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Missing Links in Global Water Governance: a Processes-Oriented Analysis

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ABSTRACT. Over the past decade, the policy and scholarly communities have increasingly recognized the need for governance of water-related issues at the global level. There has been major progress in the achievement of international goals related to the provision of basic water and some progress on sanitation services. However, the water challenge is much broader than securing supply. Doubts have been raised about the effectiveness of some of the existing governance processes, in the face of trends such as the unsustainable use of water resources, the increasing pressure imposed by climate change, or the implications of population growth for water use in food and energy production. Conflicts between different water uses and users are increasing, and the state of the aquatic environment is further declining. Inequity in access to basic water and sanitation services is still an issue. We argue that missing links in the trajectories of policy development are one major reason for the relative ineffectiveness of global water governance. To identify these critical links, a framework is used to examine how core governance processes are performed and linked. Special attention is given to the role of leadership, representativeness, legitimacy, and comprehensiveness, which we take to be critical characteristics of the processes that underpin effective trajectories of policy development and implementation. The relevance of the identified categories is illustrated with examples from three important policy arenas in global water governance: the effort to address access to water and sanitation, currently through the Millennium Development Goals; the controversy over large dams; and the links between climate change and water resources management. Exploratory analyses of successes and failures in each domain are used to identify implications and propose improvements for more effective and legitimate action.

Key Words: *climate change and water; global water governance; network governance*

INTRODUCTION

Over the past decade the policy and scholarly communities have increasingly recognized the need for governance of water-related issues at the global level (Conca 2006, Pahl-Wostl et al. 2008). At the same time, doubts have been raised about the effectiveness of existing global water governance in the face of trends such as the unsustainable use of water resources, the increasing pressure imposed by climate change, or the implications of population growth for water use in food and energy production. Globally, freshwater resources are not (yet) scarce. However, their unequal distribution at different scales can create tensions over allocation, use, development plans, and management strategies. Prospects for the future are not promising, and the situation is aggravated by climate change, which will intensify looming water crises (Bates et al. 2008). The fourth World Water Development Report (WWAP 2012) confirms the continuation of alarming global trends. Water demands are increasing, with detrimental impacts on ecosystems and freshwater biodiversity. Despite increased efficiency, agricultural water use is projected to increase in response to increasing demand for food. Growth trajectories for biofuels and hydropower in a changing energy landscape have uncertain but potentially dramatic implications for water and land use. Such developments highlight the need for increasing coordination across sectors

and policies. However, as these challenges grow, there is a disturbing void of effective global policy processes to deal proactively with such emerging issues.

Such governance frameworks must be adaptive and create links across policy fields such as energy, trade, and agriculture, since water challenges cannot be addressed by remaining within the “water box” (UN 2006). Although the design features of governance processes—including whom they involve, how they are structured, and what gives them authority—are certainly not the only determinant of effectiveness; they remain key factors for success in dealing with emerging policy problems (Mitchell 2006, Koppell 2010).

Our approach is guided by the assumption that a major reason for policy failures can be traced back to missing links in trajectories of policy development and implementation. A framework of analysis is developed that captures what we consider to be essential governance processes and how they are performed and linked. We use this framework to identify different types of missing links, including performance gaps and missing connections. To illustrate the argument, we draw examples from three important policy arenas in global water governance: the Millennium Development Goals (MDG) on access to water and sanitation, the controversy over large

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Table 1. Overall characterization of the three policy processes.

Characteristic	Water and sanitation	Large dams controversy	Climate change and water
Nature of problem	Addressing basic human needs for water supply and sanitation services Need for action not contested	Addressing environmental concerns, equity issues (livelihoods), and human rights controversies Resolving conflicts among sustainability goals (economic, social, and environmental)	Promoting anticipatory action to prevent undesirable impacts for humans and environment Identifying no-regret options Linking largely separate water and climate change communities (epistemic and policy)
Process duration	Three decades	Two decades	One decade
Process effectiveness	Achieved considerable improvement Millennium Development Goals globally on track regarding drinking water, but target missed regarding sanitation Long-term effectiveness not guaranteed and contingent on an integrative approach to water resources management	Significant effects on discourse around large dams Uneven impacts on international support for large dams Limited effects in catalyzing national dialogues and policy reform processes	Awareness raising National level actions limited primarily to nonbinding strategic goals No global policy framework or initiative in place World Bank, UNDP, WMO, FAO actions/programs under way

dams, and the links between climate change and water resources management (Table 1).

CHALLENGE OF GLOBAL WATER GOVERNANCE —THREE MAJOR POLICY ARENAS

The challenge to secure access to water and sanitation entered the international agenda in the 1970s as it became clear that global support for local problems was required. Following up on the United Nations (UN) Water Conference in Mar del Plata, 1977, a first International Decade on Drinking Water and Sanitation was announced for the 1980s. Results of this decade were mixed. While millions of people got access to improved services, on the one hand, measures often implemented in a top-down manner were less effective than necessary, on the other hand. In addition, the complex, multiscale and multisector dimensions requested new approaches and “outside the box” thinking, as it became clear that water crises at different levels were driven by factors largely outside the water sector, such as population growth or economic development. While the 1990s witnessed the emergence of new nongovernmental actors and hence new governance approaches to this challenge, new momentum could be particularly garnered by declaring access to (drinking) water and later on basic sanitation as one target of the Millennium Development Goals. “Outside the box” thinking was also reflected in the water community’s effective highlighting of the importance of water for achieving the full range of MDGs, not just those explicitly targeting water. More recently, further momentum has come from the adoption of water and sanitation as a human right, which complements the pragmatic MDG approach in a more formalized manner and

addresses some of the shortcomings of the MDG target (for example, to work towards “universal access”). The outcome document of the June 2012 Rio+20 conference incorporated the commitment to work toward basic water and sanitation service for all. While the access challenge may not be a clear-cut success story, progress can be seen in the course of the past decades. A constant reframing of the challenge complemented by a certain degree of resource mobilization can be identified. It remains an open question, however, whether global water governance can address adequately the natural water resource base for providing such access in the long run.

The controversy over large dams came onto the global agenda in the 1980s when human rights and environmental activists joined hands in protesting against several dam projects. Confronted with growing resistance from nongovernmental organizations (NGOs) and civil society, the World Bank and IUCN, in 1997, initiated the establishment of an independent commission to review the development effectiveness of dams, assess alternatives, and develop internationally acceptable criteria and guidelines for future decision-making. The World Commission on Dams (WCD) was formed in 1998 with 12 independent commissioners from academia, government organizations, NGOs, and dam-building companies. The WCD’s final report, including seven strategic priorities and 26 guidelines for planning and implementing large dams, was published in 2000. The Dams and Development Project, which the United Nations Environment Programme (UNEP) sponsored from 2001 to 2007, aimed to disseminate the WCD materials, provide practical guidance on how to implement the

WCD recommendations, and draw governments more centrally into the process. To date, the WCD standards have been reflected to a partial extent in the safeguards and practices of some export credit agencies and international financial institutions. The WCD has also changed the discourse away from the question of whether dams are good or bad and towards questions about how dams should be planned and implemented in cases where no better alternatives exist.

The discourse on climate change and water has a quite recent history in global water governance. It was only during the fifteenth Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) in Copenhagen 2009 that Climate Change and Water was officially included in the UNFCCC process. Prior to that, the global debate was shaped mainly by the global water forums and in global epistemic communities. A hallmark of the international debate was the initiation of the Dialogue on Climate and Water launched in 2001 at the Bonn Freshwater Conference (Kabat and van Schaik 2003). That year (2001) coincided as well with the publication of the third report of the Intergovernmental Panel on Climate Change, which contrary to previous reports, gave considerable attention to climate change adaptation (Beck 2011). The increased attention to climate issues is also reflected in the establishment by UN Water of a task force on climate change in 2008. The third World Water Development Report (developed under the overall umbrella of UN Water), launched in 2009, emphasized climate change as well and highlighted the need to go beyond the water box and integrate across policy fields. The fourth World Water Development Report (2012) emphasized managing risk and uncertainty and dealt directly with new climate change scenarios and the necessary adaptive management responses.

FRAMEWORK FOR ANALYSIS

Governance as a concept acknowledges increasing societal interdependencies and complexity of interactions in policy processes (Hooghe and Marks 2001). This is true for several reasons, including global economic restructuring, rapid technological change, and blurred boundaries between what is public and what is private. Global governance adds yet another dimension of complexity: global policy processes are complex and multilevel, involving a multitude of actors across many different kinds of settings, from formal UN mechanisms to informal global forums and networks (Rosenau and Cziempiel 1992). The scholarly task to develop frameworks for analysis that capture this complexity is daunting. Reducing the analysis to one dimension or to a single level of analysis, however, risks missing key elements and, in particular, their interaction. We aim at closing this gap by putting complexity, i.e., “missing links,” at the center of analysis. We do not claim to offer a comprehensive theory but rather a theory-informed framework of analysis that highlights factors essential to understanding success and failure of global water governance processes.

The most widely used model for policy processes is the policy cycle, which assumes that processes unfold along sequential stages and that they are characterized by a rational decision-making process in order to achieve an overall policy objective. The policy cycle has been used mainly as an analytical device for policy analysis. Some applications make a normative claim in the sense that “good” processes following a sequential logic are assumed to result in good policies (Bridgeman and Davis 1998). The latter claim has been criticized as being too deterministic, overstating rationality, and not taking into account the complexity of real-world policy processes and the multitude of actors and different perspectives shaping them (Colebatch 2006, Kingdon 2010).

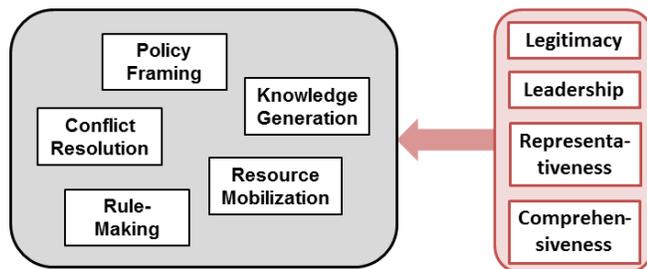
The notion of complex adaptive systems (CASs) is useful to characterize such complexity while making normative judgments about the quality of policy processes (Harrison 2006, Pahl-Wostl 2009). A CAS is a complex, nonlinear, interactive system which has the ability to adapt to a changing environment. Many elements interact according to certain rules of interaction. A CAS is characterized by the potential for self-organization and emergence. They are not deterministic. Such a conceptual base resonates with the modern understanding of governance. It implies that contingencies may result in the failure of good processes to achieve a policy objective. Good policy processes—those that comply with certain quality requirements—are considered necessary but not sufficient for effective policies.

In order to address our “missing link” thesis, we develop a normative model for good policy processes based on theory-supported arguments about factors that have been shown to influence the quality of a policy process. Given the nature of a CAS, we assume that these factors, although not guaranteeing success in achieving policy objectives, increase its probability significantly. We refer to such a complex global policy process, unfolding over time and across different levels of social aggregation, as a policy trajectory. In this approach, we stress certain key elements lying at the heart of policy trajectories as a way to structure a functional model of the evolution of distinct fields of governance. Further, we identify what we consider to be critical emergent properties of those elements as a way of getting at overall policy effectiveness. The model is presented schematically in Fig. 1.

Derivation of the core elements of the functional model

Given the complexity of processes characterizing contemporary governance, particularly at the global level, the traditional and narrow emphasis of the policy cycle on state-based public policies is outdated. Different modes of governance—markets, networks, bureaucratic hierarchies—interact. As a consequence of such kinds of settings, a model for the evolution of governance fields must emphasize a wider range of action, and take several typical or characteristic features of such settings into account:

Fig. 1. Functional model of a policy trajectory comprising a set of interdependent elements (left box) and properties characterizing the performance of these elements (right box). Note: the figure presents elements assumed to be necessary for dealing with a complex policy problem, without assuming a sequential logic among them. Interdependencies between elements may be complex and recursive.



- the knowledge base is incomplete, characterized by uncertainties, and often contested,
- the perceptions about the nature of the problem and about potential solutions diverge,
- an institutional setting with well-defined procedures is absent or is not comprehensive,
- the resources to develop and implement policy responses (financial, human, institutional) are insufficient or lacking entirely,
- a wide array of actors may wield effective veto power over policy initiatives, and
- potential conflicts of interest among different stakeholder groups are abundant.

These characteristics, in turn, draw our attention to a specific set of necessary elements if policy trajectories are to navigate this terrain effectively:

Knowledge generation and knowledge stabilization

Knowledge generation may encompass the collection of new information and/or the integration of available, fragmented evidence from different sources. A key step in this process is the translation of that information into validated and legitimized “knowledge” that is sufficiently stable to have shared meaning for various actors involved (albeit in different ways and to varying extents) (Jasanoff 2004). Knowledge generation is not only of key importance in initial stages of a policy trajectory. Given complexity and uncertainties, it is crucial that new insights (e.g., from scientific monitoring or

new conceptual understandings) are incorporated effectively during policy development and implementation.

For example, knowledge generation has been central to early advances in the water and climate change trajectory. A hallmark of the international debate on water and climate change was the initiation of the Dialogue on Climate and Water, which brought together science and practice and acted as integrator between regional and global concerns. The release of the “Comprehensive Assessment of the World’s Freshwater Resources” in 1997, which also led to the establishment of the World Water Development Reports later on, is another example of knowledge influencing policy trajectories.

Policy framing

The framing of the problem is of key importance in shaping a policy trajectory, particularly in its initial stages. Framing involves identifying the nature of a problem, potential causes, and solutions. Framing identifies not simply ends but also the range of plausible means to an end, thereby focusing but also limiting the imagination of actors and the feasibility of various forms of action. For this reason, frames that take a pluralistic approach, allowing for different world views, are important to deal with complex issues in conflictive settings (Conca 2006, Pahl-Wostl et al. 2007).

In the case of the large dams controversy, the problem framing put forward under the leadership of International Rivers Network (later renamed International Rivers) combined environmental with social concerns, and further put these in relationship to the economic costs and benefits of large dams. This comprehensive problem framing helped bring a broad array of affected interests into the global debate on large dams. In the water arena more generally, the concept of Integrated Water Resource Management works along the same lines and mirrors the wider integrative framing of sustainable development.

Rule-making

Rule-making occurs at many stages, but in particular as actors move from deliberation and learning towards more formal commitments (Young 1998, Pahl-Wostl et al. 2007, Pahl-Wostl 2009). Rule-making is an essential ingredient enabling informal social learning processes to structure interactions and support progress towards tangible outcomes (Mostert et al. 2007, Pahl-Wostl et al. 2007). Rules may be prescriptive (what actors should do) or proscriptive (defining unacceptable actions). In addition to these regulative attributes, rules may also be constitutive in the sense that they give foundational shape to processes or assign roles within those processes (Barnett and Finnemore 2004, Ostrom 2005).

If one does not restrict rules to formalized and legally binding contracts, then water governance has seen extensive rule-making (Conca 2006). When the MDG on water supply and,

later, sanitation was identified, clear targets and timelines were established, which resulted in refocused action by various actors and, partially, in impressive improvements concerning monitoring capacities for observing “compliance” with this commitment. The adoption of a human right to water by the UN General Assembly in 2010, followed by a resolution of the UN Human Rights Council that states clearly that this right is legally binding, provides another example. The fate of this realm may be bound to finding new and innovative ways of combining the (more) programmatic MDG approach and the (potentially) enforceable human rights approach for effective water governance.

Resource mobilization

Dealing with a problem requires resources, including funding, expertise, and political resources, that generate policy support at different levels. In complex, multilevel settings of the sort considered here, substantial resource mobilization may be required simply to create the initial conditions for a policy trajectory. Difficulties in mobilizing resources may come from several sources: inability of actors to agree or prioritize actions; classic barriers to collective action (Ostrom 1990) such as uncertainty, mistrust, transaction costs, and coordination barriers; or lack of leadership or stewardship.

One of the virtues of the MDG process was its direct influence on donor’s commitments and their willingness for better coordination among themselves. Given that this realm of global water governance, i.e., water supply and sanitation, is currently more programmatic than regulatory in nature, resource mobilization is a crucial element. Beyond meeting basic human needs now, a key challenge for sustainable water governance is to provide stable resources in addition to standards, guidelines, or assessments.

Conflict resolution

Conflicts are endemic to governance processes and to water governance in particular, given the resource’s multiple uses, irreplaceability, unpredictability, and strategic value as a productive resource, a constituent of critical ecosystems, and an anchor of local livelihoods and cultures (Conca 2006). Unresolved conflicts may jeopardize the continuation of a policy trajectory or marginalize certain actors, who may in turn seek to block action through coercive, extra-institutional, or even violent means.

The WCD process can be seen as an attempt to resolve conflicts, with the World Bank and dam builders reaching out to anti-dam activists. As a result, the discourse changed from “yes-or-no” to “how” to build dams, as reflected in the WCD’s final report. However, while the report was welcomed by many as the outcome of an inclusive process and a comprehensive approach, it also stirred considerable debate and reignited controversy in some quarters.

Derivation of properties characterizing the performance of elements in the functional model

We argue that how these elements are performed and how their interaction is coordinated are of critical importance for policy effectiveness. We further argue that for these elements to support effective policy processes in complex, multilevel settings such as global water governance, they require a particular set of properties, as indicated in Fig. 1. We base these observations on our reading of the scholarly literature, our own prior research, and our observation of the three policy trajectories of water access, large dams, and water and climate.

Legitimacy

Legitimacy refers to the validity and broadly based acceptance of the authority of an actor or event, making it possible for those actors and events to play an influential role in the overall process (Risse 2006). Legitimacy may derive from the way authority was conferred on an event or group (for example, through a democratic, open, and inclusive process). Legitimacy may also be gained by generating outcomes that are endorsed by many participants of the overall process (so-called “performance legitimacy”). A lack of legitimacy may lead to opposition, resistance, or loss of commitment. Legitimacy is frequently contested in complex, multilevel governance settings given the involvement of a multitude of actors and their often poorly defined roles.

For example, the pricing of water has been an enduring international controversy. Although strong arguments have been made to move toward more efficient price structures that reflect underlying economic, social, and environmental costs, the manner in which such “reforms” have often been implemented (e.g., through structural-adjustment conditionalities tied to wider water sector policy changes) is a prime example of the lack of (perceived) legitimacy. As a result, some policy options become limited a priori. Scholars have not identified many necessary conditions of institution building. However, legitimacy seems to be one candidate for this (Breitmeier et al. 2006).

Representativeness

Active involvement of not only powerful actors but also affected stakeholder groups has proven crucial to ensure that a process is perceived as legitimate and to reduce the likelihood that the process is jeopardized by narrow interests (Scholte 2004). Broader participation may also enhance effectiveness through learning mechanisms or the generation of new information (Brown and Timmer 2006). The water arena has been at the leading edge of experimenting with various “stakeholder” models of participation in governance processes (Conca 2006, Pahl-Wostl et al. 2008), in which traditional representative systems are complemented by, or replaced with, more direct forms of engagement among parties with a stake in the outcome. Ideally, stakeholder involvement takes place

in a transparent and open process that differs from lobbying behind the scenes.

When the WCD was formed in 1998, the initiators aimed at a balanced composition of the commission by designating 12 independent commissioners from academia, government organs, NGOs, and dam-building companies. However, initial limitations on activist participation almost caused the process to collapse, and the failure of major pro-dam governments and business representatives to buy into the process affected its ultimate influence.

Leadership and stewardship

Complex governance processes are characterized by self-organization and emergence. However, self-organization without leadership may fail to produce tangible outcomes. This may be formal leadership of a governmental body, but it may also be emergent leadership that develops from an actor's influential role in a network (Pahl-Wostl 2009). Two recent, comprehensive studies confirmed the importance of this kind of emergent, forward-looking leadership for sustainable resource governance at local and regional levels (Gutiérrez et al. 2011, Kenward et al. 2011). We also pay attention to the key role of stewardship, defined as facilitation and the forging of inclusive linkages as processes unfold (Chapin et al. 2009).

International Rivers, an international NGO opposing destructive dam projects, took a leading role in connecting activists from around the world. Under this leadership, the network built up the technical and analytical knowledge that was necessary to lobby effectively against large dams (Conca 2006). A different type of leadership was performed by Kofi Annan, who put water back on the international agenda and at center stage for global summits during his term as UN Secretary-General, including both the Millennium Summit and the Johannesburg Summit on sustainable development in 2002.

Comprehensiveness

As highlighted previously, the issues of interest in water governance must be addressed from an integrated perspective. Often, problems arise from the interaction of different policy fields and a lack of coordination across them. Again, the water arena has (partly in theory and partly in practice) been at the forefront of developing and "testing" concepts of integrated resource management. Some have criticized such approaches as unrealistic abstractions and as requiring rigid bureaucratic structures for their implementation (Biswas 2004). While such critiques may raise important concerns about the need for flexible, adaptive policy systems under conditions of uncertainty, they may also be rooted in a technocratic paradigm that fails to recognize the need for integrated governance of interdependent policy fields (Pahl-Wostl et al. 2011). Comprehensiveness is more likely to be achieved in open and flexible governance settings (Pahl-Wostl 2009, Galaz et al. 2012).

For example, while the International Drinking Water Supply and Sanitation Decade of the 1980s made some gains, it also provided the important lesson that policy measures focusing solely on supply and ignoring other factors shaping access, effectiveness, and sustainability would not yield the desired outcomes. Such a supply-driven focus is still inherent in the MDG on water and sanitation. However, the complementary efforts for strengthening integrative water resource management (and comparable approaches), as well as growing appreciation for the "nexus" between water and other sectors such as food security, present steps towards a more comprehensive and hence potentially more effective approach.

A policy trajectory as a whole is judged by its overall effectiveness. Effectiveness refers, on one hand, to the achievement of measurable products and the achievement of explicitly stated goals. Such tangible outcomes are typically required for continuity and step-wise progress toward an overarching goal. However, given that our focus is on a policy trajectory over time, effectiveness may also refer to sustaining the trajectory by maintaining the engagement of important actors and nurturing a requisite element of consensus. Thus, while in terms of formal goal attainment, the MDG policy trajectory on water and sanitation would seem to be the most successful of our three examples, a dynamic assessment of effectiveness would also consider these elements.

MISSING LINKS IN POLICY TRAJECTORIES

We argue that policy failure may be explained by identifying the absence of important properties of elements (e.g., legitimacy) or inadequate or missing links among elements (e.g., failure to connect knowledge generation to the framing of policy responses or rule-making). This allows us to identify two types of missing links that influence the effectiveness of policy trajectories:

1. Type I: Performance gap—the lack of a requisite property of an element
2. Type II: Missing connection—the lack of a necessary link between elements

A third logical possibility, not examined here, is the complete absence of one or more elements (e.g., policy framing, rule-making) in the left-hand box of Fig. 1.

Link Type I: Missing or weak properties

Weak performance of an element may be caused by the absence of the properties we identified: leadership, legitimacy, representativeness, or comprehensiveness.

The MDG process put water back on the global political agenda in 2000. It circumvented formal rule-making as a necessary condition for this new political attention and helped mobilize resources, commitments, and greater coordination. The process remained highly dynamic, with the partial

progress toward the MDGs affecting policy framing (towards “universal access”), knowledge generation (especially monitoring of progress), and rule-making (strengthening the rights-based approach). However, this is certainly taking into account that properties for one element—say, rule-making—may not benefit from properties needed in order to push for another element—say, resource mobilization.

However, the MDG trajectory also shows clear deficiencies. One crucial criticism is that policy framing in its current shape lacks comprehensiveness, which is reflected in the MDG’s negligence of universal access. Continuous leadership by some states as well as key actors and/or networks was needed in order to strive for universal access by applying a human rights approach. As stated above, lessons learned from the 1980s decade clearly argue in favor of a more comprehensive approach towards the challenge than declaring success on the number of people gaining access every year. A more integrative or comprehensive perspective can be increasingly identified (Rahaman and Varis 2005). Various “visioning processes” starting around 2000 made a clear case for “people-centered approaches,” i.e., to including those still lacking access as part of the solution and not just the problem. We argue that the element of resource mobilization has been pushed by the MDG process, which has had some “spillovers” to other elements as well. However, it remains to be seen if the human rights approach, exemplified here as part of the rule-making element, will be able to continuously generate all properties of its own for success. In itself, a (revitalized) focus on this element is an answer to the missing or insufficient comprehensiveness of the MDG trajectory.

The WCD effectively reframed the question around large dams as a need to better understand the full range of impacts and to resituate dam planning in larger considerations about water and energy for human development. The participation of both dam proponents and opponents in the process of bringing the commission together, and of launching its knowledge generation exercise, gave greater legitimacy and representativeness to these elements, and led to a quite comprehensive (some would say exhaustive) knowledge generation exercise that featured both expert and stakeholder input in a variety of forms. These elements also benefited from strong leadership by the commission chair and secretariat. In contrast, the subsequent element of rule-making—which began with the WCD recommendations and was supposed to spin off into national dialogues and donor reforms—failed to attain the same degree of either representativeness or legitimacy (Dingwerth 2005). The process suffered when the strong consensus within the commission did not translate into buy-in from all elements of the wider stakeholder community.

The most important advances in the water and climate change trajectory have been in knowledge generation, which has grown increasingly comprehensive and has high legitimacy

regarding the production of scientific knowledge. This has been of particular importance for establishing a factual knowledge base on the influence of humans on climate change and its potential impacts on water resources. However, the assessment of the severity of the problem and appropriate response options requires legitimacy derived from a higher degree of representativeness. Such discourse has taken place mainly at the global water meetings (World Water Forum, Stockholm Water Week), which have been subjected to severe criticism due to lack of representativeness (Gleick and Lane 2005). Some argue that the World Water Forum has become an arena to promote economic interests of the powerful. Indeed, whereas the size of the industrial exhibition is growing from year to year, the final declaration of the Forum’s informal ministerial process has remained quite inconsequential in policy terms. Despite strong leadership in the scientific community in the initial stage, water and climate change is lacking leadership in the formal policy process, which is required for effective rule-making (e.g., Baumgartner and Pahl-Wostl 2013). A comprehensive approach is strongly promoted by emphasizing water security and the water-food-energy nexus. Again, however, without political will and leadership, it is questionable whether such reframing of policy will lead to tangible outcomes and enhanced water security in times of increasing climate change (Pahl-Wostl and Thoenen 2009).

Link Type II: Missing links between elements

Another important aspect affecting the success of a policy process is the links between the various elements. Missing links lead to reduced effectiveness.

The struggle to provide clean drinking water and basic sanitation over the past 30 years can be described as a sequence of different governance modes favoring different elements, as put forward in our functional model. The elements of policy framing, resulting in the “discovery” of water as a “finite resource” in the late 1970s, and (formal) rule-making were adopted rather early, leading to the first international water decade in the 1980s. The other elements, however, were missing or premature in order to guide action and to secure success. The programmatic swing of the 1990s and the strengthening of the element of resource mobilization resulted again one decade later in the initially quite powerful MDG focus, which was little interested in rule-making. However, as issues such as “universal” access and the challenges of social sustainability came to the fore, this approach was recently complemented with the potential formalization (i.e., rule-making) of this policy realm by adopting the human right to water and sanitation. Overall, access to water and sanitation is equipped with above average monitoring capabilities in the realm of water (i.e., knowledge generation), a condition which became a rather effective enforcement instrument over the years (e.g., through the reports of the World Meteorological Organization (WMO)/UNICEF Joint Monitoring Programme

for water supply and sanitation). Although the sanitation crisis remains daunting, a more solid understanding of the situation, which is now in many cases in place at the country level, is a prerequisite for new attention and possibly action. The fact that more pragmatic and more formal elements complement each other to a certain degree in global water governance can be seen as one explanation for why access to water is not the “worst case” of global governance (e.g., compared to access to energy).

In the dams case, the conflicts leading up to the WCD, and the work of the WCD itself, effectively reframed the debate about the costs and benefits of large dams and triggered a unique process of knowledge generation that demonstrated the highly uneven performance of large dams and the skewed distribution of costs and benefits. By themselves, however, these elements were not sufficiently robust to translate into effective rule-making. Instead, while quite comprehensive, the “rules” for dam decision-making put forward by the WCD did not garner broadly based legitimacy, and were embraced (unevenly, at that) primarily by donor organizations rather than dam-building nations, which exacerbated conflicts about conditionality and national sovereignty that the WCD was in no position to resolve (Dubash 2010, Scheumann 2008). Given this substantial gap between elements, the policy trajectory has arrived at a point of mixed results. It is certainly the case that better practices for dam planning, financing, and execution have been identified and are being put into practice in some cases. But the larger ambition—to develop consensual guidelines about how to situate dams in a larger set of means/ends assessments about water, energy, poverty, and development—has not resulted (Briscoe 2010).

In the case of the water and climate trajectory, there has been a strong emphasis on knowledge generation and policy framing. That can be related to the importance of well-established informal networks that support knowledge generation and could also integrate across levels. However, this has not yet translated into formal rule-making or substantial resource mobilization. Given that the discourse of water and climate change emerged only about a decade ago, one may argue that this is a question of maturity of the policy debate rather than a clear deficiency of the policy trajectory. However, the absence of a formal global policy process where water and climate change is a focal theme, and thus the lack of legitimate and representative global leadership, may also impede progress in this respect in the years to come.

DISCUSSION

The exploratory analyses we presented cannot provide a rigorous test of the assumptions made in our normative model. They illustrate the analytical strength of our approach and the appropriateness of the variables chosen.

We note that the two types of missing links are not entirely independent. One element may be weak due to missing

properties, and this can be a major reason for disruptions in the policy trajectory. Furthermore, the factors that influence the property of an element may change over time along a policy trajectory. This seems to be the case in particular for knowledge generation. In the initial phases of a policy process, scientific legitimacy seems to be necessary and often sufficient. However, we note major missing links between knowledge generation and policy framing and between knowledge generation and rule-making. There seems to be a clear role for flexible global multi-actor networks for issue integration, agenda setting, and open (re)framing processes. But for rule-making in governance settings, it is important to move from mobilizing action to formalizing commitments. Knowledge generation happens mainly in epistemic communities that have traditionally been linked to established policy fields (e.g., agriculture, water). Comprehensive and integrative approaches required to address complex environmental problems go increasingly beyond these traditional boundaries. Such knowledge production takes place, increasingly, in open, polycentric networks that foster emergent leadership but which may at times suffer from a lack of transparency regarding the legitimacy and representativeness of the knowledge production process. Representative democracy, the nation-state and its supranational negotiation and policy platforms have evolved and have claimed to be the most legitimate way of representing the interest and rights of individual citizens irrespective of access to resources and power. This model is not outdated, and though imperfect is still widely perceived as the best available institutional setting. However, it has been extended by a complex interplay among government-led action, markets, and polycentric networks with a multitude of leadership, which is most evident at the global level. Here, legitimacy linked to representativeness plays a key role.

Multilevel interactions need to be strengthened. The MDG example shows clearly that using financial resources for effective implementation requires processes tailored to the needs of those affected. Strengthening of multilevel interactions can be achieved by improving representativeness and legitimacy of governance functions throughout the whole policy process and in particular during policy framing, rule-making, and knowledge generation. This cannot be easily achieved by informal, polycentric actor networks, which have the advantage of open access but also the potential danger of being taken over by powerful actors that can mobilize more resources to make their voice heard. The MDG process also shows how monitoring can be used to influence the reframing of policies and the actions of both governments and the donor community. In fact, global water governance may be seen as a best-case example of how much steering can be executed by setting targets and monitoring progress towards their achievement. If combined with a legally binding approach, this can be very powerful. The analysis here suggests that

relative progress on the water supply target may be best understood as a combination of pragmatic and formal elements which are to some extent complementary.

The capacity in scientific and policy communities for comparison and critical reflection has not kept pace with such developments. We see the framework we have presented as one step towards improving this capacity. The results from the exploratory analyses illustrate the usefulness of the chosen categories and show no need at this stage to extend the framework by adding further elements. It seems that not all possible links of Type I or Type II (performance gaps and connections between elements) are of equal importance, and the relative importance may change over time. However, again it would be premature to come to specific conclusions in this respect. We expect that a broader application of our framework will allow the identification of types of policy trajectories that would improve comparability and facilitate the derivation of policy advice.

Responses to this article can be read online at:

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