

When Regionalism Works: An Exploration of Design Elements and Contexts

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Abstract

In the past two decades, there has been a notable rise in cooperative efforts at the river basin level aimed to promote joint management and protection of international rivers. This paper examines a variety of comparative examples from around the world to ascertain characteristics of effective regionalized water management. The purported benefits of regionalism and approaches to the study of performance in regional water management are explored. We examine the presence and absence of four important design elements—transparency, scientific learning, conflict resolution, and public participation—in a variety of illustrative cases from around the globe. We uncover a gap in performance in regional water management. In part, this gap may be explained by unrealistic expectations around the effectiveness of river basin organizations and the widespread promotion of models of best practices that may be inappropriate in particular contexts. We conclude that a design features approach to understanding regionalized water management can benefit from an integration of political, economic, and social contextual factors.

Introduction

Regional cooperation around water resources is not new! Nations have been signing treaties, forming regional cooperative organizations, and engaging in joint water programs for centuries. Since the first international water treaty was signed concerning navigation rights on the Danube between Austria and Turkey in the early 1600s, more than 400 international water

treaties have been signed between riparian countries (Wolf 2004). Regional cooperation may be further institutionalized by the creation of river basin organizations (RBOs) designed to govern aspects of transboundary water resources management.

The idea of river basin management received considerable zeal with industrialization and development of technology for multipurpose river development (White 1969) and became manifest in 1933 with the Tennessee Valley Authority. This expert-driven model spread throughout the world (Mukhtarov 2007), and by the 1950s, RBO discourse came to be framed in the ideals of democracy, modernity, economic development, and part of the larger fight against communism (UN 1970; Ekbladh 2002; Turton et al. 2004). As non-navigational uses expanded in the latter half of the twentieth century, regional organizations acquired new responsibilities related to dam construction, water allocation, and pollution (Wescoat 1996).

Since the 1990s, there has been a notable rise in cooperative efforts at the river basin level aimed to promote joint management and protection of international rivers (Conca et al. 2006; Gerlak and Grant 2009). In the past two decades, both domestic and international RBOs have been established in virtually every region of the world (Barrow 1998; UNECE 2009; OECD 2011). There is great variety in the form and function of international RBOs around the world, constituting commissions, committees, and authorities (Lautze et al. 2013). River basin organizations are promoted by a host of international organizations, including the Global Environment Facility, the World Water Council, and Green Cross International (Cosgrove and Rjsberman 2000; Green Cross 2000; Uitto and Duda 2002; Gerlak 2004). Under the UN 1997 Convention on the Law of the Non-navigational Uses of International Watercourses, states are encouraged to establish joint mechanisms or commissions to facilitate transboundary cooperation. The Berlin Rules also promote basin-wide joint agencies or commissions to undertake the integrated management of international waters.

Regionally, there is also movement to promote river basin organizations in many parts of the world. For example, in South Africa, the South African Development Community (SADC) Water Protocol on Shared Watercourses (1995) calls for the establishment of river basin institutions. River basin institutions are on the rise in Europe today as well, as a result of the 1999 European Union Water Framework Directive, which aims to standardize water management practices in the region, and the UNECE Convention

on the Protection and Use of Transboundary Rivers and International Lakes of 1992, which mandates multilateral agreements and the establishment of joint bodies (Barraqué and Mostert 2006; UNECE 2009). To promote exchange between river basin organizations and facilitate regional networks of basin-level organizations, the International Network of Basin Organizations (INBO) has emerged in recent years. Based in Paris, the network is hosted by the Office International de l'Eau, an organization mainly funded by the French water industry and the government (Molle 2008: 141).

In the wake of growing fragmentation and diffusion in water management (Hoff 2009; Gupta 2011), the creation of RBOs represent efforts to promote more centralized regional water management around transboundary rivers. To better understand the relative strengths of regionalized water management, this chapter examines a variety of comparative examples from around the world. By doing so, we are able to ascertain characteristics of effective regionalized water management.

The first section of the paper examines the purported benefits of regionalism and how benefits have been historically framed based on the dominant discourse and governance trends of the day. The second section outlines questions of effectiveness and performance in regional water management. To better understand regionalized water management in practice, we then examine the presence and absence of four important design elements—transparency, scientific learning, conflict resolution, and public participation—in a variety of illustrative cases from around the globe. In the final section, we discuss the gap in performance uncovered by this research and suggest how a more contextual approach might help us to better understand gaps in performance that stem from variations in design and implementation. Ultimately, this understanding can better inform regionalized water management.

Unpacking the Benefits of Regionalism

Regional water management organizations at the river basin level are purported to offer a variety of benefits. They are thought to promote cooperation between upstream and downstream states, help standardize water policies across states, and serve as a form to bring between areas like flood protection, regional planning, wastewater treatment, water supply, and hydropower generation (Pahl-Wostl 2007: 55). If they appropriately coincide

with the boundaries of the river basin, they can help overcome many of the collective action problems associated with transboundary resource management and promote information sharing (De Lange et al. 2005). In addition, regional cooperation over water resources is thought to provide significant ecological and pollution control benefits (Sadoff and Grey 2002).

The benefits of regionalism are relative to the degree and depth of cooperation and institutionalization. Broadly speaking, RBOs vary in their form and function, representing advisory committees, authorities, associations, commissions, councils, corporations, tribunals, trusts, and federations (Gupta 2009). In the Danube River basin, for example, the highly institutionalized International Commission for the Protection of the Danube is credited with helping to facilitate cooperation among riparian states, lessen the divide between states in a post-Cold War political climate, and strengthen democratic institutions in the former communist bloc (McNally and Tognetti 2002: 21).

Historically, benefits of regionalism have been framed based on the dominant discourse and governance trends of the day. Today, RBOs are in good currency; the belief in the utility of RBOs is firm and RBOs are prominent in the contemporary debates on water governance (OECD 2011). Generally, the appeal of RBOs is broad. In part, it reflects a renewed interest in the river basin as the ideal scale for water management (Barrow 1998; Molle and Wester 2009: 5). According to engineer and international water scholar Peter Rogers (1997: 45), RBOs are popular in economic and planning literature because they reflect the notion of internalizing externalities by analyzing the river basin as a single unit.

The promotion of RBOs as a tool for regional water management also reflects notions of good governance. Some recent research examining global water discourse and governance highlights the role of transnational policy entrepreneurs, particularly global knowledge networks, in producing and maintaining the global discourse of RBOs through the development of knowledge, development assistance projects, global water meetings and publications (Mukhtarov and Gerlak 2013). For example, the International Law Association, a global knowledge network composed of academics and practitioners, promotes RBOs as central to good governance practices, including transparent decision-making, the rule of law, and non-state participation (Hilderling 2004: 89). For others, like the Global Water Partnership, the World Water Council, and numerous academics, institutions at

the river basin level help achieve Integrated Water Resource Management (IWRM), an approach to water management that aims at holistic and multi-level governance of water and related resources (Hooper 2005, 2010; Global Water Partnership 2000; Serageldin et al. 2000). The World Water Council (2012) recently reported that strengthening regional cooperation can better achieve water security and economic development.

International environmental NGOs, like the World Wildlife Fund, Green Cross International, and the International Union for Conservation of Nature, also advance RBOs as a vehicle for conservation and integration (McNally and Tognetti 2002; WWF 2002; Green Cross 2000: 14; Aguilar and Iza 2011). An important attraction of RBOs to NGOs is the potential participatory venue, or vehicle for bottom-up planning (Warner et al. 2008: 131; NGO Forum 2005). In many regions of the world, the appeal is quite simply money. IGOs and government-based development organizations, as well as global knowledge networks, leverage material and nonmaterial incentives such as donor conditionality to get actors “buy into” the RBO discourse and governance approaches (Mukhtarov and Gerlak 2013).

Effectiveness and Performance in Regional Water Management

Effectiveness and performance often fall short of promise in the eyes of both practitioners and scholars. There remains no single approach to studying effectiveness in regional water management. At its best the case research is descriptively rich and detailed. At its worst, it is narrowly construed and piecemeal, capturing mere snapshots in time. Although it has been more than a decade since international relations scholar Thomas Bernauer (2002: 2) observed that we have very limited knowledge of the nature and extent of variation in the performance of existing international river management schemes, the finding remains largely true today. Governance mechanisms and their effects in international water management are still not well understood (Riekerman et al. 2006).

The case research reveals some notable limitations in regionalized water management. In the case of the Joint Technical Committee in the Euphrates-Tigris River basin, researchers have found that it has been limited in its achievements and has not fulfilled its expressed aim of coordinating the development and use patterns of the three riparians, leading to further

conflict and crises in the basin (Kibaroglu and Ünver 2000; Mostert 2005: 33; Islar/Ramasar 2009: 12). The Niger Basin Authority has been criticized as a paper tiger, meeting few of its stated goals over the past two decades (Bernauer 1997: 159; Lautze et al. 2005: 26; Rangeley et al. 1994: 18). So too has the Indo-Bangladesh Joint Rivers Commission, a commission between India and Bangladesh dating back to the early 1970s to help manage and resolve disputes along the Ganges River, been criticized for failures in implementation (Nishat and Faisal 2000: 299; Kliot et al. 2001: 306). Some argue that the Mekong River Commission has been unable to effectively manage water development (Backer 2007: 44; Ha 2011: 125); others point to worse ecological conditions in the Mekong River Basin, despite the long-standing presence of transboundary cooperation (Sneddon and Fox 2006: 183).

Over the past decade, some momentum has been building toward more comparative studies designed to more fully understand effectiveness in regionalized water management (e.g., Nakayama 1997; Kliot et al. 2001; Marty 2001; Rieckermann et al. 2006; Verwijmeren and Wiering 2007; Siegfried and Bernauer 2007; Dombrowsky 2008; UNEP 2009; Schmeier 2012). Schmeier (2012), for example, takes an institutionalist approach to examine the effectiveness of river basin organizations that includes a comparative look at the nature of the problem, the constellation of actors, and factors of institutional design. Dombrowsky (2008) studies a smaller number of RBOs to better understand the depth of integration including questions of RBO membership and scope. Siegfried and Bernauer (2007) offer an approach that focuses on causal effects and problem solving, and produces quantitative assessments that are comparable across cases of river management. Even some more traditional studies of river treaties in international relations scholarship are calling attention to questions of institution design (Stinnett and Tir 2009).

As a result of this evolving body of research, we are learning that both the presence and absence of particular governance features help to explain effective regional water management. Notably, there is a growing recognition that institutions can perform effectively only when they include certain governance mechanisms for conflict resolution, allow for public participation, include access to reliable expert knowledge to address the issues at hand, and incorporate rules or mechanisms that acknowledge uncertainty or are flexible under changing circumstances (Rogers and Hall 2003; Wolf 2007; Raadveger 2008; Bernauer and Kalbhenn 2010). The absence of such

mechanisms may lead to inflexible or unenforceable decisions that fail to garner local support (Cassar and Mock 2003). Further, how elements, like legitimacy, representativeness, leadership, and comprehensiveness, are performed and how their interaction is coordinated are thought to be of critical importance in terms of effectiveness in water governance (Pahl-Wostl et al. 2013).

Increasingly, scholars are calling attention to the broader context in which institutions are shaped and governance plays out. According to Oran Young (2002: 5), the institutional design needs to be compatible with the bio-geophysical systems in which they operate. The design must also be “sensitive to and reflective of” the political, economic, and social contexts in which they operate (Myint 2003: 292). For Helen Ingram (2011), a contextual approach to water management takes into account the “history, culture and sense of place, and suggests that mixed strategies that appeal to multiple values and fit into local circumstances are more appropriate.” There is growing recognition in water governance research that context shapes collaboration, innovation, and on-the-group implementation of projects and policies (De Boer et al. 2013). In terms of regionalized water cooperation, a contextual approach may better inform variation in design and implementation and call attention to interrelationships between factors related to performance.

A Process-Design Approach

Drawing from a diverse literature on social and ecological systems, international institutions, common-pool resources, and international waters, some recent research (Berardo and Gerlak 2012) explores conditions under which institutions are more likely to foster meaningful cooperation in the management of shared rivers. Effectiveness can be examined at two levels: first, a broader level focused on the interstate agreement itself; and second, a level addressing the process design elements.

The first level of effectiveness speaks to the interstate agreements that commonly govern international rivers, which in turn structure and shape the relationships among all parties involved in the use of the common resource. Interstate agreements may establish RBOs to serve as venues for state interaction and assist with information exchange and the achievement of settlements (Haftendorn 2000: 66–67; Schmeier et al. 2013). Under

this first level of effectiveness we also include process design, which refers to the complex internal negotiations that usually take place inside new institutions to decide how, when, and under what conditions the parties interact. Various studies highlight different “process” dimensions that affect the nature of adopted rules and regulations in the context of interstate agreements around shared waters (Hamner and Wolf 1998; Jägerskog and Phillipp 2006; Kistin et al. 2009; Stinnett and Tir 2009; Gerlak et al. 2011).

Process design in turn affects how states shape the design elements at the second level of effectiveness, which can also be thought of as process challenges that must be continuously faced to ultimately achieve collaborative solutions to problems in the river basin. Process design elements associated with effectiveness in river basin management include transparency, scientific learning, conflict resolution, and public participation.

To better understand regionalized water management in practice, it is important to examine the presence and absence of these four design elements in a variety of cases. The goal is to examine a broad array of cases from around the globe to probe for common patterns or insights that can better inform regionalized water management. Next, we delve deeper into the four design elements and offer illustrative case examples.

Transparency

In the context of transboundary watercourses, public access to information ensures that citizens and other members of civil society have the ability to request from governmental and intergovernmental authorities information on the status of the watercourse and its tributaries (including water flow and water quality), factors that could affect the watercourse or its tributaries, and norms, policies, and management plans that shape activities relevant to the watercourse (Bruch 2000). Increasing transparency is a fundamental step to tackle noncompliance among member states (Mitchell 1994) and also to give private citizens in some parts of the world recourse to redress on unfair actions or incompetence of the executive authority (Asian Development Bank 1995).

In the context of institutions that deal with complex water issues that cross political boundaries, transparency increases the ability of multiple participants to understand the inner workings of the decision-making process that affects the management of the natural resource. This means that in an institutional setting where a given watercourse is managed, information

of a technical and legal nature should be available to all interested parties (Bruch 2000). Transparency allows for all actors involved, including policy makers, scientists, and the public, to have the potential to examine the functioning of the organization (Berardo and Gerlak 2012).

Several water reports in the past decade highlight concerns about transparency in water governance. According to UNESCO (2009: 57), the water sector has been historically plagued by “lack of political support, poor governance, under resourcing and underinvestment” which is manifested in nontransparency and lack of accountability. Transparency International’s *Global Corruption Report 2008* chronicles limited oversight capacity and widespread corruption in water development projects. Capacity building activities should be based on a principle of openness and accessibility, according to the UNDP (2008: 8). New tools are needed in the contracting process to provide for a transparent and accountable process that is free from corruption (Water Integrity Network and Transparency International 2010). In the context of regionalized water management, transparency in management and decision-making can mean transparency of public investments and monitoring of government and RBO activities.

In some cases there is a good deal of transparency in terms of annual reporting, access to meeting minutes, and organizational reports. The International Commission for the Protection of the Danube River, for example, has a fairly extensive and accessible website (<http://www.icpdr.org/main/danube-basin>) that includes summaries of meetings and many subgroup reports and papers. Member states of the International Commission for the Protection of the Rhine report regularly to the ICPR on the legislative, regulatory, and other measures, and the ICPR submits an annual activity report to the member states and informs the public on the state of the Rhine and the results of its work (Burchi and Spreij 2003: 44). In contrast, the Joint Rivers Commission, created by India and Bangladesh for sharing the Ganges River, reports very little information about their operations or activities publicly (Nishat and Faisal 2000: 301). Further, even when there is fairly good public access and transparency in operations, as in the case of the Mekong River Commission, negotiations and deals made outside of the forum of the RBO hinder transparency. For example, announcements of bilateral agreements in recent years between several states in the Mekong River basin (including between Lao PDR and Thailand and between Lao PDR and Viet Nam) for dams on the main stem of the river along with

private contracts agreed by these states have called into question the lack of transparency in planning processes (Molle et al. 2009).

Transparency can also be exhibited by the monitoring of financial expenditures and records. Public expenditure reviews are one tool to review spending and increase the accountability and transparency of results (UNESCO 2009: 10). Financial transparency, by way of access to banking records of multinational companies involved in water development projects of the Lesotho Highlands Development Authority, proved critical in prosecutions there (Stålgren 2006; Earle and Turton 2005). The Project represents the largest international water transfer in the world, designed to provide extra water to the city of Johannesburg, South Africa, by transferring water from the Orange to the Vaal River. In this instance, the chief executive of the Authority was ultimately charged and convicted (with an 18-year prison term reduced to 15 years, on appeal) on bribery and fraud charges for the way construction contracts were awarded for the project. The state of Lesotho subsequently brought charges against several foreign construction companies working on the project, several of which have been successfully convicted of bribery. Ultimately, transparency in financial practices is an important and necessary element of financial sustainability as part of larger RBO performance and effectiveness (Hooper 2005: 31).

Scientific Learning

Another factor involves the production and dissemination of scientific knowledge. Fostering the development of a base of commonly accepted scientific knowledge is one of the most important contributions that governance arrangements can make, since scientific learning is critical for the successful management of complex ecosystems (Rogers and Hall 2003; Wolf 2007; Underdal 2008; Bernauer and Kalbhenn 2010; Gunderson and Holling 2002). Design features that support information management processes and the flow and production of information are thought to be important design features (Eakin and Lemos 2006). Jointly managed and integrated databases, often organized around GIS mapping, common monitoring protocols, and jointly developed ecosystem models, provide the technical platform for the scientifically informed knowledge base that is characteristic of successful ecosystem management initiatives (Karkkainen 2006: 229).

The sharing of data is thought to develop collaboration and friendship between experts and technicians in the basin (Nishat and Faisal 2000: 300).

Further, joint and transparent information acquisition and interpretation can help to develop a sense of reciprocity between states and mutual assurance of joint compliance (Burton and Molden 2005) and diminish asymmetries in information that can undermine cooperation (Sadoff et al. 2008: 31). Open access to information and data sharing processes are essential to monitoring practices (Stinnett and Tir 2009) and to adaptive, integrated management of water resources (Timmerman and Langaas 2004).

The production and dissemination of scientific knowledge is necessary to promote scientific learning in regionalized water management. Under the Okavango River Basin Water Commission (OKACOM) Protocol on Hydrological Data Sharing (2010), OKACOM monitors water level, water discharge, water quality, sediment transport, and meteorological data of the Okavango River, aiming at using it for “sustainable integrated river basin planning, decision making and management” (OKACOM Protocol, Preamble). In the Lake Victoria Basin, the Lake Victoria Basin Commission (LVBC) Protocol requires the LVBC and member states to exchange information with the public and promote awareness of sustainable water resources use, which they do so through National Focal Points (LVBC Protocol, Articles 24 and 37). If a member state receives a request from another for information that is not readily available, the requesting member state can be asked to cover the costs associated with collecting and processing the data. Further, the exchange of information or data does not extend to information that is protected under the laws of the member states or any international treaty to which a member state is a party (LVFC Protocol, Article 24).

One of the more established practices for scientific learning can be found in the Rhine River basin. Here, under a detailed framework, the International Commission for the Protection of the Rhine (ICPR) monitors the state of the basin, gathering information on water pollution levels measured by more than 100 monitoring stations along the river (ICPR 2007). This allows for tracing the intrusion of pollutants into the river and observing changes in the river’s pollution level. But in some cases, like for the Joint River Commission along the Ganges-Brahmaputra-Megna System between India and Bangladesh, regular collection and sharing of data is lacking, which results in ineffectual management, among other things, in suboptimal flood forecasting (Nishat and Faisal 2000).

But it is not just a process that is necessary to support scientific learning. Political support and capacity are critical elements to scientific learning.

Consider the Mekong River Commission, an RBO characterized by a highly developed data and information sharing system that allows for gathering, processing, and disseminating data (Backer 2006; Schmeier 2012). The MRC is credited with data and information exchange for both ecological issues related to hydrology, biodiversity, fisheries and socioeconomic and development in the basin in the form of the State of the Basin reports. Its flood-specific early warning systems are well-respected. Yet, limited capacity in some states, such as Laos and Cambodia, hampers data acquisition and analysis. Moreover, data and information sharing with nonmember states has proven particularly difficult, significantly hindering integrated river basin governance in the Mekong River basin. The lack of data from upstream stretches of the river has presented an obstacle to basin-wide modeling (Schmeier 2012).

Conflict Resolution

Conflict resolution mechanisms are seen as important for ensuring that institutional actors can address their differences, overcome conflict, and sustain cooperation (Ostrom 1990; Hansen et al. 2008). Once an initial agreement is reached among states on the need to jointly manage an international river, successful implementation is dependent not only on the terms of the agreement but also on an ability to enforce those terms (Wolf 1997; Stinnett and Tir 2009). Better enforcement of rules reduces transaction costs, which in turn “frees” resources that can be used for the establishment of cooperative activities (Hensel et al. 2006).

Many times, however, the terms that govern the interactions among actors are contested or are not clear enough for a plurality of participants in the institution. When this happens, conflict is likely to erupt and institutions must overcome it through the use of effective conflict-management techniques (Hansen et al. 2008). Conflict resolution mechanisms can support robust institutions because they can foster adaptive governance (Dietz et al. 2003). This is because these mechanisms allow actors to evaluate and interpret rules, and ultimately revise them to better meet new or changing conditions, clarify ambiguous agreements and thereby, promote greater compliance (Chayes and Chayes 1995). Further, the ability to draw on conflict resolution mechanisms can guide members through periods of high tension (Zawahri 2008: 466). While mechanisms to settle disputes can be varied, the most common are direct negotiations, nonbinding mediation, or

binding arbitration or adjudication by an international institution (Elhance 2000; Cosgrove 2003).

Conflicts in regionalized water management tend not to be isolated and rare. But the mere presence of a river basin organization is not enough to preclude conflict between states. Consider the Ganges River basin, where conflicts date to the 1970s following the creation of the IJBC, well into the 1990s, and more recent years around diversions and water development schemes (Gleick 2009). In the case of the Euphrates–Tigris River basin, meetings of the Joint Technical Committee on Regional Waters (JTCW) failed to provide workable solutions and conflict resolution (Islar 2009). In part, some researchers suggest this is the result of inadequate financial and technical capacities (Kibaroglu 2002).

The Permanent Indus Commission (PIC) offers an example of effective conflict resolution design and implementation. The PIC has detailed conflict resolution mechanisms where the commissioners first attempt to resolve disputes that arise (IWT, Articles VIII, IX; Annexures F and G). If they are unable to resolve the dispute, the matter is deferred to the member states' foreign secretaries for negotiation and then, if necessary, to a neutral expert for resolution and perhaps an appointed court of arbitration. In her research of the PIC, Zawahri (2008: 468) reports that since its formation, the PIC has resolved all but a couple of questions. This includes the size of agricultural land India can irrigate from the western tributaries, as well as a new method by which flood warnings are delivered to Pakistan. In a couple of matters, including the construction of the Salal dams and the Baglihar dam, the foreign secretaries and a neutral expert, respectively, helped the parties reach resolution.

Public Participation

Finally, effective water governance depends on ensuring wide participation throughout the collective process (Marty 2001; Rogers and Hall 2003: 28). Prior research suggests that it is through deliberation that divergent parties can develop trust and social capital, which are necessary conditions for collaboration (Adger 2000: 359; Bruch 2000; Gunderson et al. 2006). Mechanisms that allow for actors to share and deliberate new ideas and information with actors external to the institution, such as through public participation and advisory bodies, are thought to facilitate the adaptability of common pool resource and social-ecological systems (Ostrom 1990; Lebel et al. 2006), and

lead to more flexible decisions that are also easier to enforce (Cassar and Mock 2003; Wester et al. 2003). A lack of public participation may result in limited support for any agreement reached or may challenge implementation (Mostert 2003). Multiple design choices are available to address public participation (Fung 2003), but in transboundary water governance these mechanisms may range from the informal submission of comments at different stages of the decision-making process to more formal mechanisms that require public input as a component of planned management actions.

Nonstate actors, like community groups, community and individual rights holders, or water users, have historically been excluded from transboundary water governance (UN 2013: 7). In most cases, international organizations, international donors, and other government bodies have only observer status in river basin organizations (Mostert 2003). There are, however, a few exceptions to this, where international and national NGOs play a greater role in active discussions with the organization. Most of these instances are isolated to river basin organizations in Europe and North America (Schmeier 2012). For example, the ICPR along the Rhine is mandated to cooperate with NGOs relevant for the RBO's activities by sharing information and providing observer status at commission meetings (Rhine Convention, Article 14). The International Commission for the Protection of the Elbe organizes annual meetings between the RBO and NGOs from both member states.

Some research around public participation in RBOs suggests that they fail to provide a forum for public participation, offering little access to information and few mechanisms for broader stakeholder participation (Milich and Varady 1999; Schmeier 2012). For example, in the Orange River basin there are concerns that water management is too technocratic and top-down (Pahl-Wostl 2007). In our research of the pulp mills controversy along the Uruguay River, we uncovered the river basin organization's failure to channel in constructive ways the growing public sentiment (particularly on the Argentine side) that the mills could be pernicious for the health of the river's ecosystem (Berardo and Gerlak 2012: 114). In this case, the Administrative Commission of the Uruguay River, formed initially in 1975, did not provide a mechanism for public participation. In the wake of mounting public pressure and social protests over the construction of paper mills on the Uruguay side of the Uruguay River (i.e. the blocking of bridges between the two countries), the commission was unable to

adapt and provide a forum to resolve the conflict. Ultimately, the conflict reached the International Court of Justice. But the case highlights the need for change and adaptation in the organization's modus operandi to equip it better to face modern challenges. Like previous studies on water management have shown, collaborative practices that lead to cooperation heavily depend not so much on making sure all interests are represented, but on making sure all interests are represented before the decision-making process starts (Scholz and Stiffler 2005). Further, different forms of engagement are often necessary for different types of stakeholders (Sadoff et al. 2008).

A Gap in Performance in Regionalized Water Management

In examining several key design elements associated with effective regional water management, we can observe how the presence or absence of these factors plays out and ultimately impacts regional cooperation along transboundary rivers. Overall, this review reveals a mixed record. It finds that it is not the relative presence or absence itself that often makes the difference but rather the effective—or ineffective—implementation of the design feature in practice. Process design features are effective only to the extent that they are implementable. Implementation of process design elements like those studied here require the requisite political support as well as the appropriate administrative and technical capacity. Further, treaty design elements, associated with the first level of effectiveness, influence the implementation of the process design elements of transparency, scientific learning, conflict resolution, and public participation. As Fischhendler's (2008: 132) research points out, ambiguity in treaty design can be constructive by helping to bring a dispute to temporary closure but can also leave unresolved critical issues that negatively impact the relations between parties during the implementation and management phases of agreements.

The examples highlighted here from the diverse case research around transboundary waters suggest that the cases do not always bear out the purported benefits. This is partly because expectations for RBOs as a vehicle for regionalized water management may be too high. The expected functions of RBOs may simply be too ambitious or unrealistic (Jouravlev and Solanes 2008; Rangeley et al. 1994). In part, this tendency to overpromise and then under-deliver is the result of an inability to recognize important contextual factors that influence effectiveness. As Ruth Meinzen-Dick (2007: 15200) writes, "Over the past 50 years, a series of institutional

arrangements has been presented as panaceas to improve water management . . . Each of these approaches has failed to live up to expectations, largely because the variability of local situations and the difficulty of transplanting institutions from one place to another.”

This belief in a magic formula or panacea is manifest in the promotion of models of regional river basin management. Models of “best practices” demonstrate that a certain institutional design can serve as a blueprint for implementation. In the case of river basin organizations, the adoption of a model that has been successful elsewhere is more politically conducive than innovation (Molle 2008: 146). These models are attractive to national officials in that they offer possible solutions to complicated and problematic water management problems, and perhaps more importantly, they frequently come with significant donor investment (Molle 2008; Chambers 1997). Models also bring perceived legitimacy and thus may be used to justify a particular political agenda. For example, the French model for basin management has been used to support a pollution tax in Indonesia and new administrative budgeting processes in Brazil (Mollinga and Bolding 2004; Rap 2006). Historically, the Tennessee Valley Authority represents a classic best practice model, promoted by the U.S. Army Corps of Engineers and applied in various parts of the globe (Priscoli 2007; Ekbladh 2002). The Australian federal government widely supported the Murray-Darling River Basin Commission model thereby influencing developments in countries such as China, Sri Lanka, and Vietnam and contributing to the creation of the Mekong Basin Commission and its ongoing operations (Molle 2005).

This blind promotion of models of river basin management in part explains the gap in performance revealed in this paper. This Field of Dreams—“if we build it, they will come”—approach where donors and other transnational policy actors promote the argument that one organizational design and approach can be exported to other parts of the world sets up unrealistic expectations that are often not matched by on-the-ground outcomes. In his study of effectiveness in regional water management along the Rhine River, Erik Mostert (2009: 148) makes the argument that experiences along the Rhine cannot simply be applied or exported to other regions because of the role of critical contextual factors in the region, including regional economic cooperation, domestic legislation and technological innovation. He contends that the Rhine Action Plan worked in the basin only because the “low legal status was more than compensated by the political

and social pressure on the different Rhine governments to implement the plan” (Mostert 2009: 149). Myint (2003: 312) also explains the success of the Rhine in part due to how well the Rhine Action Plan fits with the political, social, and economic contexts in which it operates, particularly in contrast to earlier, less successful initiatives in the basin. Indeed, such a domestic context varies substantially in other parts of the world.

The design elements approach outlined in this paper helps to highlight general organizational principles on a more macro level that we know are important in the context of river basin planning and management. It offers a set of design elements specific to the context of transboundary, regionalized water management to be considered as we evaluate regional planning and management processes, design new processes and institutional structures, and modify or adapt existing institutions. The mixed record reported here suggests that the next steps might be to move beyond the general design criteria to ask, What are the contextual situations where one or more of these design features are important in supporting effective regionalized water management?

A more contextual approach can help us to better understand gaps in performance that stem from variations in the design and implementation of particular elements. Consider public participation, a design feature that has received considerable attention and support from those in the international water community in recent years. It is inconceivable to imagine anyone arguing against broad public participation in regional water management. Yet political scientists have long understood there to be decision rules around who participates—and how they participate—that are politically driven (Blomquist and Schlager 2005). Moreover, participation may be compulsory, top-down, or merely symbolic (Cooke and Kothari 2002). A more contextual approach would help uncover power differentials among populations of peoples and cultural barriers, allowing us to see differences in design and implementation that shape effectiveness. Or it might reveal the role of national or sub-national entities in contributing to the establishment of trust among stakeholders, leading to greater technical cooperation and improving coordination over shared waters once institutions are established (UN 2013: 8).

Scientific learning will also play out differently in varying river basin contexts. This is because knowledge processes are specific to particular communities and the context itself can support or undermine laws, institutions, and processes (Brugnach and Ingram 2012). In some cases lack

of capacity may hinder effective river basin management (UNDP 2008). This lack of capacity may result from an inadequate and unstable financial investment, but it may also stem from failures and gaps in technology and innovation (Le Marquand 1977; Kliot et al. 2001; Nakayama 1997). A more contextual approach would better reveal flaws in design or implementation around the production and dissemination of scientific knowledge given realities in capacity.

With regard to conflict resolution features, a contextual approach would allow us to think about how this design feature plays out differently in some basins versus others. For example, given that the upstream-downstream externality problems are more difficult to solve than collective (common pool resource) problems (Le Marquand 1977; Marty 2001), we might expect the conflict resolution mechanisms to be quite important in these basins to help even the playing field or minimize asymmetric challenges in the basin.

Similarly, the design and implementation of transparency features matters greatly based on the context. As Helen Ingram (2011) argues, "In situations of excessive bureaucratic control, designs with greater transparency and public participation are appropriate. However, transparency and openness are not by themselves useful in contexts of great economic and social inequity where the resources necessary to participate are out of reach to the disenfranchised." Rather, as Ingram argues, other strategies and capacity building mechanisms would be necessary in such a context. Further, a more contextual approach to transparency may highlight the role of regime type in implementation, for example, suggesting that even in cases where the public has access to information, political systems at the national level may not provide proper mechanisms for voices to be heard.

Finally, in looking at context, we might begin to see interrelationships between design elements. In looking at the various cases presented here we can see how transparency in reporting and public access can help to heighten greater public participation. Similarly, public participation may improve transparency in reporting. Scientific learning and monitoring can also support public participation and transparency and may serve to minimize conflict.

But admittedly, a contextual approach makes the conversation and the commensurate research more challenging. Practically, it may well mean more mixed strategies and approaches to motivating behavioral change (Ingram 2013: 11). In terms of scholarly research, a more integrated,

contextual approach to design elements in effective transboundary water management requires better data and research around design features in practice. This research needs to be more comprehensive across temporal and spatial scales and more comparative in nature. As long-time water scholar and professional Asit Biswas (1008: 5) notes, one of the greatest challenges for the twenty-first century is how to develop and manage transboundary water resources “sustainably and efficiently in full agreement and cooperation between the appropriate co-basin countries so they result in a win-win situation for all the parties concerned.” To meet this challenge, we will need to better understand similarities and differences in design features across various economic, social, and political contexts.

References

- Adger, W. N. 2000. Social and Ecological Resilience: Are They Related? *Progress in Human Geography* 24(3): 347–364.
- Aguiar, G., and A. Iza. 2011. *Governance of Shared Waters. Legal and Institutional Issues*. Gland, Switzerland: International Union for Conservation of Nature.
- Asian Development Bank. 1995. *Governance: Sound Development Management: Policies and Strategies*. Manila, Philippines: Asian Development Bank.
- Backer, E. B. 2007. The Mekong River Commission: Does It Work, and How Does the Mekong Basin’s Geography Influence Its Effectiveness? *Sudostasien aktuell: Journal of Current Southeast Asian Affairs* 31–55.
- Barraqué, B., and E. Mostert. 2006. *Transboundary River Basin Management in Europe*. New York: UNDP.
- Barrow, C. J. 1998. River Basin Development Planning and Management: A Critical Review. *World Development* 26(1): 171–186.
- Berardo, R., and A. Gerlak. 2012. Conflict and Cooperation along International Rivers: Crafting a Model of Institutional Effectiveness. *Global Environmental Politics* 12(1): 101–120.
- Bernauer, T. 1997. Managing International Rivers. In O. Young, ed., *Global Governance: Drawing Insights from the Environmental Experience*. 27–63. Cambridge, MA: MIT Press.
- . 2002. Explaining Success and Failure in International River Management. *Aquatic Sciences* 64:1–19.
- Bernauer, T., and A. Kalbhenn. 2010. The Politics of Freshwater Resources.

- In R. A. Denemark, ed., *The International Studies Encyclopedia*. 5800-5821. Oxford: Wiley-Blackwell Publishers.
- Bernauer, T., and P. Moser. 1996. Reducing pollution of the River Rhine: The influence of international cooperation. *The Journal of Environment & Development* 5:389–415.
- Biswas, A. K. 2008. Management of Transboundary Waters: An Overview. In O. Varis, C. Tortajada, and A. K. Biswas, eds., *Management of Transboundary Rivers and Lakes*. 1–20. Heidelberg, Germany: Springer-Verlag.
- Blomquist, W., and E. Schlager. 2005. Political Pitfalls of Integrated Watershed Management. *Society and Natural Resources* 18(2): 101–117.
- Bruch, C. 2000. *Charting New Waters: Public Involvement in the Management of International Watercourses*. UNU Workshop on Southern African International Waters, Sandton, South Africa, 25 and 26 September.
- Brugnach, M., and Ingram, H., 2012. Ambiguity: The Challenge of Knowing and Deciding Together. *Environmental Science & Policy* 15: 60–71.
- Burchi, S. and M. Spreij. 2003. *Institutions for International Freshwater Management*. Paris: UNESCO.
- Burton, M., and D. Molden. 2005. Making Sound Decisions: Information Needs for Basin Water Management. In M. Svendsen, ed., *Irrigation and River Basin management: Options for Governance and Institutions*. 51–74. Massachusetts: CABI Publishing.
- Cassar, A., and G. Mock. 2003. Transboundary Environmental Governance: The Ebb and Flow of River Basin Organizations. In *World Resources 2002–2004*. Washington, DC: World Resources Institute.
- Chambers, R. 1997. *Whose Reality Counts? Putting the First Last*. London: ITDG Publishing.
- Chayes, A., and A. H. Chayes. 1995. *The New Sovereignty: Compliance with International Regulatory Agreements*. Cambridge, MA: Harvard University Press.
- Conca, K. 2006. *Governing Water: Contentious Transnational Politics and Global Institution Building*. Cambridge, MA: MIT Press.
- Conca, K., F. Wu, and C. Mei. 2006. Global Regime Formation or Complex Institution Building? The Principled Content of International River Agreements. *International Studies Quarterly* 50(2): 263–285.
- Cooke, B., and U. Kothari. 2002. *Participation: The New Tyranny?* London: Zed Books Ltd.
- Cosgrove, W. J. 2003. *Water Security and Peace: A Synthesis of Studies Prepared under the PCCP–Water for Peace Process*. Paris: UNESCO.

- . 2009. Public Participation to Promote Water Ethics and Transparency. In M. R. Llamas, L. M. Cortina, and A. Mukherji, eds., *Water Ethics: Marcelino Botin Water Forum 2007*. London: Taylor and Francis Group.
- Cosgrove, W. and F. Rijsberman. 2000. *World Water Vision: Making Water Everybody's Business*. London: Earthscan Publishers.
- De Boer, C., J. Vinke-de Kruijf, G. Özerol, and H. Th. A. Bressers, eds. 2013. *Water Governance, Policy and Knowledge Transfer: International Studies on Contextual Water Management*. Abingdon, UK: Routledge.
- De Lange, M., D. J. Merrey, H. Levite, and M. Svendsen. 2005. Water Resources Planning and Management in the Olifants Basin of South Africa: Past, Present and Future. In M. Svendsen, ed., *Irrigation and River Basin Management: Options for Governance and Institutions*. 145–168. UK: CABI Publishing.
- Dietz, T., E. Ostrom, and P. C. Stern. 2003. The Struggle to Govern the Commons. *Science* 302(December 12): 1907–1912.
- Dombrowsky, I. 2007. *Conflict, Cooperation and Institutions in International Water Management: An Economic Analysis*. Cheltenham, UK: Edward Elgar.
- . 2008. Integration in the Management of International Waters: Economic Perspectives on a Global Policy Discourse. *Global Governance* 14: 455–477.
- Eakin, H., and M. Lemos. 2006. Adaptation and the State: Latin America and the Challenge of Capacity-Building under Globalization. *Global Environmental Change* 16(1): 7–18.
- Earle, A., and A. Turton. 2005. No Duck No Dinner: How Sole Sourcing Triggered Lesotho's Struggle against Corruption. Presentation at Can We Meet International Targets without Fighting Corruption? seminar. *World Water Week* (Stockholm), 20–26 August.
- Ekbladh, D. 2002. Mr. TVA: Grass-Roots Development, David Lilienthal, and the Rise and Fall of the Tennessee Valley Authority as a symbol for U.S. Overseas Development, 1933–1973. *Diplomatic History* 26(3): 335–374.
- Elhance, A. P. 2000. Hydropolitics: Grounds for Despair, Reasons for Hope. *International Negotiation* 5(2): 201–222.
- Fischhendler, I. 2008. When Ambiguity in Treaty Design Becomes Destructive: A Study of Transboundary Water. *Global Environmental Politics* 8(1): 111–135.
- Fung, A. 2003. Recipes for Public Spheres: Eight Institutional Design Choices and Their Consequences. *Journal of Political Philosophy* 11(3): 338–367.

- Gerlak, A. K. 2004. The Global Environment Facility and Transboundary Water Resource Management: New Institutional Arrangements in the Danube River and Black Sea Region. *The Journal of Environment & Development* 13(4): 400–424.
- Gerlak, A. K., and K. A. Grant. 2009. The Correlates of Cooperative Institutions for International Rivers. In Thomas J. Volgy et al., eds., *Mapping the New World Order*, 114–147. Oxford: Wiley-Blackwell.
- Gerlak, A. K., J. Lautze, and M. Giordanp. 2011. Water Resources Data and Information Exchange in Transboundary Water Treaties. *International Environmental Agreements* 11(2): 179–199.
- Global Water Partnership. 2000. *Integrated Water Resources Management*. Stockholm: Global Water Partnership.
- Green Cross International. 2000. *National Sovereignty and International Watercourses*. Geneva: Green Cross International.
- Gunderson, L. H., and C. S. Holling, eds. 2002. *Panarchy: Understanding Transformations in Human and Natural Systems*. Washington, DC: Island Press.
- Gunderson, L. H., S. R. Carpenter, C. Folke, P. Olsson, and G. D. Peterson. 2006. Water RATs (Resilience, Adaptability, and Transformability) in Lake and Wetland Social-Ecological Systems. *Ecology and Society* 11(1): 16.
- Gupta, J. 2009. Driving Forces in Global Freshwater Governance. In D. Hui-tema and S. V. Meijerink, eds., *Water Policy Entrepreneurs: a Research Companion to Water Transitions around the Globe*. 37–61. Cheltenham: Edgar Elgar.
- . 2011. An Essay on Global Water Governance and Research Challenges. In M. R. van der Valk and P. Keenan, eds., *Principles of Good Governance at Different Water Governance Levels*. Delft: The Netherlands National Committee IHP-HWRP.
- Ha, M. L. 2011. The Role of Regional Institutions in Sustainable Development: A Review of the Mekong River Commission's First 15 Years. *Consilience: The Journal of Sustainable Development* 5(1): 125–140.
- Haftendorn, H. 2000. Water and International Conflict. *Third World Quarterly* 21 (1): 51–68.
- Hammer, J., and A. T. Wolf. 1998. Patterns in International Water Resource Treaties: The Transboundary Freshwater Dispute Database. *Colorado Journal of International Environmental Law and Policy* 9: 157–177.
- Hansen, H. E., S. McLaughlin Mitchell, and S. C. Nemeth. 2008. IO Mediation of Interstate Conflicts: Moving Beyond the Global versus Regional Dichotomy. *Journal of Conflict Resolution* 52(2): 295–325.

- Hensel, P. R., S. McLaughlin Mitchell, and T. E. Sowers. 2006. Conflict Management of Riparian Disputes. *Political Geography* 25(4): 383–411.
- Hildering, A. 2004. *International Law, Sustainable Development and Water Management*. Delft: Eburon Publishers.
- Hoff, H. 2009. Global Water Resources and Their Management. *Current Opinion in Environmental Sustainability* 1: 141–147.
- Hooper, B. 2005. *Integrated River Basin Management: Learning from International Experience*. London: International Water Association Publishing.
- . 2010. River Basin Organisation Performance Indicators: Application to the Delaware River Basin Commission. *Water Policy* 12: 461–487.
- Ingram, H. 2013. No Universal Remedies: Design for Contexts. *Water International* 38(1): 6–11.
- . 2011. Beyond Universal Remedies for Good Water Governance: A Political and Contextual Approach. In A. Garrido and H. Ingram, eds., *Water for Food in a Changing World*. 241–261. Abingdon, UK: Routledge.
- Islar, M. 2009. *Crisis of Water: Interrogating Neo-Liberal Water Discourses in Turkey*. Paper presented at Third IIPPEE International Research Workshop.
- Islar, M., and V. Ramasar. 2009. *Security to All: Allocating the Waters of the Euphrates and Tigris*. Paper presented at Earth System Governance Conference.
- Jagerskog, A., and D. Phillips. 2006. *Managing Transboundary Waters for Human Development*. New York: UNDP.
- Kistin, E. J., P. J. Ashton, A. Earle, D. Malzbender, et al. 2009. An Overview of the Content and Historical Context of the International Freshwater Agreements that South Africa has Entered into with Neighboring Countries. *International Environmental Agreements* 9(1): 1–21.
- Karkkainen, B. C. 2004. Post-Sovereign Environmental Governance. *Global Environmental Politics* 4: 72–96.
- Kibaroglu, A. 2002. *Building a Regime for the Waters of the Euphrates-Tigris River Basin*. New York: Springer Publishers.
- Kibaroglu, A., and O. Ünver. 2000. An Institutional Framework for Facilitating Cooperation in the Euphrates-Tigris River Basin. *International Negotiation: A Journal of Theory and Practice* 5 (2): 311–330.
- Kliot, N., D. Shmueli, and U. Shamir. 2001. Development of Institutional Frameworks for the Management of Transboundary Water Resources. *International Journal of Global Environmental* 1 (3–4): 306–328.
- Lautze, J., K. Wegerich, J. Kazbekov, and M. Yakubov. 2013. International

- River Basin Organizations: Variation, Options, and Insights. *Water International* 38(1): 30–42.
- Lautze, J., M. Giordano, and M. Borghese. 2005. *Driving Forces behind African Transboundary Water Law: Internal, External, and Implications*. International workshop on African Water Laws: Plural Legislative Frameworks for Rural Water Management in Africa, Johannesburg, South Africa, 26–28 January.
- LeMarquand, D. G. 1990. International Development of the Senegal River. *Water International* 15: 223–230.
- Lebel, L., J. M. Anderies, B. Campbell, C. Folke, et al. 2006. Governance and the Capacity to Manage Resilience in Regional Social-Ecological Systems. *Ecology and Society* 11(1): 19.
- Marty, F. 2001. *Managing International Rivers: Problems, Politics, and Institutions*. Bern, Switzerland: Peter Lang.
- McNally, R., and S. Tognetti. 2002. *Tackling Poverty and Promoting Sustainable Development: Key Lessons for Integrated River Basin Management*. London: WWF.
- Meinzen-Dick, R. 2007. Beyond Panaceas in Water Institutions. *PNASS* 104(39): 1500–1520.
- Milich, L. and R. Varady. 1999. Openness, Sustainability, and Public Participation. *New Designs* 258–306.
- Mitchell, R. 1994. Regime Design Matters: Intentional Oil Pollution and Treaty Compliance. *International Organization* 48(3): 425–458.
- Molle, F. 2005. *Irrigation and Water Policies in the Mekong Region: Current Discourses and Practices*. Colombo, Sri Lanka: International Water Management Institute.
- . 2008. Nirvana Concepts, Narratives and Policy Models: Insight from the Water Sector. *Water Alternatives* 1.
- Molle, F., T. Foran, and M. Kähkönen, eds. 2009. *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*. London: Earthscan.
- Mollinga, P., and A. Bolding, eds. 2004. *The Politics of Irrigation Reform: Contested Policy Formation and Implementation in Asia, Africa and Latin America*. Aldershot: Ashgate Publishing Ltd.
- Mostert, E. 2003. Conflict and Co-operation in International Freshwater Management: A Global Review. *International Journal of River Basin Management* 1 (3): 1–12.
- . 2005. *How Can International Donors Promote Transboundary Water Management?* Bonn: Deutsches Institut für Entwicklungspolitik.

- . 2009. International Co-operation on Rhine Water Quality 1945–2008: An example to follow? *Physics and Chemistry of the Earth* 34: 142–149.
- Mukhtarov, F. 2007. Intellectual History and Current Status of Integrated Water Resources Management: A Global Perspective. In C. Pahl-Wostl, P. Kabat, and J. Möltgen, eds., *Adaptive and Integrated Water Management: Coping with Complexity and Uncertainty*. Heidelberg: Springer Verlag.
- Mukhtarov, F. and A. Gerlak. 2013. River Basin Organizations in the Global Water Discourse: An Exploration of Agency and Strategy. *Global Governance* 19: 307–325.
- Myint, T. 2003. Democracy in Global Environmental Governance: Issues, Interests, and Actors in the Mekong and the Rhine. *Indiana Journal of Global Legal Studies* 10(1): 287–314.
- Nakayama, M. 1997. Successes and Failures of International Organizations in Dealing with International Waters. *Water Resources Development* 13(3): 367–382.
- Nishat, A., and I. M. Faisal. 2000. An Assessment of the Institutional Mechanisms for Water Negotiations in the Ganges-Brahmaputra-Meghna System. *International Negotiation* 5(2): 289–310.
- NGO Forum. 2005. Running Dry: Does the ADB Stand for “Water for All”? *Synthesis Report of the Civil Society Organisations to the Implementation Review of the Asian Development Bank Water Policy*. NGO FORUM on ADB, Quezon City, Philippines, 18 November.
- O’Hara, S., ed. 2003. *Drop by Drop: Water Management in the Southern Caucasus and Central Asia*. Budapest: Open Society Institute Press.
- Organisation for Economic Co-operation and Development (OECD). 2011. *Water Governance in OECD Countries: A Multi-level Approach*. Paris: OECD.
- Ostrom, E. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge, UK: Cambridge University Press.
- Pahl-Wostl, C. 2007. Transition Towards Adaptive Management of Water Facing Climate and Global Change. *Water Resources Management* 21(1): 49–62.
- Pahl-Wostl, C., K. Conca, A. Kramer, J. Maestu, and F. Schmidt. 2013. Missing Links in Global Water Governance: A Process Orient Analysis. *Ecology And Society* 18(2): 33. <http://dx.doi.org/10.575/ES-05554-180233>
- Priscoli, J. D. 2007. Five Challenges for Water Governance. In Anthony R. Turton et al., eds., *Governance as a Trialogue: Government-Society-Science in Transition*. Berlin: Springer, 2007.
- Priscoli, J. D. 2009. River Basin Organizations. In J. Delli Priscolli and A. T.

- Wolf, eds., *Managing and Transforming Water Conflicts*, 135–168. Cambridge: Cambridge University Press.
- Raadgever, G. T., E. Mostert, N. Kranz, E. Interwies, and J. G. Timmerman. 2008. Assessing Management Regimes in Transboundary River Basins: Do They Support Adaptive Management? *Ecology and Society* 13(1): 14.
- Rap, E. 2006. The Success of a Policy Model: Irrigation Management Transfer in Mexico. *Journal of Development Studies* 42(8): 1301–1324.
- Rangeley R., B. M. Thiam, R. A. Andersen, and C. A. Lyle. 1994. *International River Basin Organizations in Sub-Saharan Africa*. Washington, DC: World Bank.
- Rieckermann, J., H. Daebel, M. Ronteltap, and T. Bernauer. 2006. Assessing the Performance of International Water Management at Lake Titicaca. *Aquatic Sciences* 68(4): 502–516.
- Rogers, P. 1997. International River Basins: Pervasive Unidirectional Externalities. In P. Dasgupta, K.I-G. Maler, and A. Vercelli, eds., *The Economics of Transnational Commons*, 35–76. Oxford: Clarendon Press.
- Rogers, P., and A. W. Hall. 2003. Effective Water Governance. *TEC Background Papers No. 7*. Stockholm: Global Water Partnership.
- Sadoff, C., and D. Grey. 2002. Beyond the River: The Benefits of Cooperation on International Rivers. *Water Policy* 4: 389–403.
- Sadoff, C., T. Greiber, M. Smith, and G. Bergkamp. 2008. *Share—Managing Water Across Boundaries*. Gland, Switzerland: IUCN.
- Schmeier, S. 2011. *Resilience to Climate Change-Induced Challenges in the Mekong River Basin. The Role of the Mekong River Commission*. Washington, DC: World Bank.
- Schmeier, S., A. K. Gerlak, and S. Schulze. 2013. *Who Governs Internationally Shared Watercourses? Clearing the Muddy Waters of International River Basin Organizations*. Earth System Governance Working Paper No. 28.
- Scholz, J. T., and B. Stiftel, eds. 2005. *Adaptive Governance and Water Conflict: New Institutions for Collaborative Planning*. Washington, DC: Resources for the Future.
- Sehring, J. 2009. Path Dependencies and Institutional Bricolage in Post-Soviet Water Governance. *Water Alternatives* 2 (1): 61–81.
- Serageldin, I., et al. 2000. A Report of the World Commission on Water for the 21st Century. *Water International* 25(2): 284–302.
- Siegfried, T., and T. Bernauer. 2007. Estimating the Performance of International Regulatory Regimes: Methodology and Empirical Application to

- International Water Management in the Naryn/Syr Darya Basin. *Water Resources Research* 43(W11406): 1–14.
- Sneddon, C. and C. Fox. 2006. Rethinking Transboundary Waters: A Critical Hydropolitics of the Mekong Basin. *Political Geography* 25: 181–202.
- Solanes, M., and A. Jouravlev. 2006. *Water Governance for Development and Sustainability*. Santiago, Chile: UN.
- Stålgren, P. 2006. *Corruption in the Water Sector: Causes, Consequences and Potential Reform*. Stockholm: Stockholm International Water Institute.
- Stinnett, D., and J. Tir. 2009. The Institutionalization of River Treaties. *International Negotiation* 14(2): 229–251.
- Timmerman, J. G., and S. Langaas. 2004. *Environmental information in European transboundary water management*. London: IWA Publishing.
- Transparency International. 2008. *Global Corruption Report 2008: Corruption in the Water Sector*. Cambridge, UK: Cambridge University Press.
- Turton, A., R. R. Meissner, P. M. Mampane, and O. Seremo. 2004. *A Hydro-political History of South Africa's International River Basins*. Report to the Water Research Commission. Pretoria: University of Pretoria African Water Issues Research Unit.
- Uitto, J. I., and A. M. Duda. 2002. Management of Transboundary Water Resources: Lessons from International Cooperation for Conflict Prevention. *Geographical Journal* 168: 365–378.
- Underdal, A. 2008. The Organizational Infrastructure of International Environmental Regimes. In U. Sverdrup and J. Trondal, eds., *The Organizational Dimension of Politics*, 186–205. Oslo, Norway: Fagbokforlaget.
- UN (United Nations). 1970. *Integrated River Basin Development: Report of a Panel of Experts*. New York: UN Department of Economic and Social Affairs.
- . 2013. *Water Security and the Global Water Agenda*. A UN-Water Analytical Brief. Ontario, Canada: United National University.
- UNDP (United Nations Development Programme). 2008. *Performance and Capacity of River Basin Organizations: Cross-case Comparison of Four RBOs*. Washington, DC: UNDP.
- UNECE (United Nations Economic Commission for Europe). 2009. *River Basin Commissions and Other Institutions for Transboundary Water Cooperation: Capacity for Water Cooperation in Eastern Europe, Caucasus and Central Asia*. New York and Geneva: UN.
- UNEP (United Nations Environment Programme). 2009. *Hydropolitical Vulnerability and Resilience along International Waters*. Nairobi: UNEP.

- UNESCO (United Nations Educational, Scientific and Cultural Organization). 2007. *State of the Art Review on IWRM*. Paris: UNESCO-IHP.
- . 2009. *United Nations World Water Development Report 3: Water in a Changing World*. Paris: UNESCO.
- Verwijmeren, J., and M. Wiering, eds. 2007. *Many Rivers to Cross: Cross Border Co-operation in River Management*. Delft: Eburon Publishers.
- Warner, J., P. Wester, and A. Bolding. 2008. Going with the Flow: River Basins as the Natural Units for Water Management? *Water Policy* 10(2): 121–138.
- Water Integrity Network and Transparency International. 2010. *Integrity Pacts in the Water Sector: An Implementation Guide for Government Officials*. Berlin: Water Integrity Network and Transparency International.
- Wescoat, J. L., Jr. 1996. Main Currents in Early Multilateral Water Treaties: A Historical-Geographic Perspective. *Colorado International Environmental Law and Policy Journal* 39: 1648–1949.
- Wester, P., D. J. Merrey, and M. de Lange. 2003. Boundaries of Consent: Stakeholder Representation in River Basin Management in Mexico and South Africa. *World Development* 31(5): 797–812.
- White, G. F. 1969. *Strategies of American Water Management*. Ann Arbor: University of Michigan Press.
- Wolf, A. T. 2007. Shared Waters: Conflict and Cooperation. *Annual Review of Environment and Resources* 32: 3.1–3.29.
- WWC (World Water Council). 2012. *A New Water Politics: World Water Council 2002–2012 Strategy*. Marseille, France: World Water Council.
- WWF (World Wildlife Fund). 2002. Pricing as a Tool to Reduce Water Demand. *WWF Spain/ADENA's Alcobendas: Water City for the 21st Century: A Demonstration Project*.
- Young, O. R. 2002. *The Institutional Dimensions of Environmental Change: Fit, Interplay and Scale*. Cambridge, MA: MIT Press.
- Zawahri, N. 2008. Designing River Commissions to Implement Treaties and Manage Water Disputes: The Story of the Joint Water Committee and Permanent Indus Commission. *Water International* 33(4): 464–474.