often linked to the fact that the possible outcomes of such processes are not clear to all parties beforehand—especially since downstream and potentially affected states tend to see such notification and consultation mechanisms as means for voicing their veto against a project, while upstream states often tend to be critical toward interference in their water resources development activities.

In addition to notification-specific challenges, this example from the Mekong also illustrates that joint river basin management and related activities are crucial for ensuring the long-term sustainable and cooperative development of shared river basins. Solid knowledge of the status of a river basin as well as joint basin planning activities can ensure that riparian states to a shared basin are informed about each country's development plans early on in the process and it can, moreover, help countries to choose projects that provide the most benefits to all riparian states and the basin while producing the least negative effects. And it demonstrates that insufficient processes of river basin management can significantly hamper the sustainable development of the basin and the relations between riparian countries more generally.

## 18.5 Conclusion

This chapter has shown that riparian states to transboundary rivers tend to choose cooperation over conflict. But it has also shown that they only do so—especially over longer periods of time—if they have functioning cooperation mechanisms in place that allow for generating and harvesting the benefits of cooperation for all. In addition to basic cooperation structures (international water treaties and RBOs), joint river basin management with its various dimensions and approaches is one of the key means for harvesting these cooperation benefits. Joint river basin management helps to establish joint visions and management objectives through which riparian states cooperate and streamline their activities toward common aims, thereby including both regional and national actors. Joint river basin management allows for identifying and defining key water management issues that need to be addressed by all riparian states, including issues relating to potential transboundary impacts of water resources development projects in one state on its neighbors and thus potential sources of future conflict. And joint river basin management supports monitoring and data acquisition and sharing, establishing a common and transparent ground for all riparian states (and potentially other actors) involved.

At the same time, transboundary river basin management is facing a number of challenges, not only relating to the mechanism of basin management itself (and thus, for instance, to the human, technical, and financial capacity required for effective basin management) but also to the broader context of transboundary water cooperation. Three challenges appear to be particularly problematic in this regard: firstly, the fact that national interests of basin-sharing countries often differ or even are in outright conflict makes the management of water resources across borders very problematic. Consequently and secondly, riparian states often pursue infrastructure development projects that exclusively meet their national (short-term) development needs and do not consider transboundary negative effects on other riparian states. And thirdly, even if states acknowledge that cooperation is more beneficial for their interests as well as the entire basin and, hence, establish legal and institutional mechanisms for cooperation, conflicts of interests may arise due to the different degrees to which agreements are legally binding at the national and the international levels. While national implementation in water resources management is usually legally binding, the enforcement of international RBMPs is vague. Hence, successful implementation and related compliance on the international level remains challenging.

In spite of these severe challenges, academic research as well as empirical evidence clearly demonstrates that long-term cooperation benefits prevail over potential short-term gains from noncooperative behavior—not only for the basin, its resources, and its ecosystems but also for riparian people and states as a whole. River basin management approaches and RBMPs that consider long-term planning and implementation can further improve cooperation. However, besides formally agreed mechanisms for cooperation and coordination, essential prerequisites are cooperation, will, and trust between countries sharing a basin. In case the latter aspects are lacking, transparent river basin management (see Chaps. 15 and 16) can be used as a tool to build these aspects as foundations for better formulation and implementation of policy, law, and, eventually, sustainable development of river basins and riparian states.

## References

- Agreement for the Full Utilization of the Nile Waters (1959) Agreement between the Republic of the Sudan and the United Arab Republic for the full utilization of the Nile waters, Cairo, Egypt, 8 Nov 1959
- Asia Times (2010) Then the Mekong runs dry. *Asia Times*, 13 Mar 2010
- Blumstein S, Schmeier S (2016) Disputes over international watercourses: can river basin organizations make a difference? In: Dinar A et al (eds) *Management of transboundary water resources under scarcity: a multi-disciplinary approach*. World Scientific, Hackensack, NJ
- Burton M, Molden D (2005) Making sound decisions: information needs for basin water management. In: Svendsen M (ed) *Irrigation and river basin management. Options for governance and institutions*. CABI, Wallingford, pp 51–74

- Chenoweth J, Feitelson E (2001) Analysis of factors influencing data and information exchange in international river basins: can such exchanges be used to build confidence in cooperative management? *Water Int* 26(4):499–512
- De Stefano L, Edwards P, DeSilva L, Wolf A (2010) Tracking cooperation and conflict in international river basins: historic and recent trends. *Water Policy* 12(6):871–884
- Delli Priscoli J, Wolf A (2009) *Managing and transforming water conflicts*. Cambridge University Press, Cambridge
- Economist (2012) Water wars in Central Asia. Dammed if they do – spats over control of water oil an already unstable region, 29 Sept 2012
- European Commission (2000) 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. <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0060>. Accessed 15 June 2016
- European Commission (2003) Guidance document no 3 – analysis of pressures and impacts of the common implementation strategy for the water framework directive. Produced by the working group 2.1 – impress. Office for Official Publications of the European Commission, Luxembourg, pp 13–14
- European Commission (2012) Comparative study on pressures and measures in the major river basin management plans in the EU, Task 1 – governance (final report) including Task 1b on international coordination mechanisms 2012, European Commission Directorate General Environment and Climate Action
- Farajota M (2005) Notification and consultation in the law applicable to international watercourses. In: Boisson de Chazournes L, Salman S (eds) *Les ressources en eau et le droit international*. Martinus Nijhoff, Leiden, pp 282–339
- Giordano M, Wolf A (2003) Transboundary freshwater treaties. In: Nakayama M (ed) *International waters in Southern Africa*. UN University Press, Tokyo, pp 71–100
- GIZ (2017) River basin management. The development and implementation of river basin management plans. GIZ, Eschborn
- ICPDR (1994) Convention on cooperation for the protection and sustainable use of the Danube River (Danube River Protection Convention), 29 June 1994 in Sofia, Bulgaria. [www.icpdr.org/icpdr-pages/legal.htm](http://www.icpdr.org/icpdr-pages/legal.htm)
- ICPDR (2002) Technical report on the joint Danube survey, International Commission for the Protection of the Danube River, Vienna. [www.icpdr.org](http://www.icpdr.org)
- ICPDR (2005) The Danube river basin district – river basin characteristics, impact of human activities and economic analysis required under article 5, annex II and annex III, and inventory of protected areas required under article 6, annex IV of the EU water framework directive (2000/60/EC). Part A – basin wide overview. Short: Danube basin analysis (WFD Roof Report 2004), Document IC/084 of the International Commission for the Protection of the Danube River, Vienna. [www.icpdr.org](http://www.icpdr.org)
- ICPDR (2007a) Summary report to EU on monitoring programmes in the Danube river basin district designed under article 8 – part I; WFD roof report on monitoring – part I: surface waters. Development of WFD compliant monitoring programmes for the Danube river basin district document 122 of the International Commission for the Protection of the Danube River
- ICPDR (2007b) Summary report to EU on monitoring programmes in the Danube river basin district designed under article 8 – part I; WFD roof report on monitoring – part II: groundwater. Development of WFD compliant monitoring programmes for the Danube river basin district document 122 of the International Commission for the Protection of the Danube River
- ICPDR (2008a) Technical report on the joint Danube survey. International Commission for the Protection of the Danube River, Vienna. [www.icpdr.org](http://www.icpdr.org)
- ICPDR (2008b) Significant water management issues in the Danube river basin district: including visions and management objectives for each SWMI; document 132 of the International Commission for the Protection of the Danube River, Vienna

- ICPDR (2009) Danube river basin management plan 2009. <http://www.icpdr.org/main/activities-projects/danube-river-basin-management-plan-2009>
- ICPDR (2014) Technical report on the joint Danube survey. International Commission for the Protection of the Danube River, Vienna. [www.icpdr.org](http://www.icpdr.org)
- ICPDR (2015) Danube river basin management plan 2015. <https://www.icpdr.org/main/activities-projects/river-basin-management-plan-update-2015>
- ICPDR (2016) Terms of references and work plans for the ICPDR expert groups. <https://www.icpdr.org/main/publications/tor-workplans>
- ICPR (2011) Beschlussprotokoll der SG(1)-11-Sitzung, Koblenz, 2 Mar 2011 (restricted document)
- Islar M, Ramasar V (2009) Security to all: allocating the waters of Euphrates and Tigris'. Paper presented at the 2009 Amsterdam conference on the human dimensions of global environmental change, Amsterdam, 2–4 Dec 2009
- Leb C (2010) The Tigris-Euphrates joint technical committee – deadlocked, IUCN water programme: NEGOTIATE toolkit case studies, Gland
- McIntyre O (2011) The world court's ongoing contribution to international water law: the pulp mills case between Argentina and Uruguay. *Water Altern* 4(2):124–144
- Mostert E (2003) Conflict and cooperation in international freshwater management: a global review, Paris: UNESCO: IHP Technical Document in Hydrology No. 19
- MRC (2009) Preliminary design guidance for proposed mainstream dams in the lower mekong basin (PDG). Vientiane, Lao PDR: MRC Secretariat. [www.mrcmekong.org/assets/Publications/Consultations/SEA-Hydropower/Preliminary-DG-of-LMB-Mainstream-dams-FinalVersion-Sept09.pdf](http://www.mrcmekong.org/assets/Publications/Consultations/SEA-Hydropower/Preliminary-DG-of-LMB-Mainstream-dams-FinalVersion-Sept09.pdf)
- MRC (2010) Op-Ed: low River levels caused by extreme low rainfall. Vientiane, Lao PDR, MRC Secretariat
- MRC (2011a) Prior consultation review report regarding the Xayaburi hydropower dam project under [www.mrcmekong.org/news-and-events/consultations](http://www.mrcmekong.org/news-and-events/consultations)
- MRC (2011b) Reply to prior consultation. Submitted by the Vietnam National Mekong Committee, Hanoi, Vietnam, 15 Apr 2011
- MRC (2011c) PNPCA road map regarding the Mekong mainstream hydropower scheme of Xayaburi. <http://www.mrcmekong.org/news-and-events/consultations/xayaburi-hydropower-project-prior-consultation-process/>
- Newsweek (2015) The world will soon be at war over water. *Newsweek*, 24 Apr 2015. <http://www.newsweek.com/2015/05/01/world-will-soon-be-war-over-water-324328.html>
- Pietersen K, Beekman H (2008) Strengthening cooperation among river basin organizations: a comparative study of the linkages between river/lake basin organizations and the respective cooperating national governments in seven major African basins. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ). Eschborn, Germany
- Radio Free Asia (2012) Lao expert blames Chinese dams. *Radio Free Asia/Voice of Asia*, 30 Apr 2012
- Reuters (2012) U.S. intelligence sees global water conflict risk rising, 22 Mar 2012
- Rieu-Clarke A (2013) The obligation to notify and consult on planned measures concerning international watercourses – learning lessons from recent case law. *Yearbook of International Environmental Law*
- Rieu-Clarke A, Moynihan R, Magsig G (2012) UN watercourses convention – user's guide (CWLPS 2012)
- Sächsische Zeitung (2016) Neuer Anlauf für Elbe-Staustufe. Prags Behörden legen eine neue Dokumentation zum umstrittenen Projekt vor, 21 Mar 2016. <http://www.sz-online.de/sachsen/neuer-anlauf-fuer-elbe-staustufe-3352694.html>
- SADC (2000) Revised protocol on shared watercourses in the Southern African Development Community, Windhoek, Namibia, 7 Aug 2000
- Schmeier S (2013) Governing international watercourses. River basin organizations and the sustainable governance of internationally shared rivers and lakes. Routledge, London
- Schmeier S, Gerlak A, Blumstein S (2015) Clearing the muddy waters of shared watercourses governance: conceptualizing international river basin organizations. *Int Environ Agreem* 16(4):597–619. <https://doi.org/10.1007/s10784-015-9287-4>

- Senegal River Convention (1972) Convention Relative au Statut du Fleuve Sénégal/Convention concerning the Status of the Senegal River (Senegal River Convention)', Nouakchott, Mauritania, 11 Mar 1972
- Sohnle J (2005) Nouvelles tendances en matière de règlement pacifique des différends relatifs aux ressources en eau douce internationales. In: Boisson de Chazourmes L, Salman S (eds) Les ressources en eau et le droit international. Martinus Nijhoff, Leiden, pp 389–426
- Spiegel (2012) US-Bericht warnt vor Ära der Kriege um Wasser. Spiegel Online, 22 Mar 2012
- The Guardian (2012) Water wars between countries could be just around the corner. Davey warns, 22 Mar 2012
- Treaty on the Lesotho Highlands (1986) Highlands treaty on the Lesotho Highlands Water Project between the Government of the Kingdom of Lesotho and the Government of the Republic of South Africa (LHWC Treaty)', Maseru, Lesotho, 24 Oct 1986
- United Nations (1992) United Nations treaty collection, convention on the protection and use of transboundary watercourses and international lakes, Helsinki, 17 Mar 1992. [https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg\\_no=XXVII-5&chapter=27&lang=en](https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-5&chapter=27&lang=en). Accessed 15 June 2016
- United Nations (1997) United Nations treaty collection, convention on the law of the non-navigational uses of international watercourses, New York, 21 May 1997. [https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg\\_no=XXVII-12&chapter=27&lang=en](https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-12&chapter=27&lang=en). Accessed 15 June 2016
- Vientiane Times (2010) Shallow Mekong stops northern tourist, cargo boats. Vientiane Times, 2 Mar 2010
- Vogel B, Schmutz S (2015) Environmental impact assessment for cumulative impacts of hydro-power projects in Georgia, final report, project funded by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety and implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- Vogel B, Schmutz S (2016) EU approximation in the field of environmental impact assessment for cumulative impacts of hydropower projects in Georgia. Project funded by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety and implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- Voice of America (2016) Chinese dams blamed for exacerbating Southeast Asian drought. Voice of America, 1 Apr 2016
- Wolf A, Yoffe S, Giordano M (2003) International waters: identifying basins at risk. Water Policy 5:29–60
- WSV—Wasserstrassen- und Schifffahrtsverwaltung des Bundes (2016) Umweltverträglichkeitsprüfung für das Vorhaben Staustufe Děčín. Tschechische Republik, Magdeburg. [http://www.ast-ost.gdws.wsv.de/aktuelles/Staustufe\\_Decin/index.html](http://www.ast-ost.gdws.wsv.de/aktuelles/Staustufe_Decin/index.html)

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

