PALGRAVE STUDIES IN WATER GOVERNANCE

A CRITICAL APPROACH TO INTERNATIONAL WATER MANAGEMENT TRENDS

Policy and Practice

Edited By

CHRISTIAN BRÉTHAUT AND RÉMI SCHWEIZER

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Christian Bréthaut • Rémi Schweizer
Editors

A Critical Approach to International Water Management Trends

Policy and Practice

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Editors
Christian Bréthaut
University of Geneva
Geneva, Switzerland

Rémi Schweizer
ETH Zürich
Zürich, Switzerland

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About the Authors

Rémi Schweizer is Senior Researcher and Lecturer at the University of Lausanne and ETH Zürich in Switzerland. His research focuses on environmental and food governance, with an interest on power relations, policy implementation and innovation and local community governance. Author of several books and articles, he conducts research with a strong empirically grounded approach.

Christian Brethaut is Assistant Professor at the Institute for Environmental Sciences at the University of Geneva, Switzerland. He leads the Education and Knowledge component of the Geneva Water Hub and co-leads the UNESCO Chair on Hydropolitics from the University of Geneva. His work focuses on challenges interlinked with transboundary contexts and with intersectorality. He is a co-editor of Palgrave Studies in Water Governance: Policy and Practice series.

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Taking Up Practical and Intellectual Challenges Posed by International Water Management Trends: Some Introductory Remarks

Christian Bréthaut and Rémi Schweizer

"*Water governance deserves its place on the global agenda before it's too late*." This is with such a call that a vibrant editorial of the journal *Nature* concluded in December 2016 (Nature 2016: 170). The author(s) underlined how human activities, rather than mere hydrological dimensions, were responsible for most changes and crises in Earth's water system. The inherently political dimension of water governance—a "*hard-won human compromise*"—as well as the necessity to recognize the "*long process that aims to guide policies*" at the global level were emphasized.

C. Bréthaut (✉)
Geneva Water Hub, UNESCO Chair in Hydropolitics, Institute for Environmental Sciences, University of Geneva, Geneva, Switzerland

R. Schweizer
Natural Resource Policy Group (NARP), Swiss Federal Institute of Technology (ETH), Zürich, Switzerland

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As a matter of fact, the idea that water governance matters has been around for some time now. The notion of a "global water crisis" has gained interest since the 1990s (Biswas 1999) and is now widely recognized as a crisis of governance (e.g., Biswas and Tortajada 2010; Bogardi et al. 2012; Pahl-Wostl et al. 2012; Gupta et al. 2013; Grafton et al. 2013). The extraordinary and continuously growing number of freshwater uses, underlined by its vital dimension, its unequal distribution on the earth's surface and the numerous uncertainties linked to climate change have raised some serious thoughts on the importance of water governance for human and ecosystems needs (Gleick 2000). The "long process" that the *Nature* editorial refers to was thus initiated several decades ago.

Numerous initiatives have been launched in order to address the challenges of minimizing anthropic impacts and ensuring a balanced interaction within socio-ecological systems, two key issues related to sustainable water uses (Gunderson and Holling 2002; Berkes et al. 2000). The Global Water Partnership (GWP) celebrated "20 years of impact" in 2016, the Water Governance Initiative, run under the umbrella of the Organisation for Economic Co-operation and Development (OECD), held its 8th international meeting in Rabat, Morocco (12–13 January 2017), and the 2030 Agenda for Sustainable Development explicitly places, under goal number six, water governance at the very core of sustainable development (United Nations 2015).

The actors involved in such initiatives, be they practitioners, activists or scholars, work to set governance principles, to disseminate good practices and to define and promote indicators allowing measurement of progress. They reflect on the definition of relevant tools to address the intricate challenges that water management is facing. At the same time, an expanding number of scientific articles, activists' calls and policy papers have been published, illustrating the lively debates regarding how water should or could be governed. It is to such approaches, concepts, principles and models that we refer to in this volume when we talk about "international water management trends."

In this regard, this book aims to reflect critically on these different trends by holding them up against what is happening in the field. The main objective is to revisit a selection of trends and to promote discus-

sion with the help of empirically grounded research mainly conducted in Switzerland. This Introduction is structured around five sections. Firstly (1), we focus on, along with the work of several authors, water crisis that is considered a crisis of governance. Secondly (2), we reflect on different international water management trends, on their contexts of origin and on relationships that occur between the different approaches. Thirdly (3), we present the nature of this volume. Fourthly (4), we reflect on the relevancy of case studies mainly conducted in Switzerland and explain why it represents an interesting laboratory for analyzing water trends. Finally (5), we introduce the structure of the book.

1 Water Crisis as a Crisis of Governance

Building upon resilience theories (Gunderson and Holling 2002; Berkes et al. 2000), we share the vision of water resources as a system characterized by strong interplays between society and the environment. Based on a multiplicity of feedback loops and interconnections, this system is particularly complex, fragile and unstable. Its renewal capacities and sustainability greatly depend on anthropic dimensions that entail both quantitative (water intakes, effects on water flows, etc.) and qualitative (pollution, increase of temperature, etc.) impacts on the resource. These interplays have become even more significant with the Industrial Revolution, which had two main consequences for the water sector: an increase in the goods and services derived from water resources; and an intensification of localized pressure due to spreading urbanization. Nowadays, these two continuous tendencies are followed by new challenges and uncertainties linked with climate changes. Among other illustrations, one can mention the growing occurrence of extreme events or the rise of temperature affecting the melting of glaciers and the overall ecosystem functioning.

In other words, the combination between the nature of the resource and its use by society may lead to what Hardin (1968) called a *tragedy*, in the form of resource overexploitation and/or pollution threats. As argued by many authors, the triggering factors of this tragedy generally arise

from governance failures (Pahl-Wostl et al. 2012), i.e., from incapacities to govern human behaviours in a sustainable way. The multifaceted characteristics, the diversity of acceptance and the complexity of governance processes imply a multiplicity of possible deficiencies that may, as this volume will show, occur in diverse settings and at different scales. Although for different reasons, this is just as much the case in developing as in already developed countries. As stated by Biswas and Tortajada (2010: 130): "*Because of the changes that are likely to take place, water governance has to change more during the next 20 years than it has in past 2000 years if societal needs for water-related activities, including environmental requirements, are to be met successfully in a timely, equitable and cost-effective manner*." As uncertainties grow, providing a solution to these governance failures becomes an even greater challenge.

The water crisis increasingly calls for the definition of governance instruments aiming at answering these weaknesses and anticipating possible changes. In this regard, our objective is to contribute to this lively debate by considering the different perspectives proposed to solve the water crisis through multiple analytical lenses and by anchoring our perspective in evidence-based research.

2 International Water Management Trends: Contexts and Filiations

In recent years, water management challenges have been embraced by a variety of approaches. Following incremental dynamics and under the influence of different objectives and agendas, several management trends have risen at the international level in order to define solutions to persisting water crises and to overcome the weaknesses of previous governance practices. Among others, one can mention Integrated Water Resources Management (IWRM), adaptive governance, water security or, more recently, the Water–Energy–Food Nexus.

These trends materialize both in normative approaches supported by international organizations as well as in more analytical frameworks produced by the academic community. This dual nature—normative and analytical—is, however, not so clear-cut and both dimensions interact

and nourish each other. In several instances, these trends have been developed firstly as an answer to practical and empirical concerns and have been (more or less) critically assessed by research only in a second step. This is particularly true for IWRM (GWP 2000a; Biswas 2004, 2008; Rahaman and Varis 2005; Giordano and Shah 2014), water security (GWP 2000b; Cook and Bakker 2012; Zeitoun et al. 2016) or the nexus approach (Waughray 2011; Hoff 2011; Allouche et al. 2014).

A number of publications, often following a historical perspective, track the origins of and critically explore these international water management trends. They contribute to identify their rationale and the main drivers for their emergence, development and, sometimes, revival. Researchers focus on their conceptual and ideological foundations, identifying underlying objectives, power games and political stances. They highlight their "why" (the specific agendas of their promoters) and "how" (the strategy by which they are initiated), as well as their shortcomings (among others: Biswas 2008; Rahaman and Varis 2005; Benson et al. 2015; Cook and Bakker 2012; Zeitoun et al. 2016; Allouche et al. 2015). Some authors, considering the web of multiple water management trends, also reflect on existing filiations and possible entanglements that exist among the different trends (among others: Engle et al. 2011; Varady et al. 2016). As an attempt at classification of such contributions, two main categories are brought forward.

The first element that emerges (1) is the building of a common filiation. Water management practices develop in relation to the sector needs but also follow deeper ideological tendencies. With the recognition of water uses diversity, the emergence of sustainable development principles and the increasing uncertainties related to climate changes, management practices and concerns evolve from a command-and-control perspective (Engle et al. 2011) to more horizontal, adaptive and transversal modes of governance. This evolution is supposed to imply changes in the way the water sector is governed, from centralized top-down dynamics to the development of decentralized and polycentric systems taking into consideration bottom-up dynamics and asking for growing flexibility. Despite substantial differences, similarities and overlaps in the definition of governance innovations are not rare. Complementarities and hybrid models do exist, more especially as new trends do not emerge in a vacuum. They

are shaped by political choices and can be confined or inhibited by the legacy of previously implemented perspectives. For instance, the rise of) IWRM heavily structured succeeding water policies and institutional reforms. Consequently, new path dependencies constantly occur, limiting or blocking the rise of new tools and perspectives regarding the management of water resources (Engle et al. 2011; Benson et al. 2015).

The second category of contributions (2) deals with the identification of shortcomings. On the one hand, several trends are criticized for their vagueness. They present the risk to remain *idealistic buzzwords* (Rahaman and Varis 2005) or *nirvana concepts* that do not fit real-world concerns (Petit 2016; Allouche et al. 2014; Molle 2008; Biswas 2008) and can only have a limited influence on concrete policies. On the other hand, authors built on the identification of weaknesses to highlight the causal links that sparked off new developments. For instance, Varady et al. (2016) demonstrate how one concept (IWRM) was subject to criticism for not being adaptive enough, having no clear objectives and not being sufficiently integrative. Following these three critiques, the authors establish the link with three concepts that emerge as an answer: adaptive management, water security for clearer objectives and the nexus approach for reinforced integration.

3 Nature of This Volume

Water management is seen to have evolved from centralized, top-down government to decentralized, more adaptive, multiscalar and bottom-up governance. This evolution conveys a change in the perception of the environment, of water resources and of existing interactions with society. The growing concerns regarding the environment, the emergence and continuous reinforcement of sustainable development principles and new concerns related to climate changes have been strong drivers for a reinforced consideration of water as a complex socio-ecological system. In this regard, this book addresses a non-exhaustive number of closely interlinked international water management trends that we consider as deeply structuring for the water sectors (see Fig. 1.1):

Fig. 1.1 Structure of the book

- Local Community Governance (LCG)
- Integrated Water Resources Management (IWRM)
- Transboundary Water Management
- Multi-Level Water Governance
- Water Privatization
- Water Market-Based Regulation
- Climate Change Adaptation and Water
- Water Security
- The Nexus Approach

A specific chapter is dedicated to each of these trends. The plurality of the contributions should enlighten the volume and contribute to the following three main objectives: Firstly, this book aims to critically reflect on the nature of the different trends. Each chapter explores their underlying assumptions, providing an overview of existing literature as well as a critical viewpoint. They question their nature and shortcomings from a diversity of perspectives (see later in the chapter). Secondly, the chapters are also organized to provide additional food for thought regarding the analytical and explicative power of these trends. On this basis, we want to build concrete analytical recommendations for water research as well as for practitioners that are confronted with such management trends in their everyday life. Finally, authors were asked to address the diversity of the "real-world" transpositions of these trends, with the underlying goal to assess the extent to which abstractly formulated goals influence domestic policy-making, the (sometime unintended) consequences their implementation reveals and the perceptions that actors have of them.

This book assembles contributions written by social scientists from diverse disciplinary backgrounds (political science, heterodox economics, political geography). In our view, such perspectives are essential in dealing with the inherently political profile of water governance. As already stated, we are convinced that socio-ecological systems are strongly influenced by anthropic components and that water management trends represent social constructs that are nourished by particular agendas, implying power relations and concrete impacts in the field. We are thus strongly convinced that, in addition to providing "information on water use and resources" as emphasized in the *Nature* editorial (Nature 2016: 170),

a crucial role of the scientific community should consist in disentangling the social, political and economic dimensions of water governance.

4 Switzerland as a Laboratory

Switzerland is a low-populated and relatively small country (about eight million inhabitants, 41,285 km^2) located in Western Europe, at the heart of the Alps mountain range (see Fig. 1.2). Despite being at the geographical centre of Europe, it is not part of the European Union. From the economic perspective, the country is a remarkable example of long-lasting stability that resulted in a strong economy (second-highest GDP per capita in the world[1]), ranking at the top of global competitiveness (Schwab 2016).

Switzerland is a water-rich country that receives close to 1500 mm of precipitation every year (Beniston 2012), although some areas in the

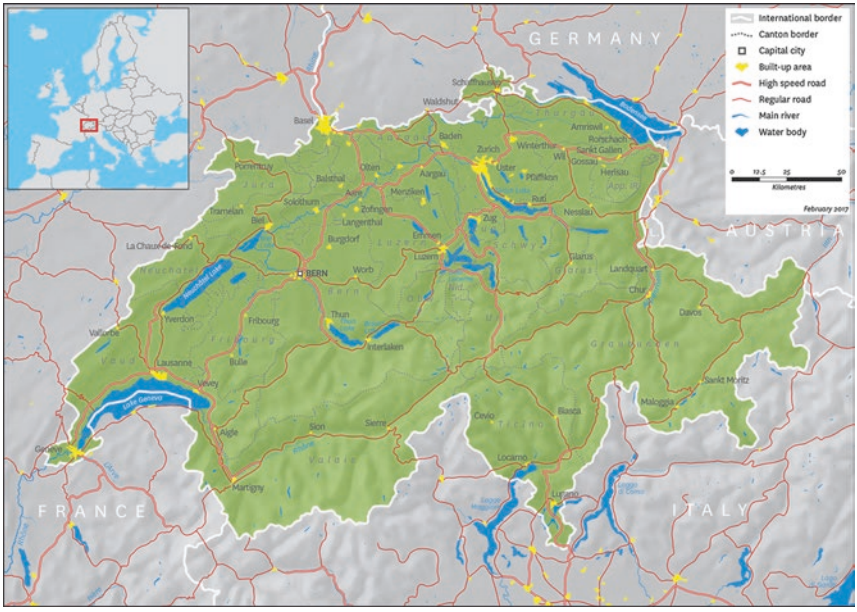

Fig. 1.2 Switzerland, geographical positioning

Swiss Alps prove to be dryer (e.g., only 600 mm of annual precipitation in some places along the Rhône valley). Overall, the Swiss mountainous topography ensures high annual rainfall, about twice the average of European values. Albeit the country covers only 0.4 percent of the European continent, its water resources represent about 5 percent of the continental reserve. Switzerland is therefore often depicted as the water tower of Europe (OFEV 2012), being the source of major European rivers, including the Rhône and the Rhine, and linked with important continental river systems such as the Danube and the Po. The country is particularly affected by climate changes. Since 1900, temperatures have risen at a rate about three times higher than the global average in the twentieth century (Beniston 2012). These changes imply less snow precipitation, heavy melting of glaciers (between 30 percent and 40 percent since 1900; see Haeberli and Beniston 1998) and an increase of intense rainfalls (Beniston 2006) and droughts (Reinhard et al. 2005).

We consider Switzerland as a very relevant laboratory to reflect on international water management trends. The country is characterized by both political and geographical specificities that provide valuable settings to analyze how international water management trends relate to domestic water policies and practices in a Western, politically stable context.

4.1 The Swiss Political System: Specificities

Switzerland is a country of cleavages (Linder and Steffen 2007): linguistic of course, but also religious and geographical (urban vs. rural). It is organized as a federal system relying on three interacting levels: the Confederation, the cantons (member states) and the communes (municipalities). Based on a compromise between a liberal-Protestant majority and a conservative-Catholic minority, the Swiss federal system was created "with limited powers for the central Government and a considerable degree of autonomy for the 'member states' in order to protect their cultural (i.e., linguistic and religious) differences" (Linder and Steffen 2007: 16). Modern Switzerland is shaped by this federalist structure as well as by extended popular rights, which both had a profound impact on the practice of "conflict resolution through negotiation" (Linder and Steffen 2007: 17).

The current organization of political institutions is based around a series of core principles (see Vatter 2007) such as the division of power: the Federal Council (composed of seven members) acts as government, the bicameral Federal Assembly (National Council and Council of States) as parliament, and the Federal Supreme Court as the judiciary authority. The Swiss political system is, in addition, deeply structured around the principle of subsidiarity, according to which "*nothing that can be done at a lower political level should be done at a higher political level*."[2] The twenty-six cantons that compose the Swiss Confederation, as well as the thousands of municipalities, thus benefit from far-reaching responsibilities both in elaborating policies that are not explicitly attributed at a higher level (principles of cantonal and municipal autonomy) and in implementing federal, respectively cantonal, policies (principle of executive federalism). Overall, the Swiss political system is characterized by a strong degree of decentralization, and the water sector makes no exception.

4.2 Regulation of the Swiss Water Sector

In Switzerland, the main regulatory competencies related to water are attributed to federal authorities. According to the constitution (Article 76), the Confederation shall lay down principles and legislates on water conservation and exploitation, on the use of water for the production of energy and for cooling purpose, on water protection or on appropriate residual flows. The regulation of the water sector is thus mainly dependent on federal legislations that cantons and municipalities are responsible to enforce and specify.

The Swiss water sector has already been extensively analyzed by scholars focusing on the evolution of its institutional regime (Gerber et al. 2009). This approach argues that the management of water resources is mainly controlled through specific protection and exploitation policies, on the one hand, and through property regimes that define ownership, disposition and use rights, on the other (Mauch et al. 2000; Varone et al. 2002). These analyses illustrate an evolving collective-action problem and the development of specific answers driven by the central state. Authors identify four phases of development for the Swiss water public policies ranging between 1871 and 2000 (Varone et al. 2002: 91):

The first phase (1), from 1871 to 1908, is structured around three main collective problems to be addressed: flood protection, acute pollution concerns and the need to reinforce energy production capacities from hydropower. Without being materialized by the development of a concrete water policy, this first phase sees the development of several sectorial policies dedicated to solve these different issues. Flood risk is mainly targeted through the protection of forests (federal forest law of 1876), water quality is subordinated to the protection of fish stocks (federal law on fishing of 1888) and the increase of hydropower capacities comes along with the will to exploit watercourses extensively (federal law on the use of hydroelectric power after 1908).

The second phase (2), from 1908 to 1953, is characterized by the expansion of water use policies with a focus on energy and food production. In parallel with the aim to reinforce the protection against flooding, public policies are defined in order to reinforce the energy and food production capacities of Switzerland in a context of the World Wars. On the one hand, concessions are awarded in order to increase hydropower production capacities while, on the other hand, measures are adopted in order to improve and extend capacities regarding land use and agriculture (Agriculture Law of the 3 October 1951).

In the third phase (3), from 1953 to 1991, Swiss lakes strongly suffer from eutrophication. As an answer, the Confederation adopts (1955) the Federal Law on the Protection of Water (1956), which is materialized by different measures aiming at protecting water against pollution, including the subsidization and construction of water treatment plans. After a second period mainly concerned with the maximization of water use, this phase is dedicated to attenuation of the negative effects that this production-centred perspective induced. In this regard, this phase is characterized by an aim "to improve co-ordination of all efforts and to take into account the entire water cycle in the protection policy" (Varone et al. 2002: 90).

The fourth phase (4) begins in 1991 with the definition of a new water policy materialized by the Federal Act on the Protection of Waters. This phase sees the development of more holistic water policies targeting the "*the global preservation of water, in terms of quality, quantity and landscape*" (Mauch et al. 2000: 56). In this regard, it's a period focused on the

development of a reinforced integrated policy design. On the one hand, it targets the reinforcement of coherence among different sectorial policies. On the other hand, it aims at expanding the perspective, considering water quality but also water quantity issues (the definition of minimum flow), notably in relation with maintained biodiversity and landscape functions of water resources.

4.3 Emerging Issues and Implementation Challenges

Currently, one can say that the Swiss water regulatory framework tends toward integration, with a great extent of regulation (high number of goods and services effectively regulated, strong capacities of rules enforcement by the state) and strong coherence (weak number of counterproductive messages between regulatory sources or regulatory levels, right targets and implemented policy instruments). This affirmation appears, however, relativized by a series of emerging issues and of implementation challenges that should be dealt with.

The regulatory framework is facing, on the one hand, growing complexities and uncertainties related to socio-economic and climate changes, two tendencies that are very likely to increase the pressure on the resource. Along with the reinforcement of environmental norms in the last decades, the sector will need to deal with new issues (e.g., micro-pollutants) that are currently growing on the political agenda and will require specific actions. More generally, it will also be confronted with a growing number and intensification of uses, leading to new and amplified rivalries to be arbitrated. As a consequence, transversal and intersectoral thinking is very likely to become key. In the Alps regions and in Switzerland in particular (Beniston 2012), climate changes also come with new uncertainties requiring rethinking water management and raising new needs related to institutional flexibility and adaptation.

On the other hand, and despite the political and economic stability that may be seen as a catalyst for the enforcement of policies, authors have shown how gaps and discrepancies may arise during implementation processes (Bréthaut 2013; Schweizer 2015). The multi-level dimensions inherent to the Swiss political system (principles of cantonal

autonomy and of executive federalism), the remaining gaps and incoherencies of the regulatory framework, the importance of localized contexts, distribution of water uses and administrative structures, the configuration, power relations and diverging strategies of actors that are not necessarily willing to implement environmental prescriptions–these are some of the elements that may disturb the linear implementation of rules decided at the federal level.

5 Structure of This Edited Volume

This book is structured around three clusters that cover nine international water management trends, perceived as normative or analytical frameworks (if not as both) (see Fig. 1.1). Switzerland is mobilized as a relevant laboratory for interrogating the nature of these trends, their analytical potential and the diversity of their transposition on the ground. Some of the contributions focus only on this country, providing in-depth case studies or surveys of actors' preferences at the federal, cantonal or local level. Others initiate a dialogue with other parts of the world, which allows putting this mainly Swiss focus into perspective.

The first cluster compiles contributions that reflect on dynamic interactions across scales, sectors and territories. Four trends are discussed: local community governance, IWRM, transboundary water management and multi-level water governance.

In Chap. 2, Rémi Schweizer explores local community governance of water in the canton of Valais, one of the driest regions of Switzerland. He questions the argument that water is a *common* that would better be governed locally and collectively, an idea that increasingly spread since the work of Elinor Ostrom (1990) and her colleagues. Using the case of water irrigation systems, the author focuses on existing governance structure to explore three issues: the delimitation of community boundaries (also meaning exclusions), the power balances and inequalities within local community and the interplay between these communities and public authorities. The analysis provides a more contrasted image than the romanticized illusion conveyed by some of the literature and argues for thicker institutional and political analyses in order to avoid falling into a "commons" trap.

In Chap. 3, Arnaud Buchs explores the concept of IWRM. Internationally promoted for decades, integration has been considered as an imperative for sustainable water use by Swiss federal authorities since the early 2000s. However, the operationalization of the notion leads the author to question the gap vis-à-vis the theoretical model. To do so, he draws on an analysis of the different phases leading to the renewal of a cantonal water act in the canton of Fribourg. Mobilizing an economy of convention approach, he shows how integrated management has to be considered, in the end, as a regionalized institutional compromise that is far from a purely functionalist vision: first, the scope of sectoral integration is not given; second, the scale finally adopted does not fit exactly the watershed, even though it is presented as the perfect functional space for regulating water use.

In Chap. 4, Christian Bréthaut focuses on the transboundary water management of the Rhône River, involving Switzerland and France. On the one hand, the chapter explores the evolution of the Rhône's Functional Space of Regulation (Varone et al. 2013). The author reflects on the evolution of the public problem, of the role of the state in the operational management of the river, and of the geographical boundaries and forms of regulation. On the other hand, he analyzes the river's evolving configuration of actors and notably the role played by non-state actors coming from different sectors. In the end, he shows how a non-state actors' perspective allows considering transboundary river management through different lenses that are crucial in understanding its evolution: power relations, actors' strategies to secure different water needs and the evolving role played by central states.

In Chap. 5, Emilie Dupuits deals with the multi-level governance (MLG) framework, which emerged as a new approach to analyze the fragmented nature of socio-ecological systems. This chapter is the only one that does not address the Swiss case but, rather, focuses on Ecuador. This is justified by the author's goals to show, first, the Eurocentric cultural bias that many water management trends entail and, second, the inherently political nature of scalar politics. Many trends analyzed in this book emerged, indeed, in a Western context, often with the support of strong international organizations. This chapter aims to address a case outside the Western contexts and to put the trend of multi-level water

management into perspective with non-Western viewpoints and concepts such as neo-extractivism (Andrade 2013).

The second cluster puts in the spotlight the link between water management and economic issues. More specifically, it reflects on concepts that aim to view water as a financial commodity. Two trends are addressed: privatization and market-based instruments (MBIs).

Chap. 6 focuses on privatization trends of the water sector in Switzerland. Eva Lieberherr leads a comparative analysis between two Swiss cities (Zurich and Bern) considering the specificities of a federal system. In particular, the author focuses on the relationship between privatization of the water sector and democratic legitimacy. The cities chose two different water management systems: direct public management in Zurich, formal privatization and delegated public management in Bern. The comparison of management processes allows an assessment of democratic legitimacy in both cities.

Florence Metz and Philip Leifeld contributed Chap. 7. They focus on the use of MBIs to govern emerging issues related to water quality (e.g., micro-pollutants). Environmental economists have advocated MBIs for their effectiveness, cost-efficiency and flexibility, but lessons from past experiences indicate that issues related to administrative complexities, legitimacy or uncertainty can arise. Turning the academic debate into an empirical one, the authors take an actor perspective and assess the potential for introducing MBIs in Switzerland. In the end, the preferences of Swiss policy actors show that support for command-and-control or voluntary instruments exceed market-based approaches for reducing emerging pollutants in water, recalling the necessity to consider political dimensions and stakeholders' objectives when reflecting on the definition of policy tools for water management.

Finally, and to echo the work of Varady et al. (2016), the tendencies described in the first two clusters also raised criticisms that generated the development of alternatives. In this regard, the third cluster concentrates on three innovative perspectives on water stakes: climate change adaptation, water security and the nexus approach.

Chapter 8 is written by Johan Dupuis and examines the status of climate change adaptation in water governance. The author questions, on the one hand, the meaning of a concept that encounters a strong polysemy

in practice and, on the other hand, the complex and erratic nature of adaptation policy processes, which may result in outputs that highly diverge from the positive expectations held in the literature and in international fora. As for other types of concepts (and notably IWRM), stakeholders may use the fuzzy and encompassing notion of climate change adaptation strategically. In order to illustrate these issues, the author uses different examples situated in Switzerland, India and France.

In Chap. 9, Thomas Bolognesi and Stéphane Kluser focus on the concept of water security. They discuss, in a first step, the different indicators that have been developed to measure water security, showing the strong heterogeneity that existing assessments reveal. Then, in a second step, they reflect on the reciprocal relationship between the integration of water regimes (reinforced regulatory capacities of goods and services) and water security improvement. In particular, the authors suggest that water security represents a crucial trigger for water regime evolution by anticipating issues in governance fitting and evolution and new uses rivalries. They conclude that water security would better be conceived as a governance principle for the adaptive management of water regimes rather than as a normative goal to reach.

Luc Tonka is the author of Chap. 10. He concentrates on the nexus approach in order to provide elements of explanation regarding the reasons why, to date, its promises have not been fulfilled. To do so, he provides a detailed assessment of extent by which the water management strategies developed by the Swiss cantons of Bern and Valais match the principles of a "nexused" approach. By bringing institutional and actorial analytical dimensions to the foreground, he highlights the triggers and obstacles to a "nexused solution" and illustrates the intrinsically political dimension of use allocation choices.

Given the crucial importance of water resources, great complexity and lively debates are not surprising. Thus, trends addressed in this book illustrate several attempts to grasp and provide answers to the practical and intellectual challenges posed by water management. In this regard, this book aims to critically question different trends that heavily structure the way water resources are considered, the way water policies are defined or the way water projects are financed. Taking advantage of evidence-based perspectives founded into recent fieldworks that have been

conducted in similar areas, this volume illustrates the diversity of approaches and the complexity of the tasks. It shows the close interplay that arises between normative and analytical viewpoints. By doing so, we hope that this volume will provide insightful and reflexive considerations to practitioners, scholars or users interested by the management of water resources.

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Notes

1. http://data.worldbank.org/indicator/NY.GDP.PCAP.CD?year_high_desc=true (visited 9 January 2017).
2. www.admin.ch/gov/en/start/federal-council/political-system-of-switzerland/swiss-federalism.html (visited 9 January 2017).

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Christian Bréthaut is an assistant Professor at the Institute for Environmental Sciences at the University of Geneva. He leads the Education and Knowledge component of the Geneva Water Hub and co-leads the UNESCO Chair on

Hydropolitics from the University of Geneva. His work focuses on challenges interlinked with transboundary contexts and with intersectorality. He is a co-editor of the Palgrave Series in Water Governance.

Rémi Schweizer is a senior researcher and lecturer at the ETH Zürich. His research focuses on environmental and food governance, with an interest in power relations, policy implementation and innovation and local community governance. Author of several books and articles, he conducts research with a strong empirically grounded approach.

2

Avoiding the Commons Trap: An Exploration of Local Community Governance of Water in Valais, Switzerland

Rémi Schweizer

1 Introduction

Today, the idea of *commons* (in the singular or in the plural, as a name or a qualifier) acts as a mobilizing banner that gathers academics and activists from various horizons. More than the intrinsic nature of the resources qualified as such, what is put forward is a form of social organization that relies on community initiatives and local-level solutions to foster sustainable development—what I will call *Local Community Governance* (LCG).[1] In the wake of the United Nations Conference on Environment and Development (UNCED) of 1992 and of crucial scientific contributions at the turn of the 1990s, the idea progressively emerged that LCG

R. Schweizer (✉)
Natural Resource Policy Group (NARP), Swiss Federal Institute of Technology (ETH), Zürich, Switzerland

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models could contribute to a more democratic, fair, sustainable or effective management of natural resources. This worldwide trend is partly rooted in water governance debates, at the same time as it has strongly infused them. The notion that "*water is a common*" became a rallying cry, leading to the production of a wide range of scientific literature, strategic papers and non-governmental organizations' (NGOs) statements that highlight the necessity to develop, maintain or come back to more local and cooperative forms of governance.

As this enthusiastic body of research developed, however, some authors have been providing a more nuanced picture, pointing out the mixed results of LCG, questioning the underlying assumptions of the literature and emphasizing complexities and social dynamics in resource governance. The aim of the present chapter is to explore some of the controversies and analytical pitfalls that arose by comparing them with what is happening in the field. The first part starts from the eclectic consensus generated by LCG and identifies three constitutive dimensions of a minimal definition: a clearly delineated community; a principle of self-governance; and an endogenous local regulatory arrangement. The chapter continues by reviewing more critical streams of literature, from which three controversies arise in relation to these constitutive dimensions: the more or less exclusive delineation of the community; the nature of the interactions within and around it; and the interplay with state actors and regulations. These controversies are then confronted to the case of the Valaisan bisses, which provides a sound empirical field to discuss them. The necessity to go beyond a sentimentalized image of LCG and to avoid falling into a form of "commons" trap, as well as avenues for future research, are identified in conclusion.

2 From an Eclectic Consensus to a Minimal Definition of LCG

During the last three decades, considerable attention has been devoted to LCG as a successful strategy for avoiding Hardin's (1968) "Tragedy of the Commons." Departing from the deep-rooted pessimism that the

"Tragedy of the Commons" contributed to spread, a pervasive consensus (Mosse 1997) in favour of LCG progressively emerged. This enthusiasm has been nourished by a wide range of examples from all around the world, regarding resources as diverse as mountain pastures, forests, fisheries or water (Berkes et al. 1989; Ostrom 1990). The widespread existence and numerous benefits of LCG have been demonstrated and, more than often, their development or revival called for. Elinor Ostrom crucially contributed to the dissemination of the notion with her 1990 seminal book, to the point that she received the 2009 Nobel Prize in Economic Sciences for the way she "*challenged the conventional wisdom*" by demonstrating how natural resources can successfully be managed as "*local commons without any regulation by central authorities or privatization*.".[2]

At the heart of this worldwide trend is, as suggested by the preceding statement, an operational emphasis on local communities and an empirical investigation of the conditions under which their members will be led to *cooperate towards a common interest*—a dimension that Hardin and his followers failed to consider. What is put forward is a heterogeneous world of social and institutional practices that goes beyond the logics of market and state, a way of governing natural resources that is different from top-down state intervention and privatization. As such, the notion conveys a plasticity that makes it attractive to actors from diverging, sometimes loosely connected areas (McCarthy 2005).

Scholars have studied local forms of cooperative actions from very different perspectives, rooted in long-opposed social sciences traditions. Often classified in dichotomous ways (see Mosse 1997; Johnson 2004), the main academic streams oppose rational-choice institutional-economics (in line with Ostrom) to socio-historical approaches influenced by notions of moral economy (Scott 1976). In activists' or practitioners' circles, too, the idea of *commons* is mobilized by various actors, from alter- or anti-globalization circles with more or less radical agendas (e.g., Klein 2001; Bollier 2002)—which see them as an alternative to the commodification, corporatization and propertization movements that came with the neo-liberal turn of the 1980s—to international organizations with more or less liberal approaches—which see the

devolution of management competencies as an alternative to state-owned or state-operated utilities and as a way to reduce subsidies by transferring costs to local users.

A similar attraction towards LCG can be found in the specific area of water. The vision of water as a *common* that would better be collectively managed (by local communities, water users associations, watershed committees) gained considerable weight in the academic literature (Wade 1988; Trawick 2001), among activists' circles (Shiva 2002; Barlow 2007), and in international debates (United Nation 2015). Again, two broad schools of thoughts can be identified (Bakker 2008): a first perspective that emphasizes community solidarity, traditions and moral codes in preserving and providing water resources for community members (Shiva 2002; Trawick 2001); and a more utilitarian perspective that underlines how LCG can function to avoid water resource depletion amongst a strictly delineated group of users (in line, again, with the work of Elinor Ostrom).

These different approaches depart from antagonist worldviews and theoretical strands. If one wished to sort them out, however, one could say that they all emphasize modes of governance that do not rely on the interventions of a distant authority (through public policies or the guarantee of ownership), but on solutions devised by the users themselves. Although the main points of emphasis may vary, most contributions highlight a series of principles that are structured along a common line. Without pretending to settle existing disputes, I propose a minimal definition of LCG by drawing this line along three dimensions:

- *the existence of a clearly delineated community*, organized within a structure of governance that gathers the users of a (system of) resource(s);
- *a principle of self-governance* according to which the community can elaborate and impose to its members its own system of rules, without the intervention of an external authority and with a strong involvement of members;
- *a local regulatory arrangement* that is formed through the aggregation of these endogenous rules and has the legitimacy to monitor the actions of the members vis-à-vis the resource (notably through the distribution of use rights among them);

3 The Debates Around LCG: Three Points of Controversies

As this eclectic consensus developed, more critical stances also began to appear. Scholars have, in fact, regularly pointed out the shortcomings of the LCG trend (see Mosse 1997; Agrawal and Gibson 1999; Leach et al. 1999; Bakker 2008; Saunders 2014; Cleaver and de Koning 2015): how its promises often fell short of expectations; how the two schools of literature (rational-choice and moral economy) contributed to diffuse a *romanticized image* of the community; and how the analyses that are provided are more than often oblivious of power relations, inequalities and wider political structures. Hall et al. (2014), in an attempt to synthetize key themes of debates, identify three main lines of critiques: the *homogenous community*, associated with a mystification that "can lead to the exacerbation of inequalities and exclusion" (p. 73); the *avoidance of politics*, which prevents LCG analyses to account for the ways in which "power relations at local levels affect institutional outcomes" (p. 76); and the *socially inadequate analyses* that are provided.

At the hearth of these critical contributions are, of course, ontological debates about the nature of individuals and of social interactions. But these debates also have implications on a more empirical and operational level, as they raise crucial questions related to the nature of LCG: does the *delineation of the community* result in an exclusive or an inclusive model of governance (dimension 1); are heterogeneity and power relations within local communities a reality and, if so, how do they materialize in the *local regulatory arrangements* governing resource uses (dimension 3); how does the inclusion of local communities within wider frames of governance take place and what does it means in terms of self-governance (dimension 2)? These three points of controversies and the analytical pitfalls they lead to are briefly described hereafter.

3.1 The Delineation of the Community (Ins and Outs)

The delineation between the commoners (*ins*) and the outsiders (*outs*) is at the core of LCG models as analyzed by Elinor Ostrom (1990) and her followers, but also by scholars from the moral economy school

(see Johnson 2004). Historically, the development of LCG approaches can be understood as a reaction against the equivalence made by Hardin (1968) between the notions of *commons* and of *Open Access* : for LCG proponents, *commons* do not rely on "any one" property but, to the contrary, on a collectively organized system of rights and obligations. The allocation of these rights delineates the community of users and differentiates LCG from open-access models.

The question remains, however, as to the exact level of exclusivity—or of inclusiveness—that is characteristic of LCG. For some, a major benefit is the importance given to a certain level of openness (Weinstein 2015, 77) and to the adoption of rules that "enhance, not restrict, access" (Johnson 2004, 415). For others, to the contrary, the "key is the ability to limit the access of outsiders" (Berkes 2006, 3) and to develop a form of "private property for the group" (Bromley 1992, 11). If both points of view are not necessarily antagonist—one can limit the access to a resource while maintaining a certain level of openness–their normative concerns are quite opposed: in the first case, it is a *philosophy of inclusion* that is put forward, while in the second case the accent is put on the *crucial dimension of exclusion*, with the risk of developing models of governance that are regressive (Bakker 2007, 447) and serve to reproduce gender and caste exclusions (Mosse 1997, 499). Failing to consider the possibility and consequences of exclusion represents a first pitfall for empirical analysis.

3.2 The Nature of Interactions Within and Around the Community

The nature of interactions within and around the community is another point of division. Regardless of whether the accent is put on simply calculated pay-offs (in institutional-economic approaches) or on traditional wisdom (in the moral economy school) to understand rules development, LCG analyses have been criticized for avoiding politics (Hall et al. 2014, 76–80). Several contributions emphasize their limits when it comes to the understanding of historically specific structures of power (Mosse 1997, 470) or of heterogeneity within communities (Cleaver and de Koning 2015, 2). Questions related to social conflicts and inequalities

are not necessarily negated, but do not represent a major entry point. To the contrary, the image of "a community in which resource users are on roughly equal footing" (as explicitly put forward by Schlager 2005, 39) often prevails. The focus is very much on the capacity to cooperate towards a common interest, to restore harmony with the environment, or to develop endogenous (and therefore legitimate) rules.

Yet there are no reasons why the local regulatory arrangements that are at the core of LCG wouldn't be the result of negotiations and bargaining among commoners; and no reasons why these social interactions wouldn't be shaped by the power relations, the specific interests and the inequalities that necessarily exist within local communities (Agrawal and Gibson 1999; Mehta 2001; Bakker 2008). These communities are internally differentiated, and the claims of one or another member may be highly contested (Leach et al. 1999). There is, therefore, a challenge to take heterogeneity and power relations seriously and to show how they concretely work to shape and sustain local regulatory arrangements. Failing to do so represents a second analytical pitfall.

3.3 The Interplay Between the Community and State Actors/Regulations

The place of these local regulatory arrangements "within the wider frames of governance" (Cleaver and de Koning 2015, 2), and in particular within public policies, represents a last point of controversy. LCG approaches are often promoted in reaction to the perceived failures of top-down state interventions—either because they are supposedly inefficient or at the mercy of private interests. There is a convergence in diffusing an image of communities not only as homogenous, but also as isolated entities providing an alternative to public regulations. Autonomy and independence from state systems are emphasized (Mosse 1997, 469), and the complex interplays with public policies are not fully explored. Ostrom (1990, 90), for instance, mainly considers the relationships with "external governmental authorities" from a negative perspective, putting forward the recognition of a minimal right to self-organization and the absence of interference.

Several contributions have, however, highlighted the need to pay more attention to the relationships between state agencies and policies, on the one hand, and local communities and endogenous rules, on the other. Both in Southern (see Lund 2006 for the case of Africa or Roth 2009 for the case of Indonesia) and Western countries (see Gerber et al. 2011 for the case of Switzerland), the exploration of these relations has proved to be crucial in understanding resource governance. Also within the commons scholarship, a large body of literature emerged around the idea of co-management (Berkes et al. 1991), analyzing these interdependencies with emphasis on power sharing, collaboration or, more recently, adaptation (Olsson et al. 2004) and social learning (Berkes 2009). All these contributions point, in sum, to a third analytical pitfall related to the necessity to put LCG in context by questioning its interplays with state actors and regulations.

4 The Case of the Valaisan Bisses

The irrigation channels known as *bisses*, in the Swiss Alpine canton of Valais, provide an opportunity to explore LCG in a context that has been raised as a major point of reference in the literature. Relying on the empirical work of the American anthropologist Robert Netting (1981), Elinor Ostrom explicitly mobilized the Swiss example in her 1990 book and, in the following years, several authors have explored the Swiss commons from a variety of perspectives (e.g., Kissling-Näf et al. 2002; Stevenson 2005; Gerber et al. 2011; Baur et al. 2014). In a political system ensuring high autonomy in resource management, Swiss agro-pastoral resources are often presented as paradigmatic examples of resources that have been collectively—and successfully—managed by local communities. This holds true for pastures or forests as well as for these famous bisses.

As in other dry mountain regions around the world, supplying water to the canton of Valais has always posed major challenges. This struggle led to the construction of irrigation schemes characterized by spectacular channels hollowed out of the ground or attached to the sides of vertiginous precipices: the bisses, in French, or *Suonen*, in German. Showing long trajectories of historical continuity, these smallholder systems have

been watering crops for centuries and are still providing a wide range of services that are crucial not only to the mountain communities, but also to the people living downhill: water provision, regulation of floods, biodiversity support, landscape formation, socio-cultural services and, more recently, touristic functions. Built by local communities of users, bisses have been traditionally characterized by endogenous governance structures and community water-rights systems, the robust, long-enduring and sustainable nature of which has been highlighted many times (e.g., Crook 1997; Wiegandt 2008). This community-engineering heritage, witness of a *creative institutional genius* (Rodewald and Knoepfel 2011), has fascinated scholars, political authorities and citizens for centuries.[3]

The goal is to discuss this institutional genius at the light of the analytical pitfalls identified earlier. The general characteristics of bisses governance models and their correspondence to an ideal type of LCG are questioned in a first step, before being confronted with the three controversies. The analysis is based on the empirical material gathered in the context of a research project conducted between 2010 and 2013 (Schweizer et al. 2014)[4] and relying on an in-depth exploration of five case studies (*bisse Vieux, bisse de Tsa Crêta, Torrent-Neuf, Niwärch, Grossa*), as well as on more general secondary sources.

4.1 Bisses as a Paradigmatic Example of LCG?[5]

Although the *bourgeoisie* (*Bürgergemeinde*)[6] as a whole was in some few places responsible for their operation, bisses governance traditionally relies on ad hoc entities that gather (and delimitate) the circle of their users: the *consortages* (*Geteilschaften*). These *consortages* (today recognized as corporations of cantonal law) represent endogenous structures of governance specific to an irrigation network, an important water channel or a sub-portion of network. They hold the rights to derive a certain amount of water from a river (today recognized as an *immemorial water right*) and to convey that water to the irrigated fields through a series of channels. Their main roles are, on the one hand, to avoid rivalries regarding the access to water and, on the other hand, to develop, maintain and operate the network through a collectively organized system of rights and obligations.

At the individual level, the water derived in the network is divided among the members of the consortage (*consorts/Geteilen*), who received a certain number of water rights (*droits d'eau/Wasserrechte*) at the time of the construction. Expressed in "hours," these rights are distributed according to a strict schedule that determines when exactly they can be exercised (*tour d'eau/Wasserkehr*). They are generally recorded in a register (*ratement/Wasserbuch*) that reports the transfer or creation of new rights. If the rights of the consortage to derive and convey the water are held collectively and cannot be disposed of without the consent of the community, the water rights are individual and can be transferred under certain conditions. In some areas, these rights are strictly linked to private property rights on the irrigated field (i.e., they cannot be disposed of separately) while in others they are independent (i.e., they can be disposed of separately). The transfer of water rights outside the community can, in addition, also be limited or require the approval of the community. In any case, water rights are transferred by inheritance and the consorts can collectively decide to create new water rights to be distributed among them or allocated to new members. The boundaries of consortages are, thus, in constant evolution.

Each water right is associated with maintenance (*corvées/Gemeinwerk*) and financial obligations, as well as with a voting right at the general meeting of the consortage (*Assemblée générale/Geteilenversammlung*). The *corvées* refer to a certain number of workdays to be spent on the channel, usually at the beginning of the irrigation season. For maintenance and general surveillance, a water guard is generally appointed among the members and supplementary corvées can be organized. The day-to-day operation of the network is ensured by the committee (*comité/Vorstand*) and mainly based on customary practices and routines. The *Assemblée générale* gathers all water rights holders and represents the supreme entity of the consortage. It is responsible for formalizing operational rules (although this is rarely done before the twentieth century), allocating new water rights, sanctioning offenders (in case of water theft for instance) and electing the committee.

Although some dimensions might vary from one bisse to another, very similar systems of rights and obligations can be found throughout the canton. Bisses governance thus fully matches the three components of

LCG as defined in this chapter, and do represent relevant empirical fields to explore the controversies we are interested in:

- Consortages represent *clearly delineated communities* that gather bisses users.
- They have a capacity to elaborate and enforce their own system of rules, based on a strong involvement of users and without the intervention of an external authority (*self-governance*).
- The collectively organized systems of rights and obligations, aggregated to customary practices and routines, form an endogenous *local regulatory arrangement* that monitors the actions of the consorts vis-à-vis the resource.

4.2 The Delineation of the Community (Ins and Outs)

Water represents, in an agro-pastoral society where irrigation was for a long time the only way to increase productivity, a resource under pressure. This holds true both at the level of river basins (concurrence between consortages) and within the different irrigation schemes (concurrence between peasants). Not surprisingly, the resolution of these rivalries required a prioritization of some users over others. The main objective of the consortages was, precisely, to guarantee (i.e., to reserve) the access to water for members of the community. The presence of excluded groups appears in that respect inherent to these models. Two empirical zooms can be mobilized to support this assertion.

In one case where the archives of the consortage (period 1930–1974) were carefully kept (*bisse de Tsa Crêta*), the consorts alternated between agreeing (1930, 1954) and refusing (1952) to welcome new members. Torn between the need to maintain water supply and that of finding new revenues in a context of rural abandonment, the consorts opened up the resource mainly to bring new financial resources, notably in relation to a costly maintenance project in 1930. These observations confirm the more general conclusions of Wiegandt (1980, 155), who states that since the sixteenth century, the commoners of the village have protected their

interests by deciding to open or to close their agro-pastoral resources to outsiders.

The *Torrent-Neuf* constitutes a second revealing case, one of the few where the channel was, in a first phase, operated by the entire *bourgeoisie*. It was only in 1810 that a separate consortage was created with the goal to protect the resource from outside hands (Roten Dumoulin 1990). In the wake of the French Revolution, the egalitarian intentions of federal and cantonal authorities (equality between *bourgeois* and *non-bourgeois*) were feared because they could lead to a loss of control over crucial agro-pastoral resources. A consortage was seen as the best way to anticipate these evolutions for the 800 *bourgeois*, who "gave up" their rights to 800 consorts (the very same people). Clearly, this strategy was crafted as a way to avoid the risk of having to open the resource whenever egalitarian intentions became translated into law.

In addition to these direct mechanisms of exclusion, which target specific groups of potential users (a group of peasants, the *non-bourgeois*), more indirect mechanisms can also be observed. These devices are indirect in the sense that exclusion is not expressly formulated but stems from the specific conditions related to the transfer of rights (e.g., interdiction to transfer water rights outside the community without express permission, giving implicitly a priority to existing members) or to the repartition of new water rights (e.g., through auctioning, giving implicitly a priority to the wealthier). Because they make access to the resource more complicated, or even impossible, for some groups of people, these rules can also be seen as mechanisms of exclusion.

Determining the limits of the community is, in sum, an issue that must necessarily be addressed if rivalries are to be settled. If bisses had been modest in size, the pressure on the resource low and the community isolated, consortages would have perhaps approximated an ideal type of *commons* based on a philosophy of inclusiveness. If, however, as this is more likely to be the case, the irrigation network requires substantial investments, the pressure on water resources is high and the community is part of a broader and dynamic social context, trade-offs arise and exclusion becomes a reality. In that respect, it would be inadequate to consider consortages as models of inclusiveness. They are, to the contrary, discriminatory, and indeed that is their intrinsic aim. Consortages represent

exclusive institutional structure and convey, as such, the risk to establish quasi *club goods* reserving the access to a club regrouping those who participated to the construction of the bisse, have the financial capacity to contribute to its maintenance, or are considered as legitimate members of the community—to the exclusion of those who do not or are not. The specificity is not to reject exclusion, but to manage it through other ways than state interventions or private property—although, as we will see, the distinction is not as clear-cut as it may seem.

4.3 The Nature of Interactions Within the Community

The local regulatory arrangements that govern bisses operation are, as we have seen, largely endogenous. They are elaborated by the members of the consortages, which are granted a high level of autonomy to do so. These arrangements are formed of a mix of long-enduring customary practices—regarding water distribution, *corvées*, irrigation techniques—and of more punctual decisions, sometimes based on calculated payoffs—for instance when it comes to the inclusion/exclusion of members. Their development also represents, to some extent, the results of more or less conflictual negotiations between collective actors and/or individuals. At the light of our empirical field, local communities do appear heterogeneous in several aspects, and this heterogeneity certainly contributed to shape local regulatory arrangements.

Consortages represent, first, structures that are specific to an irrigation network, a water channel or a sub-portion of network. This ad hoc nature has two consequences. Each local community is, on the one hand, characterized by a superposition of several consortages (i.e., of *sub-communities*), each of them being responsible for a sub-portion of the local irrigation scheme and elaborating its own system of rules. One individual is, on the other hand, generally a member of several of these entities. A complex web of sub-communities and social dynamics result from this superposition, with a risk of tensions that is exacerbated when several consortages derive water from the same river or when systems of rules are in contradiction. This situation requires a minimal level of coordination

between consortages and can lead to situations of conflicts that may durably affect the rules that are adopted.

Each consortage is composed, second, of a plurality of bodies (general meeting, committee, water guard) that do not necessarily pursue the same objectives or have the same level of influence. If the general meeting is supposed to be the supreme body, the members of the committee and the water guard(s) play the most direct and important role in the day-to-day operation of the resource. These functions are positions of power that confer both social prestige and key competences when it comes to the adaptation of customary rules (i.e., to the marginal development of the local regulatory arrangement). Here again, this situation is not without risks of tensions and of power concentration (for instance through multipositionality, when an individual holds position of power in several consortages).

Last but not least, consortages are composed of several tens of members with diverging interests and values. Debates, tensions and conflicts between these members are part of everyday life within community structures (Wiegandt 1980; Crettaz 1995)—for the access to water (e.g., in case of water thefts); for the damages caused by an imprudent user; for the inclusion or exclusion of members; and for the collection of financial contributions (in particular in a context of rural abandonment). These tensions are at the core of the rules that have been developed throughout the ages. In the words of the Valaisan sociologist Bernard Crettaz (1995, 325), "*power relations cross community life […]. Here as elsewhere, there are rich and poor, dominant and dominated, in balance within the community equilibrium. […] The emblematic history of the bisses has most of the time been a history of conflicts*" (our translation).

Inequalities between the commoners are, finally, a reality that can hardly be contested. They are particularly reflected in land allocation (Reynard 2002, 91; Mugny 2012, 57). Pastures, orchards and vineyards are indeed dominated by private property schemes. Their exploitation is individual and exclusive and their repartition far from equitable. The system is therefore underpinned both by community values and by individualistic interests, and the potential social benefits of LCG are to some extent qualified by the private allocation of land: the distribution of rights within the consortages generally reproduces

the inequalities existing in land allocation. At the light of that, it becomes apparent that the governance of water cannot be analyzed in a vacuum, but rather needs to be understood in relation to the other resources in presence.

4.4 The Interplay Between the Community and State Actors/Regulations

The historical trajectories of the Valaisan bisses are symptomatic of the (increasing) interdependences between LCG and public regulations that is likely to occur in modern states. In a context characterized by processes of federal integration (in particular regarding civil law), rural abandonment (in connection with industrialization), and ecologization, these interdependences played a key role in the development and, in some cases, the survival of the Valaisan bisses. From the 1900s onward, the evolution of bisses LCG cannot be understood without considering its inclusion within the larger frames of state interventions.

At the national and cantonal levels, the Swiss political system instituted the institutional conditions for continuity. On the one hand, the unification of civil law and the consecration of private property in the Swiss Civil Code of 1907 were made neither at the expense of community governance structures (consortages) nor of the rights they hold (immemorial water rights, land easements, individual water rights). All were explicitly recognized in the Swiss Civil Code and in the cantonal laws of application, which were partly influenced by local traditions and Germanic law (Knoepfel and Schweizer 2015). On the other hand, the development of state interventions did not challenge the essence of community governance (Schweizer and Knoepfel 2013). They contributed to open up formerly closed hydrosystems to new actors and stakes: hydropower production, touristic uses, environmental protection. However, they also left a great deal of autonomy to consortages. In fact, LCG existence and legitimacy were recognized in a number of ways: the Water Right Act (WRA) and the Water Protection Act (WPA) assimilate the water rights of consortages to acquired rights that can be opposed to hydropower companies; several sectorial policies (agriculture, tourism, environment)

recognize consortages as legitimate interlocutors, eligible for subsidies and sometime included in the implementation schemes; most public policies, finally, do not interfere with consortages' prerogatives and allow for continuity in the development of the rules governing bisses operation.

At the local level, a general transition towards more nested models of governance can be observed. In some cases where substantial investments were needed at the beginning of the twentieth century, negotiations were conducted between consortages and public authorities (municipalities) in order to save the network. In several cases, the municipalities accepted to develop the infrastructure (tunnels were constructed), but the consortages had to give up some or most of their prerogatives. The operation and governance of the network were partially (e.g., *Torrent-Neuf*) or totally (e.g., *Niwärch*) transferred. In numerous cases, similar negotiations were conducted but failed, and the bisses were abandoned (e.g., *Tsa Crêta*). In other places finally, consortages remained strong and kept a key role in resource governance. In these cases too, however, the governance became increasingly hybridized, with community rules and practices cohabiting with other logics of governance (mainly from the public sector). The case of the bisse Vieux is particularly illustrative of the complex processes through which these evolutions took place, with a consortage very active in pushing towards governance adjustments and much more reluctant public actors at the municipal level. In the end, each evolution in the sharing of responsibility occurred through confrontational and conflictual negotiation.

5 Conclusion: Avoiding the "Commons" Trap

The chapter offers a contrasted image of LCG, more nuanced than the romanticized illusion conveyed by some of the literature. Clearly, the artificial distinction between models of governance is blurred. Local community governance does not emerge or evolve in a vacuum, and the idea that it can be separated from state regulations and private appropriation is a myth. To the contrary, LCG models cannot be analyzed without taking into account its interdependencies with other modes of governance.

LCG and private property appear, first, way more imbricated than it may have seemed at first glance. Collective and individual allocations of rights interact within complex systems, within which private logics are strong (water rights are individual, land use is dominated by private property). If some principles of solidarity are present (in particular through corvées), if some major prerogatives are indeed collective (attribution of new rights, adoption of operational rules), inequalities and exclusion are part of the game. Consortages indubitably represent a form of "*private property for the group*" (Bromley 1992, 11) that convey the risk to create exclusive clubs rather than inclusive communities. Rather than ignoring this reality, LCG analyses should make it explicit and try to understand its extent and consequences.

The separation between public and community governance is also not so clear-cut. Communities always evolve *in the shadow of the state*, as Fritz Scharpf (1997) would have said, and all the empirical situations that were explored could qualify as instances of co-management (Berkes et al. 1991). State interventions played a crucial role to open up the resource to hydropower companies and to civil society while, at the same time, developing the institutional conditions for continuity. LCG was not challenged by the development of the modern state and, in some cases, consortages could actually take advantage of it to maintain and develop the resource in an evolving socio-economic context—even if it could mean a loss of prerogatives. The interplays between local communities and public actors appeared, however, only loosely connected to a collaborative ideal of trials and errors. It implied political negotiations, confrontations and power asymmetries. What seems to matter is the capacity of local actors (consortages and municipalities) to negotiate radical or incremental adaptations of the model. Here again, understanding these dynamics appears as crucial for explaining continuities and ruptures in resource governance.

This calls for thicker analyses in order to avoid falling into a sort of "commons" trap, according to which policies and actions collectively organized at the community level would necessarily be "inherently more likely to have desired social and ecological effects than activities organized at other scales" (by analogy to the idea of local trap as emphasized by Brown and Purcell 2005, 607). *Common* does not mean isolated, a-conflictual, fair or all-inclusive, and the only fact that a local community

is responsible of resource governance does not preclude dynamics of power and domination. It is only by recognizing, rather than ignoring, potential weaknesses and interdependences with other modes of governance that LCG research can make a step forward.

In that respect, there is a need for academics to go beyond a sentimentalized image of LCG and to analyze them for what they really are. This means, in particular, formulating research questions that would contribute to shed light on persistent blind spots or grey areas. From a sociological point of view for instance, one could interrogate the trajectories of those who are not accepted as members of the community. Where do they come from, how do they live, where do they end up? From a political science perspective, the way power and inequalities relate to and influence resource governance could be further explored. Between power concentration and the risk of a tyranny of the majority, what remains for the weakest members of the community? Beyond an ideal of collaboration, what is the nature of the interplays between these communities and state actors? Such questions open thrilling lines of research that could be explored either by re-interrogating the legacy of crucial authors such as Elinor Ostrom (see for instance Clement 2010 and her politicized institutional analysis and development [IAD] framework) or by mobilizing alternative approaches grounded, for instance, in critical institutionalism (Cleaver and de Koning 2015).

Notes

1. In the present chapter, *Local Community Governance* (LCG) is used as an umbrella notion that subsumes the wide range of labels—e.g., local commons, common-pool resource (CPR) management, common property resource systems, community-based natural resource management—that are found in the literature.
2. See www.nobelprize.org/nobel_prizes/economic-sciences/laureates/2009/ostrom-facts.html, accessed on March 23, 2016.
3. A group of scientists, politicians and citizens is currently working to promote a UNESCO World Heritage inscription of the bisses systems.
4. The project was funded by the Swiss National Science Foundation (SNF) as part of a Swiss National Research Program on “sustainable water management” (NRP 61).

5. The governance models that are described represent an historical appraisal of the situation at the beginning of the twentieth century.
6. *Bourgeoisies* are old civic corporations that refer to the Middle Ages communities of Burghers, which owned (and still own) many real assets in the Swiss agro-pastoral society (Gerber et al. 2011).

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Rémi Schweizer is a senior researcher and lecturer at the ETH Zürich. His research focuses on environmental and food governance, with an interest on power relations, policy implementation and innovation and local community governance. Author of several books and articles, he conducts research with a strong empirically grounded approach.

3

Integrated Water Resources Management as a Compromise: Renewing the Water Act in the Canton of Fribourg, Switzerland

Arnaud Buchs

1 Introduction

Even if it is considered as a paradigm to model water policy, integrated water resources management (IWRM) remains a polysemic notion. By referring to quantitative methodology to analyse 353 selected manuscripts on IWRM literature, Gallego-Ayala (2013) points to a great variety in the conceptual and theoretical foundations of IWRM. This analysis validates Biswas' conclusions (2004), which identified thirty-five sets of issues that should be integrated under the aegis of IWRM. Generally speaking it refers to a quest for governance modality that seeks to link various uses (drinking water, irrigation, etc.), upstream and downstream perspectives (supply, recycling, etc.), different water resources (surface, underground, unconventional, etc.) and ecosystem dynamics.

A. Buchs (✉)
LISST-DR Lab. (CNRS-EHESS-ENSFEA), Université Toulouse Jean Jaurès, Toulouse, France

C. Bréthaut, R. Schweizer (eds.), *A Critical Approach to International Water Management Trends*, Palgrave Studies in Water Governance: Policy and Practice,
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A regulatory space defined by the hydrological/hydrogeological basin (the watershed) is often implicitly added to this holistic dimension; this space is supposed to help in decentralising water management to the "lowest appropriate level" (Kemper et al. 2004). If this assertion can eventually be considered as true in the case of centralised states, for fragmented areas, conversely, the watershed offers a space for regionalising water management. IWRM is a well-documented research object: decades of research and practice have helped in identifying both its outlines and its limits (Biswas 2004, 2008; Savenije and Van der Zaag 2008; Baron and Petit 2009).

In this chapter, we do not address this type of management as such but we question the gap between theory and practice. By doing so we intend to discuss laudatory discourses' performative aspect and to overpass the naturalised and functionalist visions of IWRM. We show that beyond the quest for a miraculous solution, the establishment of IWRM falls within a regionalised institutional compromise that results from collective action. It is particularly true when democracy mechanisms are active, as in our case study.

First, we briefly introduce the notion of IWRM by focusing on two intertwined controversies: the scope of sectoral integration (which uses are regulated?), which echoes with horizontal integration; and the regulatory spaces advocated by each protagonist, which refers to vertical integration. This second controversy relates to the scale finally adopted compared to the limits of the watershed, presented as the perfect functional space for regulating water use, and to the mechanisms to articulate the watershed with other scales.

Then, the case study refers to the renewal process of the Water Act in the canton of Fribourg (Switzerland), implemented in 2011 and wrapped up with the delineation of regulatory spaces in 2014. We have identified four stages since the first draft in 2001, detailing the objections (critiques) and arguments between the two main protagonists: first, the cantonal government of Fribourg, which promotes IWRM invoking its technical relevance, which could transcend institutional, administrative and territorial fragmentation; second, the representative of municipalities, in charge of supervising local autonomy.

Finally, a diachronic and comprehensive approach is developed in order to characterise the nature of the compromise adopted as regard to the two intertwined controversies. Theoretically, we refer to institutional economics, and particularly to economics of conventions to illustrate the process of "critique" and "tests" (Boltanski and Thévenot 2006; Boltanski and Chiapello 2007) in shaping the regionalised institutional compromise finally adopted.

2 IWRM as a Regionalised Institutional Compromise: Integration and Rescaling

As Biswas points out (Biswas 2008), IWRM is an old notion. First introduced in the mid-twentieth century it has officially been promoted since the United Nations Water Conference in 1977 (Mar del Plata, Argentina) (Biswas 2004). Erroneously, it is often directly associated with the International Conference on Water and the Environment (in Dublin, 1992) and, more particularly, with the four principles mentioned in the final declaration (GWP 2003). The literature is reviewed with a specific emphasis on two main controversies: the scope of integration and the scale advocated to regulate resources and uses.

2.1 What Should Be Integrated?

There is no single definition of IWRM. The different interpretations are even conflicting (Baron and Petit 2009). For some authors IWRM implies holism, participatory processes and the involvement of women in decision making, as well as the acknowledgement of water as an economic good as a prerequisite for a paradigm shift: thus achieving simultaneously three often contradictory objectives (the three Es): Efficiency, Equity, Environmental sustainability, thanks to a "pragmatic" and technical approach (Molle 2008). International institutions, including the International Network of Basin Organizations (RIOB) and the Global Water Partnership (GWP), a World Bank and UNDP joint initiative

established in 1996, support this view. Thus, for some, IWRM meets the efficiency principle (cost recovery, private sector involvement through multiple partnerships, etc.) due to the recognition of the economic value of water (GWP 2000; Winpenny and Camdessus 2003; Kemper et al. 2004). For others, it allows for adaptive (Pahl-Wostl 2007) and supportive management (equity principle) (Van der Zaag 2005) by strengthening consultation processes and user involvement.

This foggy notion is a perfect example of a "nirvana concept" (Molle 2008), i.e., an idealised ontology of the world as it should be, supplemented by a set of recommendations to implement it. Nevertheless this functionalist perspective is challenged by local contingencies, either social or natural, and by national and regional historical trajectories, e.g., India (Saravanan et al. 2009), Israel (Fischhendler and Heikkila 2010) and South Africa (Merrey 2008). IWRM does not necessarily lead to decentralised, democratic, or even more sustainable (Jewitt 2002) management.

Following Coase (1960) and Williamson (1996), the transaction cost theory developed for decades tends to link together transaction costs and governance mechanisms. These costs (associated with time, effort and resources involved in obtaining information, in negotiating, in bargaining, etc.) are primarily related to asset specificity, to uncertainty and to the frequency of transactions. The collective action problem linked to water management is complex: first, water is highly specific (geographic and seasonal variability, risk linked to human and environmental safety, etc.); second, water management involves many actors, several sectors, several scales, and so on, thus information can be highly asymmetric; finally, no rupture in service delivery is allowed. Therefore, integration would allow users to avoid the transaction costs related to local and repeated coordination (Saleth and Dinar 2004; Dagdeviren, and Robertson 2016). Nevertheless, integration itself is costly, particularly due to bureaucracy and coordination. That is why when Hering and Ingold (2012) ask what should be integrated, they consider that integration should be moderated, at least initially: "less ambition may result in better delivery" (Schreiner and Hassan 2011, 273).

It appears that there is no ideal perimeter for integration. This is particularly obvious in the institutional resource regimes (IRR) literature (Gerber et al. 2009): on the one hand, it confirms the great diversity of

IWRM forms (analytical dimension) and on the other hand, it contributes to the debate about the relationship between the degree of integration and sustainability potential (prescriptive dimension). As we show in our case study, and more specifically in the aborted attempt to extend the scope of integration to drinking water, the perimeter of sectoral integration cannot be delineated a priori through transaction costs estimation. It merely depends on actors' coordination and on power relations (sectoral integration may change actors' "state of worth").

2.2 Looking for Regulatory Spaces: Is the Watershed Natural?

As Molle recalls (2009) the management procedures circumscribed to perimeters defined by waterways are ancient, e.g., in Sri Lanka since about 1000 BC, in China and Mesopotamia since 300–400 BC. With the development of natural and technical sciences, particularly in the nineteenth century, the positivist paradigm postulates the existence of "natural" areas for water management and tends to question previous political and administrative perimeters. Thus it materialises authorities' wishes to "control" nature.

From a technical perspective, the reference to the watershed is particularly justified by its ability to articulate upstream and downstream from the two points of view of uses and resources (from the ridgeline to the outlet). For some authors, historically, this technical argument has reinforced civil engineers' social and political power, notably in France in the nineteenth century and in Spain in the twentieth century, where hydrographic confederations played a decisive role in the emergence of "hydraulic bureaucracy" under Franco's regime (Swyngedouw 2007). Conversely, today, anchoring governance modalities within the perimeter defined by the watershed is one of the prerequisites for "good" water governance, which is promoted by international funds providers (as conditionality of structural adjustment plans): the establishment of river basin authorities supports the decentralisation of water governance and policies (e.g., the creation of river basin agencies in Morocco since 1995). The basin as a functional space has been internationally recognised as the

"logical" regulation scale (GWP 2000, 24): "one of the internationally accepted principles of river basin management is to decentralize decision making to the lowest appropriate level" (Kemper et al. 2004, 5). Ghiotti (2006) questions this assertion regarding the French case and this shows how this basic form of management is only apparent: "By becoming a political territory, the watershed is being overtaken by a logic it must overcome, to shape a hybrid form at the crossroads of political, administrative, socio-economic and environmental influences."

From a theoretical point of view the concept of "functional regulatory spaces" (Varone et al. 2013) offers an alternative to the triple breakdown that characterises public policies' traditional formatting: sectoral, territorial and scalar (between levels of government) divisions. On the one hand, the sectoral approach, which has been the main justification to grasp "territorial contingencies," limits the ability to understand the issues and items that overtake the respective fields of action. On the other hand, this territorial contingency is materialised by sometimes obsolete politico-administrative boundaries in light of the new distribution of resources, development of activities, infrastructure and populations. A functional regulatory space is an area of rivalries and conflicts for access, ownership and redistribution of goods and services as well as a social, political and economic resources pool to build collective action to regulate these rivalries and conflicts. It is a field of power relations, whose boundaries are defined by the protagonists of these tensions themselves; it "is thus a space of inextricable rivalries and conflicts, as well as a space of political regulation of these rivalries. The more or less clearly territorialized boundaries of this field of power are defined by the stakeholders who act independently from the boundaries of the preexisting sector-specific policies and institutional territories" (Varone et al. 2013).

Regarding these cannot be automatically considered a functional regulatory space, as the protagonists defining features, the watershed do not necessarily understand all the issues related to the regulation of uses and resources as the result of upstream-downstream relationships. Other (social, economic, political, technical and historical) determinants as other scales and territories (living areas, water demand and consumption areas, etc.) are involved in the governance process (Mollinga et al. 2007; Asmamaw 2015; Norman et al. 2015). Thus the concordance

between basin and regulatory space has to be questioned. The porosity of ridgelines (watershed limits) can be huge due to large-scale infrastructures. This finding is particularly obvious in the case of urbanised areas where the disconnection of resources and uses may be important from a territorial point of view. It may also be true in some mountain areas, e.g., in Valais (Switzerland), where irrigation channels involve extending the perimeter of uses' regulation beyond the basin (Netting 1974; Schweizer 2014). Mapping the territorial coverage of a watershed is not easy, especially if you move away from the traditional supply approach (resources) in favour of the analysis of multiple spatialised water demands. These findings lead some authors to promote the notion of "problemshed" especially characterised by a "network issue" rather than the watershed (Mollinga et al. 2007; Davidson and de Löe 2014).

Therefore, research challenges the axiomatic neutrality of the watershed as the perfect regulatory space transcending other issues: the watershed can be seen as apolitical (because given by nature) contrary to its adoption as the most appropriate space to manage water rivalries. Rather it expresses the "naturalisation" of a primarily political choice (Graefe 2011) that leads to partially disqualifying existing political (and even democratic) spaces. Indeed according to Bertrand (2009, 74): "These attempts remain tied to a techno-administrative perspective on ecological problem solving. Yet strengthening the power of a structure that makes local politics meaningless, while wishing for its appropriation by the local population through 'participation', is inherently antithetical."

The terms of the debate can be summarised in the confrontation of two approaches of rescaling for the regulation of environmental issues: "functional fit" and the "politics of scale" (Guerrin et al. 2014) (see Chap. 7). The first more normative approach aims to reveal the concordance between institutional arrangements and the ecological processes they should frame: this concordance is then considered a condition of their effectiveness (Ostrom 1990; Ekstrom and Young 2009). The second approach encourages the adoption of a comprehensive and historical perspective to understand the process whereby the scale was legitimised and finally adopted (Swyngedouw 2007; Molle 2009; Norman et al. 2012; Norman et al. 2015). There is no good scale a priori, thus validating the idea that "mentioning scale is admitting that something else

than size changes when the size changes" (Levy 2003, 285). Taken as a process, rescaling affects actors and the distribution of powers between them (winners and losers). It is not a zero-sum game, as it involves complex movements in terms of agenda, interests and norms (Faure and Muller 2007).

To illustrate the idea that IWRM is a protean notion, we detail a case study: the renewal process of the Water Act in the canton of Fribourg (Switzerland). It illustrates the previous general findings on the gap between theory and practice, at least regarding two main controversies: the scope of sectoral integration and the scale to regulate resources and uses (and the coordination mechanisms to articulate scales). The second controversy is particularly intense as it questions not only the articulation of scales but more fundamentally the role of actors in water and land management.

3 IWRM in a Fragmented Context: The Regionalisation of Water Policy in Switzerland

From the political point of view, Switzerland is characterised by direct democracy and executive federalism (Knoepfel et al. 2010; Art 46, Cst.) establishing complex subsidiarity (including on the issue of water resources [76-4 art. Cst.]) between the Confederation and the twenty-six sovereign cantons with their own constitution (Art. 51 Cst.). Municipalities benefit from some financial and fiscal autonomy within the limits set by cantonal legislation (Article 50 Cst.). Since the 1990s the institutional water regime at the federal level has been relatively integrated in terms of the number of goods and services regulated (extent) and the coherence between public policies and the property rights system governing the use of resources (Mauch and Reynard 2004). However the implementation of IWRM experiments is more contemporary and comes under the responsibility of cantons and municipalities. Contrary to the well-admitted mantra (water policy decentralisation), IWRM is promoted here as a means to regionalise water policy in the fragmented context of

Switzerland, i.e., institutional fragmentation linked to the multiple layers of governance (federal, cantonal, municipal) and natural fragmentation due to its geographical characteristics (alpine country, multiplicity of valleys and small watersheds).

3.1 From the Integration of the Institutional Resource Regime to IWRM Promotion

Several research projects based on the corpus of institutional resource regimes have focused on the case of water policy in Switzerland (Mauch and Reynard 2004; Mauch and Knoepfel 2004). The historical approach in the long run (since the constitution of 1874) suggests the gradual integration of the institutional water regime. Recently, this trend has been further increased, particularly thanks to two amendments to the Water Act in 2011 (renaturation of rivers and lakes) and in 2014 (funding mechanisms to eliminate micropollutants), that led to an extent of the regime's scope and to an improvement of its internal coherence.

The Waters Protection Act and its regulative ordinance is a major step towards the implementation of an integrated water regime (WPA-LEaux 1991; WPO-OEaux 1998). This holistic approach includes the three sectoral policies for protection against water, e.g., floods, water use and water protection, and considers preservation of the hydrosystem as a whole. It takes qualitative, quantitative and natural aspects into account, thus consolidating a trend to "greening and integration" (Mauch and Reynard 2004). However, Switzerland does not promote a unified and single law: hydraulic power, waterways and drinking water remain framed by specific legislation.[1] Until the early 2000s IWRM was not topical in Switzerland. Yet two earlier points reflect the trend toward integration. Section 46.1 of the WPO-OEaux ordinance, though not legally binding, promotes infra- and inter-cantonal coordination for measures pertaining to land and water protection. More fundamentally, articles 4 and 5 establish regional wastewater planning: regional wastewater master plans frame local and municipal wastewater plans (Art. 5). Several elements in these articles convey the paradigm shift and echo the definition of IWRM. In addition to the integration of different issues (ecological, flood prevention, water

treatment, etc.) they refer to the hydrological unit of the watershed to delimit regionalization. Even today, federal water law does not mention the establishment of IWRM.

IWRM officially appears in the political agenda in 2003, when an official publication presented "integral management" as an imperative for sustainable water management at the watershed scale (FOWG 2003). The second milestone occurred in 2007, which was the most prolific year regarding publications on this issue, most of them mandated by the Federal Office for the Environment (FOEN). Moreover on November 28, 2007, the Federal Council mandated the Swiss National Science Foundation (NSF) to implement National Research Programme 61, entitled "Sustainable Water Management," in which the issue of IWRM is key, which is particularly reflected via the IWAGO project (PNR 61 2015). The very same year the *Water Management in Switzerland 2007: Current situation and theses* investigation was launched (Aschwanden et al. 2008; Schaffner et al. 2009). Twenty-seven years after the previous report (Federal commission 1980), this survey aims at assessing water governance and identifying future challenges. Through an iterative and participative approach, twenty-eight theses were identified. Four of them related explicitly to IWRM, which was also mentioned in most other theses (thirty-five occurrences of "integrated management" and eight occurrences of "integrated approach").

IWRM is presented as an imperative to renew Swiss water governance. A significant involvement of the Confederation is required, particularly to support the process of redefining the distribution of power and responsibilities between users, cantonal and municipal scales. This implication must not strengthen federal centralism (as there is no single federal water act). In this assessment, users and managers express their willingness for emancipation from existing limits by advocating "functional spaces" rather than political and administrative boundaries (Schnaffer et al. 2009, 17).

Considering the claim that "water management [has] reached its limits" and requires a "paradigm shift" (Dazio 2013), the Confederation (through the FOEN and the Water Agenda 21) encourages IWRM with the provision of practical guides and support tools (FOEN 2013).[2] In these documents the assumed link between integration and sustainability is posited with three requirements: protection of the natural environment,

economic efficiency and social equity (FOEN 2012, 4–5). IWRM seems to offer an ideal solution to rivalry issues and potentially conflicting uses, notably through the adoption of the watershed as reference space: "With the watershed as reference area, the integrated management of water is primarily based on the natural system. The area in which the interactions occur and the decision-making scope coincide. The problems are solved where they are caused." (Water Agenda 21 2011, 13).

Across Switzerland, cantonal, communal and regional initiatives are numerous (thirty-eight identified by the IWAGO project [NRP 61 2015, 85]) and very heterogeneous (Scheuchzer et al. 2012). The case of the canton of Fribourg is relevant as it is much larger than other initiatives across Switzerland: it concerns the whole canton, most uses and it aims at regionalising water management through new scales, namely through watersheds.

3.2 Renewing Fribourg's Water Act: Four Stages to Shape the Compromise

Our research is based on the diachronic analysis of the renewal process of the Water Act in the canton of Fribourg (Switzerland). It draws on a genealogy of the law finally adopted in 2009, set up in 2011 and supplemented by its ordinance (WA-LCEaux 2009 and WO-RCEaux 2011). The act is compared to the three former drafts put out to public consultation. We focus more particularly on the role played by two kinds of protagonists: on the one hand, managers and technicians of the cantonal services responsible for the drafting of the law and its implementation, mainly the Department of Land Planning, Environment and Constructions (DLPEC), but also to a lesser extent other departments such as the former Department of Public Works, the Department of Public Health and Social Affairs, and the Department of Institutions, Agriculture and Forestry; on the other hand, the Association of Fribourg Municipalities (AFM) in charge of representing municipalities' interests (all municipalities in the canton are members), particularly with regard to respect for their relative autonomy. Four stages are identified. They reveal the protagonists' respective weight in shaping the institutionalised compromise.

First an outline of the cantonal organization in Fribourg has to be specified: the State Council holds executive power and each of the seven councillors heads one department of the cantonal administration. Within each department bills are drafted and then put out to public consultation (iterative process). Once the bills are finalised they are submitted to the Grand Council, i.e., a parliament that holds legislative power and is responsible for voting laws. Municipalities' support constitutes a prerequisite for the implementation of the law. This explains why we focus on the role played by the AFM.

3.2.1 Stage 1 (2001–2006): Cantonal Funds as Original Hubris

In 2001 an initial draft written by the services of the cantonal administration (Department of Public Works and Department of Public Health and Social Affairs) was put out to consultation. This new act (including the law and its ordinance) aimed at establishing "global, economic and efficient" management by including the two previous sectoral laws (without mentioning the term "integration" but explicitly referring to "watershed management"): the 1974 Waters Protection against Pollution Act and the 1975 cantonal Water Planning Act.

This first draft (D1) can be seen as the will to create an integrated, i.e., extended and coherent, institutional regime at the cantonal level. First, the scope of regulated goods and services is high: (i) all uses are dealt with (hydropower infrastructures, recreational uses, productive uses, sanitation) except drinking water supply (considered as food) and water use for hydraulic power (within the scope of public domain legislation); (ii) the law relates to surface and groundwater resources; (iii) it was designed to frame water uses, to protect against floods as well as to establish mechanisms for the revitalisation of waterways (protection of natural rivers, protection areas, restoration and renaturation of rivers to retrieve natural ways and biotopes close to the natural state [art. 17]).

Moreover, this project aspires to increase water governance coherence by redefining actors' responsibilities and by implementing regional planning (internal coherence). Then it takes into account the law on spatial planning and constructions (1983) and limits the access to the water

public domain (withdrawal authorisations are required) by proposing to amend the 1972 Public Domain Act to lower the limit defining whether water belongs to the public domain from 200 l/min. to 50 l/min. (external coherence with other public policies and with the regulative system).

Planning should be circumscribed to eight watersheds through their related basin master plans, which integrate the functions of the former regional wastewater master plans and comprehend the cantonal master plan. Apart from other changes, such as the implementation of the polluter-pays principle, the major novelty appears in the introduction of two cantonal funds: a cantonal fund for wastewater, comprising fees proportional to the pollution load, and a cantonal fund for water resources, with flat fees based on the volume of water consumed. They were considered as the main mechanisms to implement rescaling by reinforcing the power of cantonal services to supervise the management of water and infrastructures through the cantonal master plan that aims at harmonising practices across watersheds, in particular wastewater recollection and treatment (economies of scale, implementation of federal ordinances, etc.). Nevertheless, these funds crystallised the rejection of the draft during the consultation, especially by municipalities through the AFM regarding the principle of municipal autonomy (AFM 2002). This opposition means that the bill could not go through the Grand Council, because it had no chance to be voted. Subsequently, between 2002 and 2005, two major topics were addressed, at first with an attempt to extend the project to drinking water. Nonetheless, for political reasons (see later in the chapter), this competence remained within the prerogatives of the Food Safety and Veterinary Issues Board, which is under the supervision of the Department of Institutions, Agriculture and Forestry (DIAF). Finally, the major shift dealt with the redesign of cantonal funds and the financing of water protection.

3.2.2 Stage 2 (2006–2009): Responding to Critiques Addressed to Cantonal Funds

Based on the analysis of 206 standpoints vis-à-vis the first draft (D1), a new draft (D2) was put out to consultation in May 2006. In addition

to changes related to grants rates, timelines, etc., and despite the radical opposition to cantonal funds expressed by the AFM, the major shift consisted in merging the two previous cantonal funds within a single one: a cantonal water resources protection fund, supplied by a maximum fee of 5 cts(CHF)/m^3 of water used. Furthermore, D2 defined communal financial planning by establishing three distinct taxes (water connection taxes, water operation taxes and taxes based on an annual basis). In addition, watershed perimeters were "rounded" (DLPEC 2006, 14) to reflect the organisational structures of existing associations and actors (in particular wastewater plants). This stage reveals an improvement in actors' coordination compared to the first stage: the first draft was rejected with no other explanation than the problem of cantonal funds, meanwhile the second draft was discussed article by article. Nevertheless, the project was also rejected by the AFM, as the fund administered at the cantonal level and the municipal taxation recommended (not because of the introduction of the polluter-pays principle, but because the law specified the rate and nature of taxes) would have compromised the principle of local autonomy (AFM 2006).

To prevent a third failure, the Department of Institutions, Agriculture and Forestry and the AFM arranged direct coordination between 2006 and 2007 over several meetings. The Department suggested amendments in February 2007 (D2') but justified the creation of a cantonal fund, arguing that water belongs to the public domain under the responsibility of the cantonal state (also arguing that seven other cantons already had adopted such a system).

3.2.3 Stage 3 (2009–2013): From Cantonal to Regional Funds

The Waters Act was finally passed in 2009 (WA-LCEaux, December 18, 2009) and set up in 2011. Compared to D2', the major shift reflected the power of the AFM to shape the institutional compromise (AFM 2007): the abandonment of the mechanism of cantonal fund in favor of regional funds, not legally binding and administrated by local actors such as municipalities.

3.2.4 Stage 4 (2013–2014): Delineating Regulatory Spaces

This phase is related to the delineation of regulatory spaces, the so-called watersheds. Eight basins were delimited in the first draft (2001). Then, in 2013, the Department delimited twelve basins. Though their perimeters did not strictly respect hydrological and topographic limits, they took into consideration several criteria classified in three priority levels: (i) municipal boundaries, topographic and hydrologic basins, wastewater drainage basins; (ii) municipal merger plans, spoken language, number of inhabitants; (iii) surface of basins, common issues within each basin, and so on (DLPEC 2014). Supplemented by an explanatory report, this delineation was put out to public consultation during the winter of 2013–2014. Following the consultation and after the analysis of the ninety-six standpoints expressed by local actors, a new delineation of fifteen basins was finally decided by the Department (DLPEC 2014). Fundamentally, basins are inter-municipal associations (art. 9.2 WA-LCEaux). At this scale a fund may be created, financed by a maximum fee of 5cts (CHF) /m^3 of water used, to develop, for example, the watershed master plan (art. 39.2 WA-LCEaux). Municipalities remain mostly responsible for the tasks specified by the watershed master plan.

4 Discussion: The Role of Critique for Institutional Change

In this research, we question IWRM through two main controversies that are intertwined and lie on the issue of integration: horizontal integration regarding regulated uses and vertical integration regarding spaces. In the case outlined previously, both controversies implied to renew the coordination of actors and to reach an institutional compromise in order to be stabilised. We refer to institutional economics, which focuses on actor's coordination and collective action through institutions (as rules). As Dequech pointed out (2005), three types of function of institutions are intertwined: a "restrictive function" that constrains and enables behaviours (this double function was particularly developed by

Commons 1934); a "cognitive function" that provides information and conditions representations; a "teleological function" that refers to the ends that people pursue. By considering that the "justification process" (coordination of actors and evaluation of constraints, resources, objects, etc. involve coordinating social representations) is fundamental to understand institutional change, the economics of conventions (Boltanski and Thévenot 2006; Boltanski and Chiapello 2007; Favereau 2011) helps in grasping the second and the third functions of institutions and, thus, in characterising an institutional compromise finally adopted and in understanding the process whereby it was shaped.

This theoretical approach can be summarised in three main proposals. Firstly, coordination involves coordinating representations. An institution can work—as a "working rule" (Commons 1934)—only if it is founded on a "constitutive convention" (i.e., a social representation of the world, to interpret the situation in which an actor is involved) that includes both the prescriptive and evaluative dimensions. As a corollary, an institution cannot be considered as a routine because it is necessarily the product of reflexive activity (even if it is implicit) thanks to the "justification" process. Secondly, because there are several constitutive conventions to account for interest and justice there are several solutions for each coordination problem. As expressed by Rawls (1993), "the fact of reasonable pluralism" leads to admit a plurality of justified forms of action. Thirdly, institutional change is a process that involves critique and tests: "Critique and tests are intimately related. Critique leads to tests in so far as it challenges the existing order and casts suspicion upon the status of the opposing beings. But tests—especially when they claim legitimacy—are vulnerable to critique, which reveals the injustices created by the action of hidden forces" (Boltanski and Chiapello 2007, 32). Because it helps in explaining the long volitional process swayed by various actors with diverging interests, this approach can be relevant to specify the positions of the actors involved in a coordination process, in particular in environmental issues (Boisvert and Vivien 2005; Blok 2013). For our case study, this approach is useful to specify the process whereby the institutional compromise of IWRM was shaped.

Considering the first controversy, the high sectoral integration promoted by cantonal authorities is efficiency oriented and justified

by technical arguments (grasping the water system as a whole); and by economic arguments (economies of scale and transaction costs). Nevertheless, the aborted attempt to extend the scope of integration to drinking water illustrates one of the main limits of traditional public policies, particularly denounced by the proponents of "functional regulatory spaces" (Varone et al. 2013): sectoral divisions are difficult to transcend, notably when they are materialised by administrative divisions shaped to carry out specific missions (departments, agencies, etc.). Furthermore, the non-homogeneity of states appears: departments and offices as organisations may have antagonistic, and even conflicting, interests and strategies (Crozier and Friedberg 1980). The second controversy, regarding rescaling and the mechanisms to articulate scales (namely, the role of funds), leads to question the coordination of actors (municipalities and cantonal services). The protagonists involved in this coordination process since 2001 advocate for different coordination solutions, which refer to distinct constitutive conventions: as successive drafts tend to reinforce and clarify the role of cantonal authorities, municipalities nevertheless express their will to continue to manage resources and uses in practice. Theoretically, the rescaling process and the funds lead to question the "state of worth" (what are the "worthy beings" and the "less or un-worthy beings") (Boltanski and Thévenot 2006). Here the "teleological" function of institutions (see earlier in the chapter) appears. On the one hand, the cantonal administration presents itself as the guarantee of general interest considering its ability to cope with intertwined issues related to water management (human and environmental safety, economic and technical issues related to infrastructures, etc.), which justifies the creation of cantonal funds (see earlier in the chapter) by invoking its technical relevance: to tackle these crucial questions requires to rely on specialists. On the other hand, by invoking patrimonial arguments, municipalities defend their water and land-use prerogatives (and particularly to charge taxes and fees) expressed through the principle of "who pays, orders" (AFM 2006).

Thus, theoretically, the successive stages articulate tests (drafts put out to consultation) and critiques (standpoints). The test is always a test of strength (i.e., a game of power), "but when the situation is subject to justificatory constraints, and when the protagonists judge that these constraints are being genuinely respected, the test of strength will be regarded

as legitimate" (Boltanski and Chiapello 2007, 31), which is the case for the consultation process. The two first critiques expressed by the AFM were "radical" and led to the rejection of the two first drafts (the critiques were based on justifications radically different from those which supported the initial drafts). The following critiques were "corrective" and led to a draft that was finally accepted by the parties, voted and implemented. The process of test and critique is inherent in shaping a compromise. It is also the case for the delineation of watersheds. Even though Fribourg hydrography did not evolve between 2001 and 2014, the various drafts refer to eight, then twelve and finally fifteen basins. Thus the regionalisation of water governance relies on institutional compromises rather than to perfect natural boundaries: in the law, the perimeter of a basin constitutes a common denominator between administrative, natural, social, administrative and technical boundaries. Note that the scope of action of sewage treatment plants (mostly determined by the scope of the wastewater collection, usually based on gravity) has been determining for basin delineation (technical justification).

Considering that a compromise does not annihilate conflicts but merely suspends them (Amable and Palombarini 2005, 154), its viability is at stake. Thus, the process of tests and critiques, even if tedious, can be considered as beneficial for the implementation of any institution: as protagonists reveal and express their respective positions, the compromise has more chance to be shaped by taking into account various critiques—at least by answering to them—and finally it may reinforce its legitimacy (see Chap. 6). It supposes that the test of strength is considered as legitimate, which is particularly true for our case study.

5 Conclusion

The detailed analysis of the renewal process of the Water Act in Fribourg shows that both aspects of IWRM, i.e., the perimeters of integrated uses and regulatory spaces, are constructed through collective action. Thus the implementation of IWRM is a regionalised institutional compromise, distinct from the theoretical model defined a priori (the "nirvana concept"): drinking water was not taken into account (for political issues linked

with the distribution of prerogatives between departments); and regulatory spaces correspond to technical, administrative and natural spaces. Ultimately, these functional spaces partially delimited by the wastewater collection area remain inter-municipal associations characterised by conventional democratic functioning. Considering there is no good scale a priori, this case study illustrates the relevance of a comprehensive and historical perspective to understand rescaling as a process that affects actors and the distribution of powers between them (i.e., "politics of scale").

Nevertheless the establishment of IWRM has helped in rationalising infrastructures, in particular for the treatment of micropollutants (the federal Waters Protection Act was modified in 2014 and a new tax was implemented in January 2016), and in clarifying water governance through a long process of proposal, consultation and counterproposal. It has led to water regionalisation, which seems essential to counteract the institutional and natural fragmentation that characterises Switzerland.

Far from criticising IWRM, this chapter aims at showing how a case study can be useful in illustrating the distance between the theoretical model and its implementation. A diachronic approach coupled with institutional economics helps in understanding the process whereby the compromise was shaped through collective action.

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Notes

1. Federal Law on the Use of Hydroelectric Power (1916); Federal Law on Watercourses Management (1991); Law on Foodstuffs (1992) and their respective ordinances.
2. See the online *Watershed Management Guide* (10 volumes), www.bafu.admin.ch.

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Arnaud Buchs is an associate professor at Université Toulouse Jean Jaurès, France. His research articulates institutional economics, ecological economics and fieldwork. He focuses on the policies and rules that regulate water resources and their uses (social construction of water scarcity and water security in semi-arid regions, water management in fragmented areas, etc.).

4

Transboundary Water Management: From Geopolitics to a Non-state Analytical Perspective: The Case of the Rhône River

Christian Bréthaut

1 Introduction[1]

Globally, 60 percent of all freshwater flows across political borders (UNESCO 2008). As a result, the challenges regarding upstream-downstream coordination become evident (Wolf 1999). If water management is already characterized by complex multi-level interactions and trade-offs among various uses, the transboundary scale represents an additional level of intricacy with the involvement of different institutional and legal frameworks, multiple asymmetries among parties involved (Warner and Zawahri 2012) and tensions between national interests. In other words, transboundary water management represents a

C. Bréthaut (✉)
Geneva Water Hub, UNESCO Chair on hydropolitics, Institute for Environmental Sciences, University of Geneva,
Geneva, Switzerland

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"wicked problem"[2] (Levin et al. 2012; Varone et al. 2013) that calls for new solutions and new institutional arrangements.

For approximately the last twenty years, the notion of "transboundary water management" has gained momentum in parallel with the emerging concerns over "water wars" (Starr 1991; Gleick 1993; Homer-Dixon 1994). The reinforced consideration of the river basin scale as a relevant unit for the implementation of water management policies has also played an important role in this increased level of interest as seen with the concept of Integrated Water Resources Management (IWRM) (GWP 2000; GWP and INBO 2009) (see Chap. 3).

This chapter focuses on the transboundary river management of the Rhône (see Fig. 4.1). The Rhône is an international river shared between Switzerland and France (Bréthaut and Clarvis 2015). This case is particularly interesting: the Rhône does not have an international commission dedicated to the implementation of upstream-downstream coordination of the river.[3] To illustrate, the only international convention regarding the operational management of the Rhône at the transboundary level is concerned with the management of hydropower infrastructures and on the restitution, after Geneva, of French waters previously diverted upstream from Lake Geneva.[4] Moreover, central states have long been at the periphery of the operational management of the river. As a consequence, the transboundary water management of the Rhône has been characterized by poor cooperation among countries leaving significant opportunities for other actors (in this case energy operators) to define the mechanisms of how the river is used.

With a clear focus on this specific case, this chapter concentrates on the evolving role of the state as an arbitrator between different uses and boundaries and the role of non-state actors and the various activity sectors in shaping transboundary river governance. To do so, the concept of *Functional Regulatory Space* (Varone et al. 2013; Nahrath et al. 2009) is mobilized in order to analyze the evolution of the public problem, the evolving role of states, the definition of new geographical boundaries and the different forms of regulation. In this regard, the chapter focuses on the following research questions: *how did the Rhône's Functional Regulatory Space evolve throughout history? How are use rivalries regulated at the transboundary level when no international commission is dedicated to the framing*

Fig. 4.1 The Rhône basin: geographical context

of upstream-downstream coordination? What is the role of activity sectors in shaping transboundary water management?

Initially the chapter will present a "state of the art" as to how authors from different disciplines grasp the issues related to transboundary water management. Then, taking the example of the Rhône, the construction

of a Functional Regulatory Space for transboundary river governance will be analyzed. In particular, three main phases demonstrating evolving power relations and varying degrees of involvement by central states will be considered: (1) monofunctionality, (2) the end of the hydropower monopoly and (3) the shift toward increasing integration. Finally, the chapter returns to the initial set of research questions.

2 State of the Art

The management of international rivers involves numerous issues of coordination, interactions between different regulatory frameworks, power positions that vary from upstream to downstream and a multiplicity of interdependent water uses along the river's course. In this regard, transboundary river governance is characterized by both strong cooperation dynamics and also significant tensions among those involved. Many scientific publications have focused on these issues with the aim of reaching a better understanding of these problems at different levels and in diverse contexts. Research on transboundary river governance is characterized by substantial interdisciplinarity, including analysis from a variety of perspectives (historical, legal, economical, political and international relations). In this state of the art, five main bodies of work are identified.

The first body of work (1) focuses on the analysis of legal instruments that frame and regulate transboundary water management. As demonstrated by Boisson de Chazournes (2008), transboundary water management has been greatly influenced by tendencies of integration. As a consequence, the international legal framework is seen to evolve towards stronger homogeneity (Malla 2008) and develops across five main principles: equis use of water, sustainable development, the no harm principle, application of the "polluter pays" principle and the duty of compensation for possible damages. At the international level, the management of transboundary waters relies on two main instruments that mobilize these principles (Rieu-Clarke and Kinna 2014): the Convention of the Law of the Non-Navigational Uses of International Watercourses (ratified 21 May 1997 in New York) and the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (ratified

17 March 1992 in Helsinki). The two conventions are characterized by very similar legal dispositions and both are applicable at the global level. In this regard, authors raise the issue of compatibility between these two conventions and of possible misunderstanding among potential signatories states (McCaffrey 2014). With the same perspective, Rieu-Clarke and Kinna (2014) underline the different focuses adopted by the two conventions with an emphasis on environmental issues for the Helsinki Convention and with the concern of possible harm to countries downstream for the New York Convention. As a result, authors recommend considering the two conventions as a package with complementary provisions. However, whilst this literature allows a better understanding of the international legal framework regarding transboundary water management, it remains heavily centred on gaining an understanding of the dispositions themselves.

In a complementary perspective (2), other authors focus on the implementation of transboundary water management and on the role played by institutions and organizations (among others, Bernauer 2002; Gerlak 2004; Hooper 2006; Mc Caffrey 2007; Raadgever et al. 2008). Here, authors aim to understand how the management of international rivers constitute a problem of collective action as well as the possible solutions that institutions can provide (Marty 2001). Raadgever et al. (2008) attempt to define the true nature of transboundary water management regimes as characterized by the following elements: actors' network, legal framework, public policies, management of information, financing and cooperation processes. Lautze et al. (2013) describe the great diversity of river basin organizations such as international committees, commissions or basin authorities. Authors underline the importance of defining a tailor-made regime answering the particularities of each specific case.

The third body of work (3) focuses on economics. Here, authors study economic mechanisms considering the varying interests of upstream and downstream countries. This perspective introduces the notion of benefits sharing (Arjoon et al. 2016) and the attempt to quantify and give a financial value to the uses of the resources. Adopting a broader perspective, Garrick (2015) compares different institutional designs and focuses on the measurement of transaction costs involved in collective action at the transboundary level.

The fourth body of work (4) analyzes the dynamics of conflict and cooperation between upstream and downstream countries. Firstly, several authors concentrate on cooperation mechanisms (Delli Priscoli and Wolf 2009; Delli Priscoli 1996; Conca et al. 2006). In particular, Sadoff and Grey (2002) identify the benefits that can arise from cooperation in the case of international rivers. The diversity of benefits are described, including benefits for ecosystems, benefits provided by a productive use of the river, reduction of disaster linked to the river, or reinforced economic cooperation at the regional level.

Considering not only the notion of cooperation but also of conflict, Zeitoun and Mirumachi (2008) underline the continuum that exists between these two situations. Here it becomes increasingly relevant to understand the interactions between parties, to understand how riparian countries interact, how they manage asymmetries of power and how they are affected by political and economic inequalities. Interactions among parties are complex. Dinar (2009) shows that the hegemon is not always able to impose its agenda on downstream countries. Daoudy (2009), along the same lines, underlines that power asymmetries may also be favourable to interactions among countries that have access to a greater range of negotiation capacities and instruments.

Finally, the last body of work (5) highlights the necessity to extend the focus beyond state actors. Accordingly, authors reflect that non-state actors need to be considered in order to better understand the existing dynamics and the spectrum of situations that exist between conflict and cooperation. Several publications attempt to move away from a purely analytical perspective primarily centred on the role of state (Sneddon and Fox 2006; Suhardiman et al. 2012; Suhardiman and Giordano 2012; Dore et al. 2012; Bréthaut and Pflieger 2015; Bréthaut 2016). As stated by Suhardiman and Giordano (2012), focusing exclusively on states denies the chance to consider the multitude of other stakeholders who have an active role in upstream-downstream coordination. Moreover, focusing exclusively on states stunts an understanding of intra-states dynamics and their influence on decision-making processes (Suhardiman et al. 2012). Here, authors suggest an approach centred on processes. This analytical perspective allows a consideration of a significant number of stakeholders, a better understand-

ing of how decisions are made at the national level and the motives behind collaboration among riparian states. Sneddon and Fox (2006) adopt a similar approach with the concept of critical hydropolitics. Authors integrate the analysis of complex interactions between different scales, considering the river basin to be characterized by multiple socio-ecological dynamics and analyzing the construction of the river basin as an object of cooperation.

Complementary to these different approaches (legal, functioning of institutions and organizations, economical, conflict and cooperation and non-state actors), the chapter suggests a focus on the regulation of the different activities linked to the river and as such, linked to upstream-downstream coordination. An approach centred on activity sectors enables a better understanding of how public problems related to transboundary river governance are framed, how use rivalries are effectively regulated and how power games evolve within the configuration of actors. Through the analysis of the operational management of rivers' flows, the chapter considers how additional research avenues for analyzing the transboundary management of rivers can be opened. To grasp such an analytical perspective, the concept of *Functional Regulatory Space* (Varone et al. 2013; Nahrath et al. 2009) becomes particularly relevant. It allows the analysis of a social space centred around evolving use rivalries and around the regulation of these different rivalries. Viewing the evolution of transboundary river governance through this perspective allows a more integrated understanding of the situation and the main challenges. It enables a simultaneous consideration of public regulations, the influence of non-state actors (and notably of the concerned sectors of activity) and the institutional or geographical perimeter dedicated to the management of these rivalries. Authors define a Functional Regulatory Space as "*(…) a regulatory space, which politically emerges in order to tackle, support or solve problems concerning several policy sectors in different institutional territories and at different level of government*." In other words, it represents a "*regulatory space within which it becomes possible to tackle new types of problems* [that Varone et al. define as a public wicked problem] *that cut across various socioeconomic sectors as well as institutional territories and government levels*" (Varone et al. 2013: 320). In this chapter, the evolution of the transboundary governance system is analyzed focusing on the evolving

interactions within the different activity sectors. In the following sections, the evolution of Rhône's Functional Regulatory Space, characterized by evolving types of uses and rivalries is investigated.

3 Transboundary River Management of the Rhône River

The Rhône is one of the major Western European rivers. The total area of the river basin is 96,500 km^2 (Bréthaut and Clarvis 2015). In Switzerland, the river emerges as a run-off from the Rhône Glacier in the canton of Valais. It flows through the Rhône Valley, through Lake Geneva and exits Swiss territory after reaching the city of Geneva. In France, the river flows on 522 km down to the Mediterranean Sea (see Fig. 4.1). Along its course, the river is used mainly as a source for irrigation and energy production (hydropower and nuclear electricity), as a navigation axis, for the production of drinking water and for fishing, leisure and tourism. As already noted, there is no river basin organization to ensure coordination at the river basin level and therefore the transboundary governance of the Rhône is heavily structured around two main energy operators managing the river's flow under the control of both the French and Swiss authorities.

From the perspective of international water law, Switzerland and France are both signatories of agreements regarding transboundary water management. For example, the two countries ratified the Convention of the Protection and use of Transboundary Watercourses and International Lakes.[5] This agreement sets the global framework for transboundary water management and considers in particular the necessity to reduce any impact at the transboundary level (article 1 of the Convention). The operational management of the river relies on three main legal and institutional frameworks: Swiss, French and European Union. Switzerland is not part of the European Union and is therefore not legally bound to the Union's legal framework. Swiss water public policies are strongly influenced by the federal level (Varone et al. 2002; Mauch and Reynard 2004). Nevertheless, following the principle of subsidiarity, Swiss cantons are usually responsible for the implementation of rules and for framing the daily management

of rivers. In this regard, the canton of Geneva is a key stakeholder in the transboundary management of the Rhône and represents the main counterpart in operational discussions with France. Since the adoption of the European Water Framework Directive in 2000[6] and "the definition of objectives to ensure good status of surface water and groundwater" (article 4), France is obligated to define a river basin management plan and to report on the progress of its implementation (article 15). As a consequence, the coordination at the transboundary level gains significant importance as the operation conducted in Switzerland might potentially have an impact on French capacities to reach objectives regarding water quality and/or environmental policies, as defined in its management plans.

As already stated in the introduction, the Rhône is not supported by a river basin organization. At the transboundary level, the only active commission is the Commission internationale pour la protection des eaux du Léman (CIPEL), an international commission dedicated to the Lake Geneva basin and primarily to the management of water quality issues. No institution is dedicated to the river itself nor to issues linked with the management of river flows.

Other transboundary specificities of the Rhône include the attribution of the management of the river to hydropower producers that hold concession contracts granted for periods lasting between sixty and ninety years. These contracts are more or less encompassing. On the Swiss side, each dam is subject to a concession contract granted either by the canton of Geneva or by the Swiss confederation for bi-national infrastructure. In France, one concession is granted to mainly one operator for the management of the French part of the river, from the Swiss-French border towards the Mediterranean Sea. This concession comprises the management of dams but also the management of large portions of the river's banks. Since the first half of the twentieth century, there has been heavy involvement of hydropower operators (Pritchard 2011) and as such, the river was considered as a means of energy production more than as a hydrosystem.

Nowadays, the Rhône is undergoing several changes that challenge its governance structure, leading to new types of challenges and uncovering a number of uncertainties that need to be addressed. This situation is highlighted by growing tensions among river uses and growing uncer-

tainties linked to climate change, environment and energy policies. These "focusing events" (Birkland 1997, 1998) act as triggers to force a reconsideration of the transboundary governance of the river (Bréthaut 2015). Such events occur suddenly and whilst they are relatively rare, they are large in scale. They open new opportunities for policies (Kingdon 1995) to reflecting on public problems and on how to address such issues. These events shed light on the weaknesses of the system and on the difficulties linked to the coexistence of several, not necessarily coordinated, regulatory frameworks (Swiss, French, European Union).

Historically, the Rhône's transboundary governance has been characterized by a regime articulated around one sector of activity (production of energy) with strong management capacities. This is a result of the delegation of competencies. The Rhône's transboundary management evolved according to three specific periods, namely from 1870 to 1970, 1970 to 2000 and from 2000 to today (Bréthaut and Pflieger 2015).

These phases reflect the evolving perception of the collective problem of the river. They illustrate various configurations of actors and an increasing number of uses that are formally recognized by the regulatory frameworks. These phases also show an evolution in the way central states consider river governance, with varying degrees of involvement in the operational management of the river.

3.1 Phase 1: Monofunctionality (1870–1970)

In this first phase, the Rhône is essentially dedicated to the production of hydropower. The river is massively channelled on both sides of the border. The population is protected from flooding and therefore gradually the perception of the river as a natural hydrosystem changes. The management of infrastructures and subsequently of the flow of the river is delegated to a small number of stakeholders who are the operators of the river.

In Switzerland, the management of the water flow of the Rhône is defined by an agreement, signed among Swiss riparian cantons (Geneva, Vaud and Valais), that defines the regulation of Lake Geneva's levels.[7] Water flows are artificialized along with the building of infrastructures.

Downstream from Geneva to the Swiss-French boundary, three dams are used for the production of hydropower energy: Seujet dam (operating since 1984), Verbois dam (operating since 1943) and Chancy-Pougny dam (a bi-national dam operating since 1925). The first two dams are managed by the Industrial Services of Geneva (SIG), a semi-public Swiss energy operator granted with a concession contract by the Canton of Geneva for periods spanning about sixty years.

The third dam is managed by a company called Société des Forces Motrices de Chancy-Pougny (SFMCP SA). SIG holds up to 72 percent of SFMCP share capital. The remaining 28 percent is held by the company responsible for the management of the French Rhône, Compagnie Nationale du Rhône (CNR). As an operator of a bi-national infrastructure, SFMCP is granted a concession contract by the Swiss and French central states.

In France, as illustrated by Pritchard (2004, 2011), the river is considered as a tool of production dedicated to ensuring the autonomy of the country's energy. With this in mind, the construction of hydraulic infrastructures became considered as an important symbol of the rebuilding of the French nation after the destruction suffered during the Second World War. The Rhône is perceived as a major part of the national industry. This is even physically demonstrated on several French dams where it can be seen written that the Rhône is "at the service of the Nation."

The management of the river is framed by a concession contract granted by the central state to CNR[8] in 1934 for a period of ninety-nine years.

As demonstrated by Pritchard (2011), the system is characterized by a monofunctional vision of the river. This vision is primarily dedicated to the production of electricity through hydropower. This situation allows a certain number of uses to operate independently and, in fact, the transboundary level is not highly significant for either the states or the operators. Central states delegate operational power to a select numbers of stakeholders. They define technical specifications as a framework but leave large room for manoeuver for operators regarding the daily management of the river and, subsequently, regarding the strategy of the production of electricity.

3.2 Phase 2: The End of the Hydropower Monopoly (1970–2000)

This second phase is characterized by the implementation of self-organization among energy operators. Private law agreements are defined in order to regulate water transfers and to coordinate uses for efficient energy production.

Simultaneously, this second phase sees the emergence of a new arrangement where the use of the river is not only limited to the production of hydropower. Two major factors contribute to the disintegration of the "hydropower monopoly."

Firstly, this period is characterized by the emergence and the continuous reinforcement of environmental policies (Usui 2003). This trend is clearly seen at the national level (Switzerland and France) but also at the supra-national level (European Union) (Bressers and Kuks 2004; Kaika 2003; Varone et al. 2002). This policy change facilitates the return to a more natural perception of the river. The vision of the Rhône only as a means for production becomes less dominant. This evolution forces hydropower companies to include environmental considerations in the way they manage the river and this policy change reduces their freedom regarding the river's management. However, hydropower operators still have some scope to implement their own strategies of production[9] in order to respond to electricity consumption peaks.

The growing number of uses leads to a reinforcement of regulatory frameworks. This reduces the capacities granted to energy operators in the first phase by involving additional sectors (not necessarily economic stakeholders) in the system. By means of illustration, several nuclear power plants were built along the French Rhône during the 1970s. The French choice to invest in nuclear power relies on the necessity to have access to water for the cooling of power plants. As such, the Rhône has an important role in ensuring nuclear security on both the French and Swiss territories. For example, the nuclear power plant of Bugey is located about 50 kilometres from the city of Lyon and about 150 kilometres from the city of Geneva.

In this second phase, the governance structure dedicated to the production of hydropower is confronted with an increasing complexity revealing the necessity to negotiate with new types of river uses. Hydropower operators are forced to share the resource with new stakeholders and to adapt the management of river flows accordingly. In this context, states play a crucial role in this new paradigm for transboundary water management. This may be through the evolution of regulatory frameworks and the recognition of new uses or through strategic options regarding energy policy and new priorities regarding the use of water. As a consequence, the system governing a limited number of actors transforms itself. New negotiations begin on how to use the river and calls are made for a new role of central States in arbitrating different needs and uses.

3.3 Phase 3: Towards Increased Integration (2000–Present Day)

This last period witnesses the continuous proliferation of activity along the river. The Rhône is now viewed not only as a source of energy production but also as a means for irrigation, the production of drinking water, tourism or the maintenance of ecosystems services.

This last phase sees central states returning to the centre stage with the desire to reinforce their regulatory capacities on the system.[10] This return can be explained by various factors. The recurring droughts of the last ten years and specific focusing events, coinciding with patterns shown by climate and hydrological modelling (Ruiz-Villanueva et al. 2015, Chauveau et al. 2013; Beniston et al. 2011), ensured that transboundary coordination is placed firmly on the agenda. In fact, these events highlight the deficit of coordination and the intensity of use rivalries among the different sectors of activity. For example, in 2012, the lack of coordination between Switzerland and France led to concerns regarding the cooling of the nuclear power plant of Bugey. This event acted as a trigger for reconsidering transboundary water management and led to a ministerial discussion between the two countries.

Table 4.1 Evolution of the Rhône's transboundary river management through the lens of uses, position of central States within the configuration of actors and relevance of the transboundary level

	Phase 1: Monofunctionality (1870–1970)	Phase 2: The end of hydropower monopoly (1970–2000)	Phase 3: Shift toward increasing integration (2000–Present day)
Uses of the river	– Hydropower is the river's main use at the transboundary level	– Hydropower still dominates the configuration of users – Emergence of the nuclear power industry (nuclear power plant of Bugey) – Emergence of additional uses of the river (drinking water, irrigation) – Increase of environmental norms	– Hydropower still dominates the management of the river – Reinforced protection of the environment and obligation to report to the European Union – Arbitration necessary between the different uses
Position of central States within configuration of actors	– Attribution of concession contracts – Delegation of competencies and framing of activities through bills of specifications	– French central State accompanies and frames the emergence of new water uses – The operational management of the river remains primarily delegated to hydropower operators and a lack of clarity exists regarding private law agreements between operators	– Framing of operators' activities through the bill of specifications and through the regulatory frameworks – In France, new obligations from the European Union's regulatory framework – Growing need to better understand the system at the transboundary level – Growing pressure from France for the definition of an agreement at the transboundary level

(*continued*)

Table 4.1 (continued)

	Phase 1: Monofunctionality (1870–1970)	Phase 2: The end of hydropower monopoly (1970–2000)	Phase 3: Shift toward increasing integration (2000–Present day)
Relevance of the transboundary level	– Weak upstream-downstream coordination – Relevance of the transboundary level only through the lens of energy production and mainly through the collaboration of private operators	– Relevance of the transboundary level mainly through the lens of energy production and through the collaboration of private operators	– An emerging level of governance with an increasing involvement of central States – Recurring "focusing events" highlighting coordination issues at the transboundary level

Then, as an extension of the trend described in phase 2, the regulatory framework encounters an increase in environmental policies. At the EU level, this shift comprises the definition of environmental objectives and the obligation of reporting (Albrecht 2013), calling for reinforced supervision and control of the system by the French central state. The delegation of competencies through concession contracts meant that the system was long reliant on self-organization and on numerous agreements between the different energy actors. This situation led to growing opacity and raised questions regarding the coordination between different sectors of activity, and more specifically, regarding the coordination between the production of energy and other types of river uses.

As the number of recognized uses increases, the governance system itself becomes more complex and polycentric. Increased coordination is demanded and the states are required to gain a better understanding of the situation. As shown in Table 4.1, the governance system of the river transitions from a system with a limited number of operators toward a more complex constellation of activity sectors with significant overlap between different configurations of stakeholders. These include stakeholders dedicated to hydropower, production of energy and/or protection of the environment.

4 Discussion

This case uncovers the discussion around the role of non-state actors in implementing transboundary water management and the role of states in providing an increasing number of arbitrations. It encourages reflection on the benefits of integrating these two perspectives to reach a better understanding of transboundary water management. This reflection is structured around three research questions that are discussed in this section.

The first question examines *how the Rhône's Functional Regulatory Space evolves throughout history*. As shown in Table 4.2, this evolution has been analyzed across three phases and using four analytical variables. These are the extent to which transboundary river governance is considered as a wicked problem and is affected by political agendas, the definition of new hierarchies and priorities between policy sectors, the evolution of the governance system's geographical boundaries and the ever-changing division of competencies between different levels of government.

This analysis shows how the river's governance becomes a wicked problem, which entails complex rivalries among a large range of water uses. The necessity for arbitrations and for the definition of new priorities is evident. This has been forced by various factors including a shift towards increased integration at the national level, the evermore-popular view of the river as more than a tool for energy production and "new" issues such as the environment or nuclear safety. In consequence, the transboundary level is seen to evolve towards the definition of a Functional Regulatory Space in which authorities aim to tackle new problems and consider a growing number of implicated policy sectors. A new type of territoriality is considered. This goes beyond political boundaries. If the operation of the river has always relied on a limited number of stakeholders, this changes the situation. The need to discuss coordination at a higher institutional level with the involvement of national authorities becomes a necessity. This shift represents a (re)politicization of the governance system with a less decentralized operation and with discussion taking place between high-level administrations.

The second research question is linked directly to this reinforcement of use rivalries: *How are use rivalries regulated at the transboundary level when no international commission is dedicated to the framing of upstream-*

Table 4.2 A historical analysis of Rhône River's function space of regulation

	Phase 1: Monofunctionality (1870–1970)	Phase 2: The end of hydropower monopoly (1970–2000)	Phase 3: Shift toward increasing integration (2000–present day)
Wicked problem put on the political agenda	No. The river is mainly dedicated to the production of electricity, poor consideration for other types of uses and de facto rivalries between water uses.	On-going. Use rivalries are increasingly taken into account. New types of water uses are recognized implying a new consideration of transboundary river management.	Yes. Growing integration implies the need for considering and arbitrating multiple and complex use rivalries. As a result, states return to centre stage.
New hierarchies between policy sectors	No. Production of hydroelectricity remains a top priority for states. Concession contracts are granted to operators who benefit from a large room to manoeuver.	Yes. The monopoly of hydropower ended with the recognition of new policy sectors such as the growing body of environmental policies for example.	Yes. When the European Water Framework Directive entered into force, new hierarchies between policy sectors and new power games between France and Switzerland (the latter being not a member of European Union) were generated.
New geographical boundaries beyond institutional territories	No. River management is fragmented and does not imply strong transboundary collaborations.	On-going. The consideration of new uses such as nuclear power (and its related security) and the increase of environmental policies reinforce the need to reflect on the transboundary level and on upstream-downstream coordination.	On-going. As a consequence of previous phases and specific "focusing events," the transboundary governance of the river is (re)discussed between countries in order to ensure a reinforced upstream-downstream coordination.

(*continued*)

Table 4.2 (continued)

	Phase 1: Monofunctionality (1870–1970)	Phase 2: The end of hydropower monopoly (1970–2000)	Phase 3: Shift toward increasing integration (2000–present day)
New division of competencies between levels of government	On-going. In France, the 1965 water law creates water agencies, which structure the management of water around river basins. Nevertheless, this perspective remains rooted in the limitations of national boundaries.	On-going. The recognition of new types of uses implies the need for stronger arbitration and for governance capacities to be centralized toward states.	Yes. This last phase sees the return of national authorities to centre stage for the conduct of international negotiations regarding upstream-downstream coordination.

downstream coordination? The upstream-downstream coordination of an international river takes place without any active institution dedicated to the transboundary level and where central states have long been at the periphery of a configuration that is actually led by hydropower operators. In this context, private law agreements between hydropower operators have privileged specific types of uses. Greater flexibility in the operational management of the river has also been encouraged. For example, one of the main agreements authorizing the transfer of water between Switzerland and France ("Mesures d'exécution 2000") relies on hydropower operators and is possibly renegotiated every five years. In this context, private law seems to reduce the inertia linked to a decision-making process driven by the states. Nevertheless, the Rhône example also shows the risks of a lack of transparency related to the overlapping of different agreements (often resulting from multiple bilateral negotiations and private law agreements).

Finally, this chapter focuses on non-state actors with the concluding research question: *What is the role of sectors of activity in shaping transboundary water management?* As demonstrated by Marty (2001), sectors

of activity might represent a relevant entry point for considering transboundary river management. In fact, several examples (the Danube or the Rhine) show how the collaboration around sectors of activities has been the starting point of more formal transboundary collaborations. With this in mind, the Rhône example shows how relevant it is to analyze transboundary river governance using the sectors of activity and related rivalries as the entry point. It also shows how sectors of activity can represent significant levers for central states when developing transboundary collaborations. This is particularly true in the case where institutional contexts and regulatory frameworks really differ. In the case of the Rhône, three regulatory frameworks coexist (Swiss, French and European Union). Here, the implementation of private law agreements exceeds the constraints of multiple and fragmented institutional settings. The implementation of a depoliticized transboundary river management occurs that is based primarily on operational considerations. By doing so, collaboration between sectors of activity may represent a stepping-stone for a more formal transboundary management. Conversely, the Rhône case also demonstrates the difficulties linked to a transboundary governance system that relies primarily on operators. In fact, the emergence of a polycentric system made up of competing water uses demands two things: reinforced coordination through the return of central states to the centre stage and the need for arbitration at a higher institutional level (Ostrom 1990).

5 Conclusion

Transboundary water management requires coordination between different institutional and legal frameworks and various sectors of activity with diverse objectives and modalities for the use of water. Literature shows that a huge range of institutions and organizations has been established in an attempt to address these challenges. This is seen with international legal frameworks that define obligations of parties and with the implementation of international commissions dedicated to the upstream-downstream coordination.

This chapter analyzes the evolution of the Rhône's Functional Regulatory Space. It illustrates how this regulatory space evolves, how it

meets the challenges of increasing use rivalries alongside the proliferation of environmental policies and water uses. As shown, these changes demand an evolution of the way that actors are configured and witnesses a shift in the way central states position themselves regarding the operation of the river. The Rhône case shows how states initially entrusted the management of the river to the electricity operators before returning to the centre of the configuration with a new role to arbitrate among a growing number of recognized uses.

This analytical approach is mirrored in the existing literature that concludes that focusing on non-state actors contributes to a better understanding of transboundary water management (Suhardiman and Giordano 2012). This analysis, therefore, is focused on the evolution of structuring sectors, on the evolution of regulatory settings and of the role played by authorities. The specificities of the management of the Rhône is a pertinent case to reflect on the evolution of non-state actors' room for manoeuver. The latter evolves over time, revealing power struggles between sectors and changing levels of autonomy in how the river is operated. This analysis demonstrates the added value of a system where key sectors of activity are responsible for implementing transboundary river management and notably the advantage of the flexibility of agreements based on private law. Nevertheless, this context also has its limits and this is seen with the tendency towards greater opacity and the exclusion of other types of river uses. In this regard, the analytical perspective of non-state actors has facilitated the simultaneous review of transboundary river management through different lenses: the study of power relations, the strategies used to secure different water needs and the evolving role played by central states within the system.

Notes

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de Genève (SIG), CIPEL. The opinions stated in this article are the sole responsibility of the author.

2. Wicked problem can be defined as: "*High-intensity public problems that result from multiple sets of complex interdependent causes, negatively affect large portions of a population, and to which high political priority should be accorded*" (Levin et al. 2012 in: Balsiger and Nahrath 2015, 9).
3. The upper Rhône is part of the Lake Geneva basin that is included in the perimeter of the International Commission for the Protection of Lake Geneva. Nevertheless, this commission focuses on the Lake basin exclusively and mainly focuses on water quality issues.
4. Convention entre la Confédération suisse et la République française au sujet de l'aménagement hydroélectrique d'Emosson (23 août 1963).
5. Also called the UNECE-Water Convention, Helsinki, 17 March 1992, entered into force in 1996.
6. Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.
7. Acte intercantonal concernant la correction et la régularisation de l'écoulement des eaux du Léman, 11 September 1985.
8. Concession du Rhône, 20 December 1933.
9. Interview conducted with the Head of Electricity Production Activities at Industrial Services of Geneva(SIG), 18 July 2012.
10. Interview conducted with the Head of the "Pressure on water Bodies" service at the French Ecology, sustainable Development, Transport and Housing Department Rhône-Alpes, Lyon, 10 July 2012.

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Christian Bréthaut is an assistant Professor at the Institute for Environmental Sciences at the University of Geneva. He leads the Education and Knowledge component of the Geneva Water Hub and co-leads the UNESCO Chair on Hydropolitics from the University of Geneva. His work focuses on challenges interlinked with transboundary contexts and with intersectorality. He is a co-editor of the Palgrave Series in Water Governance.

5

From Multi-level Governance to Scalar Politics: Water Community Networks Challenging Neo-Extractivist Governmental Institutions in Ecuador

Emilie Dupuits

1 Introduction

The multi-level governance (MLG) framework emerged as a new approach to analyze the fragmented nature of socio-ecological systems, such as water resources (Moss and Newig 2010; Gupta and Pahl-Wostl 2013). It is widely used in the academic field, especially by authors from the common goods theory (Brondizio et al. 2009). It is also used in the practitioner's field by international expert networks such as the Global Water Partnership (GWP) or the World Water Council (WWC). Analytically, the MLG framework highlights the scale-sensitive character of water issues, influenced by multiple actors, levels of decision-making and sectors; more normatively, it aims to define the best scale to manage water issues. For example, the challenge of universal access to drinking water and sanitation calls for a global coordinated action. Meanwhile

E. Dupuits (✉)
Global Studies Institute, University of Geneva, Geneva, Switzerland

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extreme climate related water events, such as droughts or floods, require more cooperation between states inside transboundary river basins.

The three main criticisms of the MLG framework will be further developed in this chapter. First, the MLG framework tends to reproduce a cultural bias. Indeed, whereas the concept takes its origins in the European context, water resources are the object of multiple interpretations depending on the distinct geographical and cultural contexts (Boelens et al. 2016). Second, the MLG framework has a normative character postulating similar institutional arrangements without consideration of local contexts (Moss and Newig 2010). Third, beyond its normative character, the MLG framework does not take into account power relations, social inequalities, specific interests and conflictive representations on water resources (Swyngedouw 2004; MacKinnon 2011).

In the specific case of Ecuador, water resources are the object of neo-extractivist interests from the national government (Boelens et al. 2015), generating protests and network mobilizations led by local communities (Boelens 2008). Neo-extractivism has been defined as the exploitation of natural resources by progressive states justifying the need to finance social development (Andrade 2015; Svampa 2015). Multi-level water governance institutions in Ecuador hide various limits in terms of decentralization to lower scales of governments, conflicts between national development interests versus agricultural and human consumption uses, and remaining power inequalities among actors. While the approbation of the new water law in 2014 aims to resolve these tensions, there remains much criticism from civil society actors (Ortiz Crespo 2016). For example, most water community organizations deplore the state privatization of water resources. In this context, the recent creation of national and transnational networks by water community organizations managing drinking water and sanitation services reveals the existence of scalar strategies beyond static levels and hierarchies imposed by centralized water governance institutions.

These considerations raise the following question: to what extent do scalar politics implemented by water community networks overcome the existing gaps in water governance institutions? This chapter aims to analyze how, in a context of water governance institutions shaped by the neo-extractivist strategies of the central state, national and transnational

water community networks mobilize various scalar politics in order to promote their model of governance and become included in national decision-making policies.

The analysis is based on the empirical case study of Ecuador. The aim is to discuss the three limits of the MLG framework previously identified (the cultural bias, the normative character and the ignorance of power relations). Moreover, national and transnational water community networks are almost inexistent in Switzerland and Europe due to the high degree of decentralization toward municipalities in the first case and the predominance of mixed public-private models in the second case. This justifies the focus on Latin American cases.

First, a conceptual and theoretical framework about the origins and meanings of multi-level water governance is presented. Second, the limits of the MLG framework to understand water politics are discussed on the basis of the Ecuadorian case study. Third, critical reflections are raised through the analysis of scalar politics implemented by national and transnational water community networks in Ecuador and in the Latin American region to influence neo-extractivist states. More broadly, this study underlies the need to critically analyze the mechanisms of articulation designed between levels to avoid hierarchy and to consider grassroots scalar politics in water governance in terms of evolving power relations.

2 From Multi-level Water Governance to Scalar Politics

2.1 The Multi-level Water Governance Framework

The MLG framework originates from the context of the establishment of the European Union (EU). The underlying objective is to facilitate the distribution and articulation of roles between member states, supranational institutions and sub-national regions (Hooghe 1996). More broadly, MLG refers to vertical arrangements, with institutions created between jurisdictional or geographical levels, and horizontal arrangements, with networks created between diverse actors and sectors (Andonova and Mitchell 2010). The objective is to encourage the creation of institutions

beyond one single level, and to change the perception of the national government as the best level at which to address environmental issues. Moreover, MLG aims to address the dilemma between citizen participation at the local level and system effectiveness at the global level (Moss and Newig 2010). In this regard, Brondizio et al. (2009) explain that "institutions at (and linking) multiple levels are essential for the long-term protection of ecosystems. Focusing only at a local, regional, national, or international level is itself a source of inadequate policy design" (254).

The MLG framework has been largely applied by scholars to the study of water challenges, deploying across multiple levels, involving multiple actors and influencing multiple sectors (Moss and Newig 2010; Gupta and Pahl-Wostl 2013). Authors have analyzed the multi-level issues emerging at the global level, due to the fragmented nature of global water governance, which has no formal international regime[1] (Gupta et al. 2008, Pahl-Wostl 2015). This fragmentation leads to conflicts between actors regarding their representations on water as a common good, an economic resource, a public good or a human right[2] (Conca 2005). Moreover, global water governance tends to be dominated by expert networks, such as GWP, WWC or the Stockholm International Water Institute (SIWI), gathering together states, the private sector, UN agencies, academia and civil society organizations. These expert networks have been criticized for the gap between the definition of abstract global norms, such as good governance or integrated water resources management (IWRM), and their concrete implementation at the local level, as well as for their embeddedness with the private sector considering water as a market good (Conca 2005).

Another major multi-level challenge identified by authors is the cross-cutting character of water governance among sectors as seen at the core of the Nexus concept (see Chap. 10). Other authors have analyzed multi-level challenges due to interactions between state jurisdictions and the natural water flow that crosses political boundaries (see Chap. 4). This is what Cash et al. (2006) call cross-scale governance, referring to the overlaps between jurisdictional levels (governments) and spatial scales (hydrological cycle). Beyond the wide range of studies dedicated to analyze multi-level water governance issues, other authors from the political geography field aim to highlight power relations and socio-political constructions in water governance, preferring to use the term of "scalar politics."

2.2 Scalar Politics and Power Relations in Water Governance

Authors from the political geography field criticize the MLG framework for its static conception of levels, its normative character, the hierarchy of levels it entails, and the lack of analysis of power relations (Smith 1993; Swyngedouw 1997, 2004). Moss and Newig (2010) question "the static assumptions regarding the possibility of finding 'optimal' scales inherent to economic and many political science approaches" (7). On the contrary, these authors use the concept of "scale" rather than "'level," to highlight the socio-political dynamics at work in the rescaling processes of collective action (Swyngedouw 1997; Dufour and Goyer 2009). In this perspective, scale is meant as an interactional process influenced by power relations between actors. According to Swyngedouw (2004), "the social power that can be mobilized is dependent on the scale or spatial level at which social actors can operate. Consequently, the success or effectiveness of social and political strategies for empowerment is related to the ways in which geographical scale is actively considered and mobilized in struggles for social, political, or economic resistance or change" (26).

The literature on scalar processes is divided into materialist and constructivist approaches (Manson 2008; MacKinnon 2011; Poteete 2012; Padt and Arts 2014). In a materialist approach, Cash et al. (2006) define the concept of transcalar governance to highlight the interactions at the intersection of different levels and scales. They differentiate "'scale' as the spatial, temporal, quantitative, or analytical dimensions used to measure and study any phenomenon, and 'levels' as the units of analysis that are located at different positions on a scale" (2). Three solutions to the challenges of transcalar governance are identified: institutional interaction, co-management and boundary organizations.

In a constructivist approach, authors talk about the politics of scales to highlight "the idea that the subsequent constitution and transformation of scales are the result of sociopolitical projects and struggles and contestations between actors inscribed in power relations" (Smith 1993; in Masson 2009, 117). Smith (1993) defines the politics of scales as the capacity of actors to "jump" from one scale to another in order to serve some interests or to "bend" particular scales in which some actors or arrangements are tied. According to Gupta and Pahl-Wostl (2013), "the

politics of scale helps to shape the level at which these problems and the resulting claims for governance are constructed" (1).

The approach of *scalar politics* goes a step further than the politics of scales, focusing on the construction of new scales of action by actors, and the manipulation of certain scales for other interests. In this regard, Masson (2009) highlights the capacity of social movement to engage in their own processes of scale construction and transformation, leading to the production of new scales of identification. The scalar politics approach gives a particular attention to framing[3] processes considering scale as a social construct shaped by actors' representations and discourses (MacKinnon 2011; Warner et al. 2015). Finally, some authors use the concept of "grassroots scalar politics" (MacKinnon 2011) to analyze "how grassroots organizations and movements engage at different spatial scales to defend their interests, autonomy, rights and voice" (Hoogesteger and Verzijl 2015, 14).

Various authors have adopted this critical approach of scales to study power relations among states and non-state actors within river basin committees (see Chap. 3). These studies go beyond the normative vision of river basins as the best level to govern water issues and instead study the power dynamics at stake (Lebel et al. 2005; Molle 2009; Graefe 2011). In the same perspective, some authors analyze hydraulic mega-infrastructures in their political dimension and the constant redefinitions of scales, perceptions and conflicts over their governance (Guerrin et al. 2014). Consequently, scalar hierarchies are not fixed but constantly reshaped in function of actors' power and exclusion processes.

Other authors from the political ecology approach use the concept of hydro-social territory[4] to highlight the social construction of water resources beyond biophysical characteristics. This can lead to struggles over the control of resources (Swyngedouw 2005; Budds and Hinojosa 2012; Hoogesteger 2012; Boelens et al. 2016). This set of studies widely uses the concept of hydric justice to analyze how vulnerable actors are often excluded or marginalized from technocratic-managerial water projects (Sze et al. 2009). Moreover, authors focusing on the Latin American context mobilize the concept of neo-extractivism to analyze how post-neoliberal states justify natural resources exploitation on the need to obtain income for social development, and doing so, seek to avoid

social contestation against development projects (Andrade 2015). Neo-extractivism hides the renewal of resource marketization implemented by states beyond the private sector through mega-projects such as hydroelectricity or mining.

However, Brown and Purcell (2005) warn on the "local trap" in which many authors from the political ecology field have fallen. They argue that the local scale shouldn't be considered as the most desirable scale to deal with environmental issues in order to avoid reproducing the same assumptions made in the MLG framework. This consideration is particularly accurate in the field of common-pool resource management (Ostrom 1990), where authors have mainly studied water community organizations at a local or sub-national level (see Chap. 2). On the contrary, other authors have studied the scalar politics and frames of water community networks at the local, sub-national or national scales, highlighting their capacity to mobilize different scales for their action (Boelens 2008, 2014; Uhel 2008; Hoogesteger 2012; Boelens et al. 2015).

In this chapter, we focus on the scalar politics implemented by national and transnational water community networks to influence multi-level water governance processes and overcome their constraints. In the next part, a detailed analysis is undertaken of the Ecuadorian context, to illustrate the concrete implementation of the multi-level water governance framework, and to discuss its normative character and limits as an analytical tool.

3 The Limits of Multi-level Governance: From Legal Reforms to Water Conflicts in Ecuador

This part aims to present a politico-legal analysis of the Ecuadorian water governance institutional architecture, and its concrete implications in terms of multi-level articulations and misfits. The modalities of MLG are discussed in terms of articulation between levels of governments, sectors and actors, and more specifically between the national government and water community organizations.

The analysis is based on a fieldwork conducted in Latin America between 2013 and 2016. It includes forty semi-direct interviews with community leaders and actors from the field of international cooperation, three direct observations of the Latin American Meetings of Water Community Management (Paraguay 2013, Costa Rica 2014 and Chile 2015) and direct observations of international conferences (World Water Week in 2013; International Climate Conference, COP21 in 2015), and national events (Hydric Resources Forum, Ecuador 2014).

3.1 Toward a More Coordinated Multi-level Water Governance Architecture?

Until the recent legal reforms of 2008 and 2014, water governance in Ecuador was highly fragmented into multiple levels of decision-making, uses and actors (Cremers et al. 2005). Boelens et al. (2015) talk about a "water governance bazaar," referring to the overlaps and misfits due to neoliberal reforms in the 1990s. These reforms contributed to dismantle water competencies into multiple actors, mainly governments, private companies and water users' organizations, reducing the role of the central government. The National Council of Hydric Resources (CNRH), created in 1994, was not granted with the sufficient human and financial resources to face this dispersion, and was only in charge of the irrigation sector.

Following the adoption, in 2008, of the new constitution, reform of the water sector began. Two years later, an intergovernmental water agency, the National Water Secretariat (SENAGUA), was created to replace the former CNRH. SENAGUA stands for a coordinating body and a multi-sectorial institution moving away from the fragmentation of water governance. The Ecuadorian government prohibited the private management of water resources in the constitution. Instead, an innovative hybrid model relying on public or community governance has been recognized, and water has been declared as a "fundamental and inalienable human right" (Art. 318).

Moreover, the Ecuadorian government approved a new water law in June 2014. This was an important step toward the reform of the

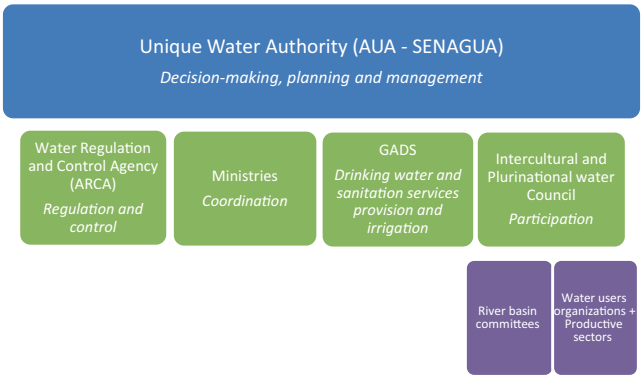

Fig. 5.1 Strategic national water system of Ecuador (Source: SENAGUA)

disarticulated water sector. The law clarified the multi-level institutional framework to govern water (see Fig. 5.1), strengthening SENAGUA as the unique water authority in charge of national planning and management; creating new institutions such as the Water Regulation and Control Agency (ARCA), the Public Water Firm (EPA), the Intercultural and Plurinational Water Council and river basin committees; and delimitating the roles of the decentralized autonomous governments (GADS) and water community organizations.

The strategic national water system mentions the necessity to decentralize a large part of the water management functions and to move from national institutions toward GADS at the local scale. This was mentioned in the Organic Code of Territorial Organization, Autonomy and Decentralization (COOTAD). This legal framework aims to promote partnerships between local governments and community organizations[5] for the provision of drinking-water services and sanitation. On one hand, public-community partnerships aim to strengthen communities' capacities in the case of technical, administrative, environmental or economic weaknesses identified by GADS to fulfil their responsibilities. On the other hand, community organizations are expected to compensate the government's difficulties to reach isolated rural populations and reduce water inequalities. One broader objective of public-community partnerships is the reduction of "hydric injustices" in the country.[6] Indeed,

Ecuador is characterized by the concentration of water rights and access in few private actors to the detriment of rural communities (Bustamante and Boelens 2010).

The different legal reforms implemented in the last few years in Ecuador have set the basis for the improved articulation of the multi-level water governance architecture. The main innovations include the creation of a transversal national water authority, incentives for the decentralization of technical and financial resources toward regional and local authorities, and the promotion of public-community partnerships for the provision of water services. However, the water governance context in Ecuador is not favorable to the concrete implementation of this multi-level framework. Indeed, the water sector is characterized by economic and political interests in the form of state centrism, neo-extractivist practices, and social protests from local communities against the lack of effective participation in water consultation and policies.

3.2 Neo-Extractivism, State Centrism and Water Conflicts

The case of Ecuador reveals the trend toward the centralization of water governance by the state, tied to increasing neo-extractivist interests on water resources. State centralization and neo-extractivist strategies can be considered as scalar politics implemented by the national government and challenging grassroots scalar politics. In the following paragraphs, the various blind spots of the analysis of water governance institutions through the MLG framework lenses are assessed. Among these are social protests against the non-inclusion of communities in the decision-making processes, water uses conflicts and the lack of effective decentralization.

A first barrier is the fact that contradictions are contained in the new water law, exacerbating political conflicts between the national government and local communities.[7] A first water protest was launched by civil society organizations in 2012 to demand their right to a pre-legislative consultation. Responding to their demand, the government organized various consultations, led a socialization process at the provincial level, and coordinated national roundtables (Ortiz Crespo 2016). However, another protest emerged following the approval of the law where civil

society organizations raised their concern over the threat of water re-privatization. Indeed, whereas private management of drinking water and sanitation services is prohibited under the constitution, local communities fear the privatization of water resources through the productive sector. Moreover, one key challenge is the persistence of private water management in some cities of the country (notably the biggest one, Guayaquil), which puts into question the legitimacy of the new legal framework. Other points of tension can be seen over water rights redistribution, the increase of water services prices, and the absence of a clear legal framework for the recognition of collective water rights.

A second barrier is the increasing number of water uses for new challenges such as urbanization or productive activities such as hydroelectricity and mining exploitation (Boelens et al. 2015). Hydroelectricity is one of the main strategic priorities for the transformation of the national production model.[8] This increase in demand for uses exacerbates possible conflicts, and water abundance hides a situation of inequities regarding water access and control (Boelens 2008). An illustrative example is the existing opposition between large-scale water projects from the state, and the low investment in agriculture and watersheds conservation. These are in contradiction with the official recognition of the human right to water found in the constitution and the new law.[9] The coordinator of water programs in the Avina Foundation, a regional NGO supporting the water community sector in the country, highlights the contradictions faced by the state regarding the various water uses. According to him, "the government has to find a way to govern the water sector trying to satisfy all the existing interests in the country. The community sector is one important actor but it is not the only one. The government knows that it has a strong pressure from productive activities."[10]

The creation of a centralized water agency can be interpreted as the government's strategy to regain control over water resources. This is in contrast with the neoliberal tendency of the 1990s. In this perspective, Boelens et al. (2015) analyze the rising control from the state on water community organizations, aiming to serve national developmentalist interests. The head of water programs in Protos, a Belgian NGO promoting the human right to water in the country, mentions the dynamic of "state control" on water governance structures in Ecuador, and the weakening of civil society movements who could balance power inequalities.[11]

Finally, the multi-level governance framework hides the ineffective decentralization of competencies from the national government toward local municipalities. Indeed, the national government does not fully provide the expected administrative and financial resources to GADS to manage water services. Moreover, local governments lack sufficient capacity to ensure effective partnerships with community organizations. Various NGOs working on water governance issues, such as Avina, Care and Protos, share the same diagnosis of the limited decentralization.[12] The coordinator of water programs in the NGO CARE explains that "an important limit identified in the country is the weak capacities and skills of people working in the municipalities. The problem is that the municipality doesn't have any capacity regarding rural issues, so it is completely neglected."[13]

Some conclusions on the MLG framework are emerging from the analysis of the Ecuadorian case study. In general, water conflicts are the consequence of the lack of articulation among different types of actors, sectors and levels (mainly the national government, local governments and community organizations), defending different interests on water resources. On one hand, hierarchy is characterizing the Ecuadorian water system, through state centrism and the lack of decentralization toward local municipalities. On the other hand, water community organizations are facing various barriers in the implementation of partnerships with local governments and in their effective inclusion in national decision-making policies. While the national government is investing in development and productive projects, community organizations and NGOs defend the human right to water as a priority and demand a better articulation with local governments.

4 Beyond Static Levels and Hierarchy: Water Community Networks and Scalar Politics in Latin America

In this last part, the scalar politics of national and transnational water community networks are explored in Ecuador and in the broader Latin American region. First, the case of an inter-communities network in Ecuador is examined. It is observed how scalar strategies are mobilized to

balance power inequalities with the national and local governments. We then analyze the regional and international involvement of water community organizations through the creation of a transnational network representing their interests. We aim to study how scalar politics implemented by water community networks overcome existing gaps in water governance institutions and neo-extractivist strategies implemented by central states.

4.1 Inter-community Networks Balancing Power Inequalities in Ecuador

Faced with the tendency towards state centrism and neo-extractivism in Ecuador, many of the water community organizations created, in 2012, a national network to defend their interests. This was called the Network of Social and Community Organizations of Water Management of Ecuador (ROSCGAE). It includes thirty-seven sub-national organizations of fifteen provinces and undertakes a role of representation and capacity building. ROSCGAE's main objective is to compensate local self-management limits (low technical and financial resources) through the promotion of partnerships between community organizations at sub-national and national scales, as well as to increase their visibility and inclusion in decision-making policies related to water issues.[14] In the context of conflicts and political asymmetries, ROSCGAE seeks to balance power inequalities among public and community actors, and among various levels. The scalar politics approach is useful here to analyze the strategies employed by ROSCGAE in an attempt to overcome static levels and hierarchies imposed by the national government in water governance.

First, ROSCGAE's).role is to mediate between communities and local governments for the concrete implementation of partnerships in the governance of water services. An emblematic example of public-community water partnership is the Center of Support for the Rural Management of Drinking Water sector (CENAGRAP). This center, created in 2002, is a co-management structure of drinking water services between the municipality of Cañar and the community organizations of the province. The center saw its membership increase, from fourteen community systems involved at the creation to ninety systems in 2011, representing 7,550

users and 37,785 inhabitants.[15] A report mentions the key role of NGOs in the success of these hybrid partnerships: "the idea to contribute to the construction of a collaborative structure, bringing actors who until the moment were functioning through confrontation, around a common issue, was possible by the existence of an actor playing the role of mediator and articulator."[16] ROSCGAE is now replacing the NGO PROTOS-CEDIR in the function of mediator, signifying an important gain of autonomy for water community organizations from external NGOs.

Based on this first success, ROSCGAE supported the agreement for a new public-community partnership in the province of Imbabura. The drinking water project of Pesillo-Imbabura involves the cooperation between five municipalities and community organizations of the province.[17] However, most of the community organizations are still reluctant to enter into partnerships with public authorities in a context of neo-extractivist interests from the state.[18]

Second, ROSCGAE plays the role of mediator in national decision-making arenas, breaking with a hierarchical perspective of levels. One of its strategic goals is to be the official interlocutor between community organizations and the national government. Following this objective, ROSCGAE).assumed the role of official representative for the community sector during the pre-legislative consultation for the adoption of the new water law. The network facilitated the concrete implementation of the prior, free and informed consultation, as the government did not have the capacity to do so. ROSCGAE's president also mentions that the role of the network "is not only to look at the water law which is one instrument, but the objective is to guarantee that local and national governments are not violating water community organizations' rights."[19]

Beyond inter-communities network politics led at the national scale, community organizations are also mobilizing regional and global scales as strategic tools to defend their model of governance in the context of conflicting water interests in Ecuador. In the next part, we analyze how the creation of a transnational water community network aims to foster cooperation among community organizations in the Latin American region, to pressure national governments using international norms and arenas, and to gain power through the acquisition of a new status as water expert. Our objective is to analyze how regional and international

involvement of water community networks impacts their inclusion in decision-making policies in Ecuador.

4.2 Transnational Water Community Networks in Latin America Breaking Hierarchies

Beyond the national scale, ROSCGAE is also representing Ecuadorian water community organizations in the Latin American region. It is a member of the Latin American Confederation of Community Organizations for Water Services and Sanitation (CLOCSAS). This transnational network, created in 2011 during the second Latin American Conference of Community Water Management in Peru, represents national and subnational water community networks from fifteen countries.[20] It is comprised of a directive committee with seven elected leaders, and a general assembly made up of two members per country. The main goals pursued by CLOCSAS are to increase the visibility and institutional recognition of the water community sector throughout the continent, and to respond to the technical and financial limits faced by community organizations in their countries.

In the next paragraphs, three different scalar politics are analyzed as strategic tools mobilized by CLOCSAS' leaders to overcome existing water governance gaps: the regional integration between water community organizations in Latin America beyond political boundaries, the reframing of global norms to pressure national governments and the professionalization of water community organizations as new water experts. For each scalar politics, we analyze how ROSCGAE's involvement in CLOCSAS influences its inclusion in national water governance policies and its capacity to challenge the central state.

A first scalar politics is the construction of a new scale of territorial integration between water community organizations in the Latin American region. Facing the diversity of community management models and identities, CLOCSAS' main leaders created the concept of "associativity" to facilitate the regional integration of its members. CLOCSAS defines associativity as "an institutional process of articulation, sharing, communication and coordination between the OCSAS of a locality,

region, country or continent, to learn from each other and to strengthen their capacities (management, advocacy on public policies, innovation) in a durable way, and oriented toward the common goal of access to water and sanitation for all Latin-Americans."[21] The normative project of associativity aims to highlight the commonalities of water community organizations and to define water as an integrative process. It aims to bring together organizations defining water as a cultural good and using integral practices around the community as a whole, with organizations more focused on an economic view of water using productive management practices.

The regional integration of water community organizations through their)involvement in CLOCSAS strengthened the legitimacy of ROSCGAE as the main representative of the water community sector in Ecuador. Moreover, it opened the opportunity for ROSCGAE to diffuse its model of public-community partnerships to other countries of the region. This diffusion process has mainly occurred through the Latin American Meetings of Water Community Management, organized each year by CLOCSAS in a different country.

A second scalar politics is the reframing of global norms to pressure national governments for the recognition and inclusion of community organizations as major actors in water governance. It also seeks to increase community organizations' international visibility, which still remains weak in comparison to public or private actors. CLOCSAS' leaders seek to reframe the global norm of the human right to water as a starting point for their claims. As an example, CLOCSAS' leaders reframed the World Water Day celebration into the Community Water Management Day, and used it to highlight the important role of community actors behind the water resource per se.[22] The day is aimed to be celebrated annually on September 14t, the official creation date of CLOCSAS, and has been officially recognized by the Ministry of Environment and Energy in Costa Rica. Another example is CLOCSAS' attempt to put the issue of collective right to water on the agenda of the World Water Forums. Pursuing this objective, CLOCSAS has created a partnership with the WWC to position water community management at the center of the next forum to be held in Brazil in 2018.

By doing so, CLOCSAS is seeking to convince public and private actors to recognize the community sector at the national scale, promoting the historical role of community organizations in providing water services in remote rural areas and raising awareness on the good practices existing in the continent. The new frame of the collective right to water was used by ROSCGAE to).influence the inclusion of water community organizations as a strategic actor in the elaboration of a complementary jurisdictional framework to the water law, regulating the formalization of water community organizations and the conformation of sub-national and national networks.[23]

A third scalar politics is the professionalization of CLOCSAS as a new international expert on water issues, influencing the inclusion of the community sector in decision-making processes. Professionalization is linked to the formalization process of water community organizations through the acquisition of technical skills and expert knowledge. One of CLOCSAS' main objectives is to break with the perception of community organizations as archaic or inefficient, and to claim the validity of local knowledge and practical experiences. In this regard, CLOCSAS created in 2012, in partnership with Avina Americas and CARE, the regional Unified Program of Capacity Building for community organizations of water and sanitation services.[24] It has been created on the basis of five existing national experiences: the Consortium of capacity-building for renewable natural resources management (CAMAREN, Ecuador), the pilot accreditation school in water and sanitation (EPILAS, Peru), the Honduran Association of Water and Sanitation Committees (AHJASA, Honduras), the Association of Community Organizations for Water Utilities and Sanitation in Colombia (AQUACOL, Colombia) and AGUATUYA Foundation (Bolivia).

Through this professionalization process, water community networks try to differentiate from radical social movements claiming water anti-privatization in the continent. On the contrary, they aim to be recognized as water experts in national decision-making arenas. Returning to the Ecuadorian case, in the process of consultation to local communities and dialogue with the national).government, ROSCGAE assumed the role of representation of the community sector. The inclusion of ROSCGAE as

the main national expert on water community governance was primarily due to the apolitical status of the network. ROSCGAE made the choice not to be associated with the National Confederation of Indigenous Nationalities of Ecuador (CONAIE), strongly opposed to the adoption of the new water law and leading many protests in the country. Indeed, these movements are perceived as being easier to exclude from decision-making processes because of their radical character, whereas ROSCGAE is aligned with CLOCSAS' objective to become an expert on water issues hence avoiding political partiality.

The three network politics analyzed give insight on the effects of ROSCGAE's transnational involvement on its inclusion in national decision-making processes and its capacity to impact neo-extractivist interests. First, the regional integration of water community organizations in the Latin American continent contributes to consolidate ROSCGAE's legitimacy as the main representative of the community sector in Ecuador and to diffuse the model of public-community partnerships. Second, the reframing of the human right to water by CLOCSAS' leaders contributes to placing the issue of collective water rights on the national agenda. Finally, the professionalization of water community organizations and the acquisition of an expert status facilitate the inclusion in national decision-making processes regarding water policies.

5 Conclusion

Water resources are highly sensitive to levels and scales. This is due to the fragmentation of water governance between multiple sectors, actors and levels of decision-making. As a consequence, the multi-level governance (MLG) framework emerged as a new approach to analyze the fragmented nature of water resources. However, three main limits have been identified regarding the concept: the reproduction of a cultural bias from the European perspective masking the multiple interpretations on water resources, the normative approach postulating the same structures without consideration of local contexts and the ignorance of power relations.

This chapter aimed to address the blind spots of the MLG framework through the analysis of national and transnational water community

networks in Ecuador. It aimed to respond to the following question: to what extent do scalar politics implemented by water community networks overcome the existing gaps in water governance institutions? The case study of Ecuador, as analyzed in this chapter, revealed the limits of an analysis through the lenses of the MLG framework and the need to adopt the approach of scalar politics. Indeed, the concept of scalar politics is useful to highlight power relations and socio-political interactions at stake in water governance, beyond formal institutional arrangements.

First, the analysis demonstrated the limits in the implementation of the MLG framework in the Latin American context of neo-extractivism on water resources. On one hand, the adoption of a new water law in Ecuador responds to the need of more integrated and participatory institutions to govern water. On the other hand, tensions remain between the national government and water community organizations in a context of state centrism and neo-extractivist interests on water resources. Beyond formal institutional architectures, both the national government and community organizations are seeking to re-scale their interests and actions to control water resources.

Second, the study revealed how national water community networks contribute to the articulation of the levels of water governance through scalar politics. The case of ROSCGAE illustrates how a national network of water community organizations takes on the role of mediator to concretely implement public-community partnerships at the local scale, and become a national referent in the design of water public policies. This result represents a break with the normative perception of water community organizations as only local actors in water governance.

Third, the case of CLOCSAS illustrates the redefinition of power relations and inequalities between the state and water community organizations. Through transnational network involvement and scalar politics, ROSCGAE increased its legitimacy as the main representative of water community organizations at the national scale, diffused the model of public-community alliances in the continent and acquired an expert status to improve the inclusion of community organizations in national decision-making processes.

The analysis of grassroots scalar politics related to water community governance enlightens the interactions between multi-level water

governanceinstitutions and network mobilizations. The adoption of the scalar politics approach goes beyond the blind spots of the MLG framework by showing how grassroots organizations overcome the local trap, create new regional scales of integration, and increase their influence in national decision-making arenas.

Notes

1. Krasner (1982) defines an international regime as "the implicit and explicit principles, norms, rules, and decision-making procedures around which actors' expectations converge in a given area of international relations" (186).
2. On one hand, the Dublin principles adopted in 1992 define water as an economic resource. On the other hand, water was recognized in 2010 as a human right by the United Nations General Assembly.
3. Framing has been defined as "the strategic efforts by groups of people to fashion shared understandings of the world and of themselves that legitimate and motivate collective action" (Khagram et al. 2002, 12).
4. Boelens et al. (2016) define hydro-social territories as "the contested imaginary and socio-environmental materialization of a spatially bound multi-scalar network in which humans, water flows, ecological relations, hydraulic infrastructure, financial means, legal-administrative arrangements and cultural institutions and practices are interactively defined, aligned and mobilized through epistemological belief systems, political hierarchies and naturalizing discourses" (2).
5. Water community organizations were created in the 1960s and 1970s as self-managed water systems by local users in the rural areas where public services were absent. According to SENAGUA, there are around 6.832 drinking water and sanitation committees (*Juntas de agua potable y saneamiento*, JAAPs) and 4.798 irrigation organizations, providing water services to around 30 percent of the total population (National Hydric Resources Forum, 2012).
6. VII National Hydric Resources Forum, Quito, Ecuador, 7–8/06/2012.
7. Direct observation of the VIII National Hydric Resources Forum, Quito, Ecuador, 26–27/06/2014.
8. "Sectores Estratégicos para el Buen Vivir", Revista del Ministerio Coordinador de Sectores Estratégicos, No. 1, Septiembre 2013.

9. Balarezo Vinueza D., Lopez Pardo C., 2012, Nuestro derecho al agua. El derecho humano al agua y la justicia ambiental en Ecuador, Canadá: Proyecto Planeta Azul, Marzo 2012, 16 p.
10. Interview in Quito, Ecuador, 02/07/2014.
11. Interview in Olmué, Chile, 02/09/2015.
12. Avina, Care and Protos are all member of the National Forum of Hydric Resources, organized each year in Quito to debate around water governance issues in Ecuador and to create common claims among civil society organizations.
13. Interview in Cuenca, Ecuador, 23/07/2014.
14. Interview in Cañar, Ecuador, 29/07/2014.
15. Garcia D., Solis H., 2011, *Yakukamay. Alianza público-comunitaria: un modelo de gestión del agua. La experiencia desde el CENAGRAP*, Cañar: Cenagrap/Protos-Cedir, Julio 2013, 86 p.
16. Idem.
17. Interview in Quito, Ecuador, 16/12/2014.
18. Direct observation of the VIII National Hydric Resources Forum, Quito, 26–27/06/2014.
19. Interview in Cañar, Ecuador, 29/07/2014.
20. Asociación Hondureña de Juntas de Agua y Saneamiento (AHJASA), Articulación de la Región Semiárida Brasileña (ASA), Asociación Salvadoreña de Sistemas de Agua (ASSA), Federación Nacional de Agua Potable Rural de Chile (FENAPRU), Federación Paraguaya de Juntas de Saneamiento (FEPAJUS), Red Dominicana de Acueductos Rurales (REDAR), Red Nacional de Comités de Agua Potable y Saneamiento de Nicaragua (REDCAPS), Federación Nacional de Cooperativas Prestadoras de Agua y Saneamiento de Bolivia (FENCOPAS), Federación Misionera de Comités de Agua Potable de Argentina (FEMICAP), Red de Organizaciones Sociales y Comunitarias de Gestión del Agua del Ecuador (ROSCGAE), Federación Nacional de las Organizaciones Comunitarias de Agua y Saneamiento del Perú (FENOCSAS), Unión Nacional de Acueductos Comunales de Costa Rica (UNAC), Confederación Nacional de organizaciones comunitarias de servicios de agua y saneamiento de Colombia (COCSASCOL), Asoverde Guatemala, Panamá (JAAR).
21. "La Asociatividad Como Estrategia en la Gestión Comunitaria del Agua en Latinoamérica," CLOCSAS, 2012.
22. Interview in Paris, France, 03/12/2015.

23. Normative framework for the conformation and legalization of the water and sanitation community organizations; regional water and sanitation community organizations; and secondary and third-level organizations. SENAGUA, 2016.
24. Carrasco P., Toledo F., "Fortaleciendo Capacidades. Para un mejor acceso al agua potable y al saneamiento en zonas rurales", Fundacion Avina, Quito, Ecuador, 2014, 60 p.

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Emilie Dupuits is a PhD student in the Department of Political Science and International Relations at the University of Geneva and a teaching assistant at the Global Studies Institute (GSI). Her research interests focus on the transnationalization of water and forest community organizations in Latin America.

6

Exploring the Democratic Legitimacy of Privatization in the Water Sector: Two Cases in Switzerland

Eva Lieberherr

1 Introduction

The question of how to manage and organize water supply and wastewater remains debated in practice and in the literature. A key aspect in this discussion is the issue of privatization and the more general reorganization of water operators to become increasingly independent from the municipal government (Furlong 2012; Schouten 2009). Privatization can be depicted along a continuum from a shift in ownership from the government to a private actor to varying degrees of private sector involvement such as contractual agreements for certain tasks (Lieberherr 2012; Schouten 2009; Ménard and Saleth 2013). However, privatization need not entail a shift of ownership (Budds and McGranahan 2003). For

E. Lieberherr (✉)
Natural Resource Policy (NARP), Institute for Environmental Decisions, Swiss Federal Institute of Technology (ETH), Zurich, Switzerland

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instance, formal privatization can involve a change from public to private law, while the ownership remains public (Wackerbauer 2007).

A key aspect underlying the privatization debate is the concept of democratic legitimacy, i.e., the degree to which citizens have influence—through democratic institutions—on their water operators (Herzberg 2015). In a system of public management, citizens can characteristically influence operators either directly, via a public vote, a citizen initiative or referendum, or indirectly through political delegates who have decision-making competences over the water operators' policies and projects. With the privatization of public services, citizens' influence, and hence democratic legitimacy, is typically assumed to decrease (Schmelzle 2008; Benz and Papadopoulos 2006b).

Historically the household water supply and wastewater sectors have been predominantly owned and operated by public actors, and classically by municipalities with city councilors holding decision-making competences; an exception is France, where private actors, that is private companies, have had a long history in the management of water services (Citroni 2010). Since the neoliberal turn in the 1980s, the public model has been questioned and a reorganization of operators to become independent from local government has increased in urban services (Lorrain and Stoker 1997; Furlong 2012). However, most water operators worldwide remain under some form of public organization. Liberalization, i.e., the removal of market barriers and the free market competition (Wackerbauer 2007) has not taken hold in this sector, as there has been re-regulation rather than deregulation (Schiffler 2015b; Ménard 2009). Moreover, during the last fifteen years, a reform of (re)municipalization, or the transfer back from the private to the public domain, has emerged (Hall et al. 2013). In addition, community alternatives to privatization have been proposed (see Chap. 2), which, however, have not necessarily led to an increase in democratic legitimacy (Bakker 2008). While often financial reasons drive privatization, recent research indicates that democratic legitimacy concerns tend to underlie the reverse trend (Wollmann 2010; Pahl-Wostl 2015; Lieberherr et al. 2016; Schiffler 2015a). Given general trends toward (formal) privatization, the question arises regarding how these reforms affect democratic legitimacy in such a context. Specifically, do privatization reforms lead to a decrease in democratic

legitimacy in comparison to public governance in Switzerland, a country with predominant publicly controlled water sectors?

This chapter focuses on household water supply and wastewater service provision (henceforth referred to as the water sectors) in urban areas in industrialized countries. To embed the Swiss case within the European water management context, different forms of water privatization across Western Europe are briefly reviewed in the next section. Then privatization reforms (or the lack thereof) in the Swiss water sectors are addressed in Sect. 3. To provide insight into how privatization may impact democratic legitimacy aspects of water service providers, the analysis hones in on a comparative case study of two cities: public water operators in Zurich are contrasted with formally privatized water operators in Berne.

2 Water Management in Western Europe

Many different management and organizational forms exist in the Western European water sectors, with great variation between as well as within countries (Lieberherr et al. 2015; Massarutto et al. 2007). In this context, a continuum from public and private governance has been established in the literature (cf. Ménard, 2009; Ménard and Saleth 2013). With a blurring between the public and private domain, public providers have become increasingly autonomous and private sector participation has become more widespread (Allouche et al. 2007).

Material privatization remains rare, as a full transfer of infrastructure ownership and operations to private actors only exists in England and Wales, where the government divested the public water companies to multinational corporations in 1989 (Wackerbauer 2007).

More common than complete divestiture is *partial privatization*. Accordingly, the ownership is shared between public and private actors and the actual management typically occurs through private actors (OECD 2009; Thom and Ritz 2006). Such partial privatization can be found in Germany, where regulation occurs via supervisory boards and competition happens in the water product and service markets (Moreau-Le Golvan and Breant 2007; Wackerbauer 2008). Unlike in England, where privatization is uniform, partial privatization typically

and primarily takes place in large cities. For instance, many other forms of water provision exist in Germany, such as public bureaus and task-specific associations (*Zweckverbände*), with public ownership and management remaining predominant. However, a highly publicized example of partial privatization is the case of Berlin, which became remunicipalized in 2013 (Schiffler 2015a).

Another form of privatization is *delegated private management*, where public actors award a private actor the right to sell water services within a public ownership frame (Lieberherr et al. 2015). This predominates in France and Spain (Schouten and Pieter van Dijk 2007). Also known as the French model of *outsourcing* or *affermage*, this entails that operational responsibility is transferred to private actors (Lieberherr et al. 2015). The private operator thus has the responsibility to maintain the infrastructure for the duration of the contract (Massarutto et al. 2007). Despite a degree of remunicipalization in France, the majority of the French population currently receives water services from private operators, while asset ownership remains public; hence, outsourcing to private providers remains the dominant water provision model in France (Lieberherr et al. 2016).

An increasing mode of water service provision in Western Europe is *formal privatization* and delegated public management, where ownership is public and the government retains indirect control over the operations, through political delegates such as city councilors. This involves a shift from public to private law (Schouten 2009; Lieberherr et al. 2015) and predominates in the Netherlands, but can also be found in many other countries including Switzerland (Schouten and Pieter van Dijk 2007).

Finally, *direct public management* remains a widespread form of service provision across Western Europe—providing more than 90 percent of water and wastewater services (Citroni 2010; Luis-Manso et al. 2007). This entails that water and wastewater infrastructure is publicly owned and operated (Schouten and Pieter van Dijk 2007). Direct public management typically involves hierarchical monitoring by government departments (Massarutto et al. 2007). Exemplary countries of direct public management include Luxembourg, Denmark and Switzerland (Schouten and Pieter van Dijk 2007).

3 Water Privatization in Switzerland

3.1 General Trends

Water provision and wastewater treatment are considered public tasks and direct public management remains predominant in Switzerland (Luis-Manso 2005; Lieberherr et al. 2016). Historically, municipalities predominantly formed task-specific associations (*Zweckverbände*) and public bureau forms (*Regiebetrieb*), with a dominant municipality providing services for other municipalities in a contractual consortium (*Sitzgemeinde*), to provide water services in Switzerland.

The Swiss water sectors have undergone an incremental shift toward delegated public management and formal privatization since the 1970s (Lieberherr et al. 2016). This entails that utilities' legal status has changed, as they have gained organizational, operational and financial autonomy from the "core" administration (Grossi and Reichard 2016). Material privatization remains rare in Switzerland (Grossi and Reichard 2016). Only one fully private water supply operator—the privately owned Zug waterworks—exists and a small percentage of wastewater service operators (ca. 5 percent) are jointly owned by public and private bodies, the rest are publicly owned (Luis-Manso 2005; Lieberherr 2012). No cases of remunicipalization can be found (Lieberherr et al. 2016). Within the constraints of a model based on public ownership and predominantly public control, there is private sector involvement in the form of short-term contracts for specific tasks such as implementing new technology (Lieberherr et al. 2016). Particularly in smaller municipalities, maintenance of infrastructure tends to be contracted out to private companies (Luis-Manso 2005). For instance, such multinationals as Veolia Environment and Suez are present in Swiss wastewater treatment (Luis-Manso 2005). However, the Swiss water market for household supply and wastewater remains non-competitive.

A key reason for the predominant public control in the Swiss water sectors has been the lack of legitimacy associated with privatization (Luis-Manso 2005; Sicher 2011). Or put differently, citizens value having (in) direct influence on their water operators, particularly on the water supply side. Indeed, public opinion has been found to underlie water sector

reforms in Switzerland (Luis-Manso 2005) and this is not in favor of privatization: a survey by the Swiss Gas and Water Industry Association, representative of the Swiss population, shows that 93 percent of the population is against water privatization (Sicher 2011). A general argument anti privatization, beyond democratic legitimacy, is that the public water systems work well. The population is satisfied with the quality of drinking water and is afraid that privatization would lead to lower quality and higher prices (Luis-Manso 2005). Citizens, public servants and politicians tend to be critical of water privatization, as they regard privatization as generating profits, which they consider incompatible with the ethic of public water provision (Pfammater et al. 2007). Despite pressure to open up its water services to the private sector, a widespread understanding exists that liberalizing the water market and enabling international competition is unlikely to take place in the Swiss water sectors (Luis-Manso 2005).

During the early 2000s, a politically active lobby, including the Working Group on Water as a Public Property (comprised of non-governmental organizations and politicians) as well as Swiss unions and charities (e.g., Helvetas, Swiss Coalition of Development Organizations, Swiss Union of Public Services) opposing privatization existed (Rothenberger 2002; Luis-Manso 2005). At that time, it was expected that the liberalization of the electricity and gas market was going to affect particularly water supply management. As electricity, gas, and water supply services have been grouped in the same entity under municipal control in Switzerland, the reforms in the electricity and gas sectors could have led to major changes in the water supply sector. However, the main characteristics and the public control of both water sectors, but particularly the water supply sector, have remained, with some cases of delegated public management and formal privatization emerging, which are addressed in the sections that follow.

3.2 Methods for Analysis of Two Water Cases

Before jumping into the case studies, the methods for this analysis are briefly explained.

3.2.1 Case Selection

To study the complex, real-world situation of water provision in specific urban contexts, with many uncontrollable variables, a case study design is employed (Yin 2006). To shed light onto reforms in the Swiss water sectors, two contrasting cases, i.e., cities with differing water management forms are analyzed: Zurich, which remains under public management, and Berne, which has undergone legal changes involving delegated public management and formal privatization.

Zurich and Berne are two major cities in Switzerland, Zurich being the largest and Berne the third largest in the country as well as the capital city. As is common in Switzerland, wastewater and water supply are managed by separate organizations in Zurich and Berne. The operators in both cities are held accountable to the cantonal (constituent state) administrations. The canton of Berne is typically described in contrast to the canton of Zurich: while the latter is seen as being rather conservative and averse to reforms, the former is viewed as being much more open to reforms, with less municipal autonomy sentiments than in Zurich (Schedler 2003). As both selected cities exemplify these reforms, they are fitting for a contrasting case study analysis. The focus of the comparison is in terms of how the water operators at the city level are managed and how this affects democratic legitimacy.

3.2.2 Operationalizing Democratic Legitimacy

Democratic legitimacy falls under the heuristic of input legitimacy (in contrast to output and throughput legitimacy cf. Scharpf 1999). Underlying input legitimacy are two differing conceptualizations of democracy (Heinelt 2002). On the one hand, input can be based on the principles of *liberal representative democracy*, underlain by state constitutions in direct and representative democracies. In terms of representation, the process of decision-making itself is assumed to be fair as citizens' interests are transmitted into the system of governing via general elections and delegation. Input legitimacy has traditionally followed along these lines of liberal representative democracy. On the other hand, input

legitimacy can be based on *deliberative democracy*, underlain by a more "normative program of good governance" (Bang and Esmark 2009, 15) through "free, open and public debate (or dialogue)" (Heinelt 2002, 24). In terms of representation, this relates to participatory governance, where all affected actors should have a right to participate *directly* (Schmitter 2002). Moreover, the form of participation focuses on deliberation, demonstrations, naming and shaming in the mass media, widespread information dissemination as well as citizen boards, consumer councils, regulatory boards, etc., rather than simply a public vote (Taiclet 2006; Heinrich 2011).

In this analysis, the former conceptualization of democracy is employed. Hence, the focus is narrow, addressing direct and representative democratic elements (institutional form) rather than constructivist preconditions (Schmidt 2013). The analysis is thus based on government responsiveness to citizens, which can be assessed in terms of political participation (Scharpf 1999; Mair 2009). Accordingly, democratic legitimacy is measured based on citizens' ability to influence decision-making either directly by voting on substantive issues or by electing politicians into office (Lieberherr et al. 2016). This can be defined on a range from high to low democratic legitimacy:

- *High*: direct voting on substantive issues of the water operator as well as indirect via electing politicians and consultation;
- *Medium*: only indirect influence through elections and consultation;
- *Low*: no influence, i.e., only being informed and consulted.

3.2.3 Data Sources and Analysis

The data are based on previous research by the author (Lieberherr 2016, 2012), which included desk research (analysis of the cantonal and city legislation, the annual reports of the water operators, etc.) and in-person interviews (with the managers of the water operators, political decision-makers, members of industry associations, etc.). Additional desk research was done by the author in 2016 on the Berne water supply case (assessing legislation relevant to this operator, contracts, policy-relevant documents like messages from the city council, etc.). The laws, reports and interviews were assessed in terms of (1) the types of management forms

(see Sect. 2) to determine whether a reform has taken place and (2) the degree to which citizens can have influence on the water operators, either directly or via political delegates.

3.3 Comparison of Water Management in Two Cities

3.3.1 Direct Public Management in Zurich

In Zurich, the water sectors are under direct public management (see Figs. 6.1 and 6.2). The wastewater and the water supply operators are both non-autonomous, without a legal personality, under public law and ownership, embedded in the public administration, with direct oversight by Zurich's City Council, the Parliament and the public. The wastewater operator (*Klärwerk Werdhölzli*) is within the city's Public Works Department. The water supply operator (*Wasserversorgung Zürich*) is under the city's Industrial Services Department. Their roles and obligations are stated in the cantonal Water Resources Law, the Water Protection Act, Food Law and other relevant administrative bylaws.

Both are public bureaus in the form of contractual consortia (*Sitzgemeinde*): the wastewater operator has six contract municipalities, where each municipality has an individual contract with the Zurich

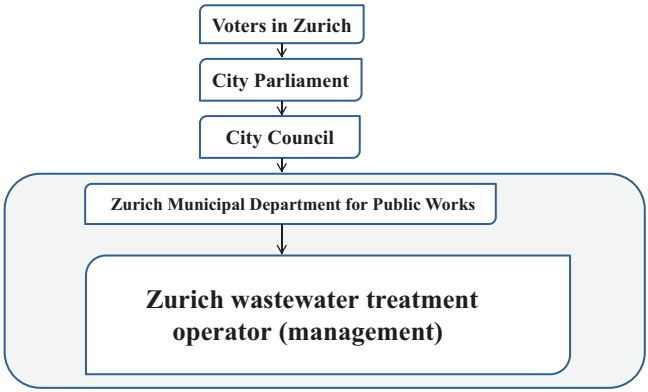

Fig. 6.1 Zurich wastewater treatment operator management and governance structure

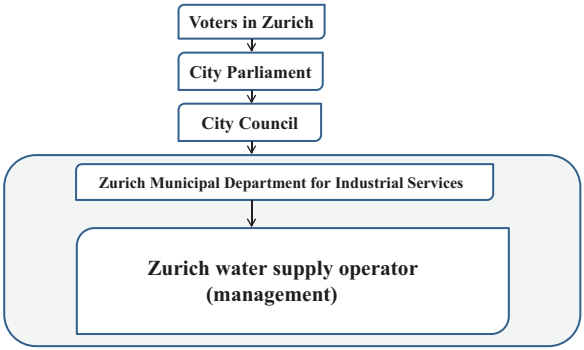

Fig. 6.2 Zurich water supply operator management and governance structure

operator to have their wastewater treated by the city. The water supply operator has thirteen contracts with municipal associations that define the operator's distribution of water supply to seventy-six municipalities. The contract municipalities would like to have decision-making clout and form an association (*Verbund*) together with the city of Zurich. Such an organizational form would give the contract municipalities more rights. Yet the Zurich operators do not see a need for change (Lieberherr 2012). Overall, the issue of democratic legitimacy plays a role in the governance constellation in Zurich: The political actors in the city (a) would like to maintain their influence and (b) are not willing to "diffuse" this control by changing the organizational form to allow the contract municipalities to have decision-making rights.

3.3.2 Formal Privatization and Delegated Public Management in Berne

In Berne, the water sectors have undergone formal privatization (on the wastewater side) and a shift to delegated public management (on the water supply side). The wastewater operator (*ara Region Bern*) is a joint-stock company, under private law, with ten stockholding municipalities who are the co-owners; the city of Berne has the majority of shares (see Fig. 6.3). Hence, although the Berne wastewater operator underwent a legal change, it remains under public ownership. In contrast to the

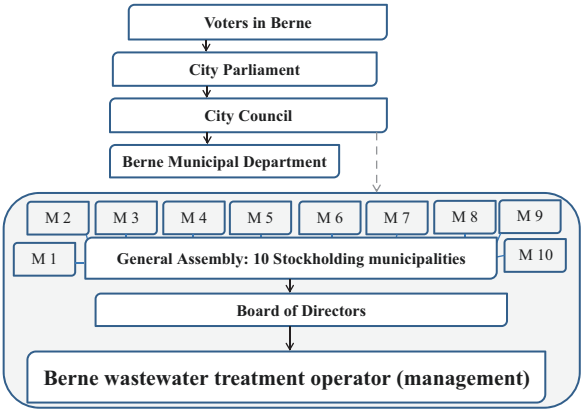

Fig. 6.3 Berne wastewater treatment operator management and governance structure

Zurich operators, this operator has a statute, in addition to the public laws specifying its role and obligations (Lieberherr 2016).

The water supply operator in Berne (*Energie Wasser Bern ewb*) is responsible for providing water, natural gas and district heating. It is an independent institution under public law and public ownership, 100 percent in the hands of the city of Berne, whereby the City Council has control over the operator[1] (see Fig. 6.4). The water supply operator has an additional ordinance (*Wasserverordnung der ewb*) and is obligated to fulfill mandates in its performance contract (*Leistungsvertrag*) (Stadtrat Bern 2001b). The water supply operator is also the majority shareholder of the *Wasserverbund Region Bern AG* a joint-stock corporation, i.e., under private law, that provides water supply to the region of Berne. This regional operator has ten participating municipalities, which are the shareholders. In this chapter the focus is on the operator for the city of Berne and not this joint-stock corporation, which in form is similar to the wastewater operator above. Yet it is important to note that (1) the Berne city water supply operator has delegated the responsibility to procure water to this joint-stock corporation (Verwaltungsrat 2010) and (2) as the largest shareholder of the *Wasserverbund Region Bern AG*, the Berne city water supplier operates most of the joint-stock corporation's water facilities.

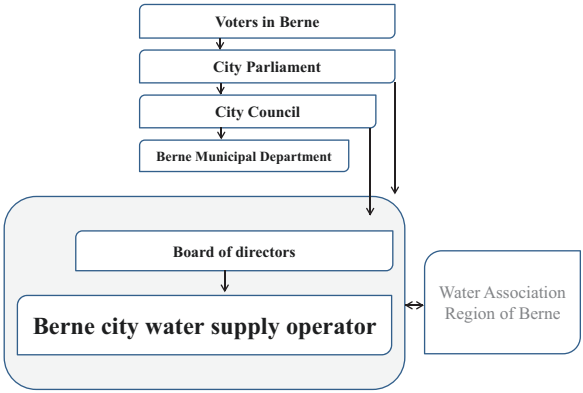

Fig. 6.4 Berne water supply operator management and governance structure

In contrast to Zurich, both operators in Berne have their own legal personality and hence legal capacity to enter contacts in its own name. Moreover, as shown in Figs. 6.3 and 6.4, the operators are no longer directly linked to the political system, hence decision-making occurs at the operational level (internal management), which is faster than having to pass through the political system (Lieberherr 2016).

The wastewater operator's reform occurred in 1996; previously, the operator was a public bureau, providing wastewater services to Berne and nine surrounding municipalities. In short, it formerly looked very similar to the current model of the Zurich wastewater operator described earlier. The reason for the change was primarily financial: the joint-stock form was deemed as necessary to enable the implementation of long-needed renovations (Lieberherr 2016). The aim was to free the operational level from the political system to be able to take action and improve its operational performance and decision-making efficiency. Yet there was also a democratic element, as it was argued that this change was necessary to address the tension between the city of Berne and the surrounding contract municipalities who wanted to have more say about the wastewater operations (Lieberherr 2016). Hence, legitimacy was a stake in the debate for the reform.

The water supply side underwent the shift from direct to delegated management in 2002, when the city of Berne decided to fuse the previous operator *Gas-*, *Wasser- und Fernwärmeversorgung Bern*, which was a

public bureau within the municipal department and did not have its own legal personality, with the *Elektrizitätswerk Bern*. Together these two organizations formed the new operator: *Energie Wasser Bern* (ewb). The driver for the reform was the liberalization of the energy market in Switzerland. The city of Berne was concerned that the public operator would not have the flexibility or the tools to be able to handle new market pressure. Hence, the city of Berne decided that an institutional change was needed (Stadtrat Bern 2001a). With this, the aim was to increase the operator's decision-making efficiency, so it could react to the fast changing environment. An additional goal was to be able to increase the quality of water, natural gas, and electricity and district heating (Stadtrat Bern 2001a). All in all, democratic legitimacy was not found to be a central point in the debate for the reform of the Bernese water supplier.

3.3.3 Democratic Legitimacy

To address the question of how the preceding reforms affect democratic legitimacy, we compare the citizens' ability to influence the water operators in Zurich and Berne. This is done by assessing the degree of democratic legitimacy, as operationalized in Sect. 3.2.2.

Zurich: Primarily the financial aspects link the operators in Zurich with the political system. The director of the *wastewater* operator has discretion for projects up to 200,000 Swiss francs (Lieberherr 2012). After that, financial decisions must be approved by the City Council and Parliament. And for new projects (e.g., for treatment technology) that are more than twenty million Swiss francs, a public vote is obligatory. On the water supply side, the operator has more leeway: the director has discretion over financial decisions up to one million Swiss francs before they have to go through the political system. And new projects larger than sixty million have to be approved by the public (Lieberherr 2012).

Both operators' annual budgets must be approved by the City Council and Parliament. Again, this political control provides an indirect link between the citizens and the operators. Moreover, if citizens regard certain large projects as unjustified—or do not agree with how a project is developed—then they have a chance to veto a large project through a referendum.

The water supply and wastewater operators' directors—responsible for the management of the utility—are appointed by the City Council. Hence, citizens can indirectly, i.e., through democratic delegation, affect the operators' management. Moreover, as they lack their own legal personality, both operators are regulated by the respective public laws, which link them to the political system. The operators are also consulted by the decision-makers, as they are pre-informed before a new law is passed (Lieberherr 2012).

In contrast to the aforementioned influence of citizens, both operators have a lower level of democratic legitimacy when it comes to their contract municipalities. The contract municipalities have no decision-making rights, as they only participate by paying the operators a fee in exchange for having their wastewater treated or receiving water supply. In addition, they are informed and consulted once a year (Lieberherr 2012). Hence, the citizens in the contract municipalities lack democratic influence on their water operators.

Berne: In contrast to Zurich, the citizens in Berne cannot vote directly on the operators' policies or financial projects, as these companies are no longer organized within the municipal departments—see Figs. 6.3 and 6.4 (Stadtrat Bern 2001a; Lieberherr 2016). Instead of being appointed by the City Council, as is the case in Zurich, the directors (operational managers) of the Berne operators are selected by the operator's Board of Directors. Further, in contrast to Zurich, the water operators are not solely regulated by the public laws, but have specific statutes and regulations (e.g., the wastewater operator's statute and the water ordinance) that define roles and responsibilities, which are no longer directly coupled with the political system.

In comparison to the Zurich cases, the wastewater operator in Berne has more financial autonomy: no decisions have to be passed by the City Council, the Parliament or a public vote; the representative democratic link has been severed (Lieberherr 2016). The Board of Directors has complete financial authority, with no cap on its financial autonomy; the director has discretion up until half a million Swiss francs, anything larger has to be passed by the Board of Directors. Neither the Parliament nor the City Council can influence the budget. The Board of Directors could legally sell the wastewater operator without consulting the munici-

palities. However, as the Board of Directors is comprised of municipal delegates, the seats are based on shares of stock (see Fig. 6.3); the link to the citizens is indirect, through electing representatives.

On the water supply side, the operator remains more closely linked to the political system. The City Council and the Parliament have the following oversight: the City Council elects the Board of Directors and its president, and has the right to recall the members; one of the Board of Directors has to be a member of the City Council, but the rest do not have to be linked to the political system (Stadtrat Bern 2001b). The City Council also approves the annual budget and the financial statements, makes decisions about the appropriation of the accumulated profit and informs the Parliament about the annual report, the annual budget and the financial statement. The City Council has discretion over whether large company shareholdings (more than seven million Swiss francs) can be sold. It can further decide to make the population vote on this matter (Stadtrat Bern 2001b). The water supply operator is thus under more democratic influence than the wastewater operator in Berne, albeit its Board of Directors is less representative. However, in terms of operational decisions, the Board of Directors has ultimate discretion, much like the wastewater operator, and also delineates the water ordinance (Stadtrat Bern 2001b).

Regarding the legal changes in Berne, the public had to vote on both the reforms of the wastewater and water supply operator. Indeed, in terms of the wastewater operator, a public vote in each participating municipality was required in order for Berne to become a joint-stock corporation with its ensuing de-coupling from the political system. During the reform process particularly the City Council was a leading actor. Moreover, within the current organization of the wastewater operator, the participating municipalities have relatively equal access to and influence on the decision-making process, which contrasts with the Zurich cases. This spread of influence across the municipalities is possible because the dominant city of Berne, who owns 76.58 percent of the shares, restricted itself in terms of votes: despite the fact that stock ownership determines voting rights (each stock is correlated with one voice), the city took only 50 percent of the votes in the General Assembly.[2] The rest of the partners have 50 percent altogether (ARB 2010). Making decision-making more equal between the city of Berne and the surrounding municipalities was

a key factor for the reform. Now the citizens in the surrounding municipalities have indirect influence—through political delegates—which they lacked prior to the reform.

On the water supply side, the policy-making of creating the current organization was also democratic: both the City Council and the Parliament were involved in the decision-making process and the final decision was made by the citizens of Berne, as they voted on the creation and outsourcing of the operator in 2001 (Stadtrat Bern 2001a). Similarly, the stock-holding municipalities in the Water Association Region of Berne have voting rights.

3.3.4 Summary

Table 6.1 summarizes the results of the two cases and specifically differentiates between direct and indirect democratic legitimacy as well as whether this is found in the city itself (i.e., in Zurich or Berne) and in relation to the contract or joint-stock municipalities who receive water services from the city operators. This then leads to an overall assessment, based on the operationalized degrees of democratic legitimacy in Sect. 3.2.2.

Table 6.1 Comparison of democratic legitimacy in Zurich and in Berne

City	Democratic legitimacy		Contract/ stock-holding municipalities	Overall
Zurich	Direct	– Voting on new and large projects – Right to veto through referendum	– No means to directly influence	– *High* for city – *Low* for contract-municipalities
	Indirect	– Financial decisions and budgets needing to pass City Council and Parliament – Directors appointed by City Council – Internal change approval by City Council	– Informed and consulted once a year	

(*continued*)

Table 6.1 (continued)

City	Democratic legitimacy		Contract/ stock-holding municipalities	Overall
Berne	Direct	– None regarding large projects and financial decisions – Legal change underwent public vote	– No means to directly influence	– *Medium* for city and stock-holding municipalities
	Indirect	– Wastewater: financial decisions and budgets needing to pass Board of Directors, but this is comprised of municipal delegates – Water supply: operational decisions needing to pass Board of Directors (one member has to be City Councilor); Board of Directors elected by City Council; annual budget and the financial statements need to be approved by City Council; City Council has discretion over whether large company shareholdings (more than seven million Swiss francs) can be sold	– Each municipality has voting rights	

In sum, democratic legitimacy of the Zurich operators is mixed, as it is high vis-à-vis the citizens in the city of Zurich, but low for the citizens in the contract municipalities who receive water and wastewater services from the city's operators. In Berne, democratic legitimacy for both the city and the surrounding municipalities is medium, because in contrast

to Zurich, the citizens in Berne and the contract municipalities have indirect influence over the operators.

4 Discussion and Conclusion

This chapter addressed privatization reforms in the water supply and wastewater sectors, with a focus on Switzerland. The first section showed that water privatization reforms in Western Europe involve a broad range of forms, from material privatization, i.e., the transfer of assets from public to private actors, to formal privatization, which involves a legal change from public to private law without an ownership change. While material privatization with full divestiture remains rare, formal privatization is more widespread. Despite predominant direct public management, formal privatization and delegated public management can be found in Switzerland. To address the question whether democratic legitimacy is indeed lower in privatized than public systems of water provision, as is often assumed, the analysis focused on water operators in two Swiss cities: Zurich, which remains under direct public management, and Berne, which has undergone formal privatization and delegated public management.

The analysis of the water operators in Zurich and Berne indicates that privatization does not per se entail a lower degree of democratic legitimacy, when taking not only the city but also the contract municipalities into account. The Zurich operators are indeed more closely linked to the political system with a higher degree of democratic legitimacy vis-à-vis the citizens in Zurich than those in Berne. Particularly in terms of financial decisions, the Zurich operators are more subject to decisions by the City Council, Parliament and citizens than those in Berne. However, the city of Zurich operators' relationship with the contract municipalities weakens their democratic legitimacy, as the citizens in these municipalities have no influence on the operators and hence we find low democratic legitimacy here.

In contrast, in Berne, the citizens in the city have indirect influence on the water operators, as political delegates have decision-making competences. In terms of the operators' relationship with the surrounding

municipalities, however, its democratic legitimacy is higher than that in Zurich, as the citizens in these municipalities have indirect influence (through political delegates) on the operator. This democratic aspect was an important factor for the wastewater operator's reform and shows how a shift to private law (formal privatization) does not preclude an increase in democratic legitimacy. The Berne wastewater operator could have achieved the same degree of democratic legitimacy vis-à-vis the surrounding municipalities with a different organizational form, i.e., a form under public law, such as a task-specific association (*Zweckverband*). Yet this form would have entailed less decision-making freedom (Rothenberger 2002) and a goal of the reform was also to increase efficiency in decision-making.

This chapter provides insight not only in terms of the polysemy and fuzziness of the concept of privatization, but also with regards to the different means of implementation. Put differently: privatization and its implications for democratic legitimacy are not linear, especially when taking a broad perspective on the affected actors. With regards to privatization, we see that it is more complex than simply a transfer of assets from public to private actors, but that it can involve changes from public to private law as well as outsourcing to private actors, without private ownership. In terms of democratic legitimacy, i.e., the citizens' influence on the water operators, a key finding of this analysis is the indication that (formal) privatization does not per se decrease democratic legitimacy. By including the role of the contract municipalities in this analysis we saw that such a reform can even increase democratic legitimacy in certain ways, such as giving surrounding municipalities a voting right. This is important for the literature, which has indicated that democratic legitimacy concerns tend to hinder privatization (Wollmann 2010; Pahl-Wostl 2015; Lieberherr et al. 2016) and empirically for Switzerland in particular, as studies have found aversion to privatization due such issues (Pfammater et al. 2007). The results are specific to the cases studied in Switzerland and the assessment of such a narrow form of democratic legitimacy are tailored to developed countries with a functioning democracy, which merit further research. Yet in the context of reorganizing water operators to become increasingly independent from municipal governments in many industrialized countries, this analysis is relevant for other similar contexts and coheres with previous studies in this field (Furlong 2012).

Notes

1. ewb website: http://www.ewb.ch/de/ueber-uns/organisation/corporate-governance.html (accessed April 2016).
2. The General Assembly is the corporation's supreme body, comprised of representatives from the partner municipalities, chosen by the municipalities.

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Eva Lieberherr leads the research group "Natural Resource Policy" (NARP) at the Swiss Federal Institute of Technology (ETH, Zurich) in the Institute for Environmental Decisions since September 2014. She has been teaching policy analysis and environmental governance at ETH and the University of Berne since 2013.

7

Governing Water with Market-Based Instruments: Preferences and Skepticism in Switzerland

Florence Metz and Philip Leifeld

1 Emerging Pollutants—New Challenges in Water Protection Policy

Increasing attention has been placed on "emerging pollutants," i.e., synthetic organic chemicals that have only recently been discovered and deemed a concern in waterbodies. Their detection is possible today thanks to improvements in analytical measurement technology (Schwarzenbach et al. 2006). Emerging water pollutants include residues of personal care products, household detergents, cleaning agents, pharmaceuticals used in

F. Metz (✉)
Institute of Political Science, University of Bern, Bern, Switzerland

Oeschger Centre for Climate Change Research, University of Bern, Bern, Switzerland

P. Leifeld
School of Social and Political Sciences, University of Glasgow, Glasgow, UK

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aging western societies, the fuel additive MBTE, biocides, and metabolites of plant protection products (Hollender et al. 2008). Some of these products contain substances that have been in use for decades, while others have been introduced to commerce more recently. Nevertheless, in both scenarios, the fact that the risks are often unknown generates increased concern. Contaminants of emerging concern (CECs) lack a regulatory standard to date but may potentially display harmful effects in aquatic life, including toxicity, bioaccumulation, and persistency (USEPA 2008). For example, estrogens, which are used in contraceptive pills and constantly emitted to waterbodies due to incomplete elimination in wastewater treatment, have been shown to cause the feminization of fish (Sedlak et al. 2000). In general, there is growing evidence about the negative impacts of CECs on aquatic ecosystems (Brodin et al. 2013; Kidd et al. 2007; Mostafa and Helling 2002) and human health (Bercu et al. 2008; Cunningham et al. 2009; Johnson et al. 2008; Rowney et al. 2009; Touraud et al. 2011). However, due to the large quantity and diversity of substances currently in use, ecotoxic evidence is still lacking for many substances present in water today. Due to the continuous development of new compounds and the potential interaction effects between substances and their metabolites, the assessment of associated risks presents a challenge today and will continue to in the future. Thus policymakers are left with a decision as to whether to take action regarding emerging substances and if so, which policy instrument mix should be used.

Water quality issues have been addressed in the past by means of two main policy approaches: wastewater treatment and environmental quality norms. These traditional policy responses have come under considerable stress as conventional wastewater treatment has been unable to eliminate numerous emerging pollutants and therefore such pollutants have been steadily transported into the aquatic environment (Wittmer et al. 2010). New wastewater treatment technologies for emerging pollutants, including ozonation, membrane filtering, or activated carbon, are in the early phases of development. Questions regarding toxicity levels of transformation products, costs, or energy efficiency have yet to be resolved (Altmann et al. 2012). An environmental-quality norms approach regulates compound by compound. Here, toxicology tests and comprehensive fact sheets are needed for every single substance in order to justify its

inclusion in a regulation. A compound-by-compound approach is a particularly resource-intensive and continuously ongoing task that must take into consideration the constant engineering of new substances.

While existing approaches to water protection must be rethought, developing an alternative political answer for the issue of emerging water pollutants is complex. Each compound is associated with a unique combination of factors determining its usage, entry-pathway into waterbodies, behavior in the environment, and effects on the ecosystem or on human health. Managing the possible impact of CECs becomes even more intricate. The transboundary effects of certain compounds and the local effects of others reflect the multi-level governance aspect of the issue. Further complexity comes with the involvement of various policy fields, such as environmental protection, chemical and agricultural policy, consumer, health, and workplace safety. Together, these fields need to bring about effective solutions. As CECs represent a complex policy problem, there is no "one-size-fits-all" solution. The search for solutions is not a purely technical endeavor. It is also clearly political. However, the complexities of CECs really challenge the political realm to design appropriate policies that effectively reduce emissions with reasonable costs and administrative efforts. Ongoing innovation ensures that it is highly likely that there will always be "new" emerging concerns on the agenda of water protection policy. To design policies, it is therefore crucial to understand how actors participating in political decision-making generally address new issues, i.e., what types of policy approaches do they consider appropriate when dealing with emerging problems. As a means of highlighting the potential for policy action in the field of emerging water quality issues, the present work explores policy actors' preferences for different types of policy instruments, including combinations of market-based, command-and-control, and information-based approaches. The main research question is: *Which policy tools do political actors prefer when dealing with emerging issues in water quality policy?*

Environmental economists have propagated the use of market-based instruments (MBIs) as particularly effective and cost-efficient in reducing pollution since the 1960s (Downing and White 1986; Stavins and Hahn 1991; Stavins 1989, 2004; Coase 1960). There has been considerable interest on behalf of the scientific and political community in market

incentives due to the potential effectiveness, cost-efficiency, flexibility, and legitimacy of the polluter-pays principle. Nevertheless, the adoption of MBIs remains limited in scope (Sager 2009; Jordan et al. 2013) and several challenges with the design of effective MBIs in water quality policy persist. For example, the non-uniform mixing of water pollution requires the establishment of differentiated charges or trading ratios, which are difficult to establish (Olmstead 2010). Another design challenge concerns the high transaction costs, which stifle the cost-efficiency asset of the market-based approach. MBIs are not only difficult to design but may also appear less appealing to policymakers aiming for pollution reduction. In response to the introduction of MBIs, for example, targets (such as industry or agriculture) may prefer to pay rather than to abate pollution. Consequently, success of pollution control by MBIs is often uncertain, and thus, less appealing to policymakers. Another reason that renders the introduction of MBIs less attractive is the illegitimacy of "a right to pollute." As a consequence, the political acceptance of these policy tools has been lagging behind its promises (Cordes 2002). Nevertheless, MBIs may be an innovative method to handling new concerns in water quality policy. The use of substances that serve our societies (e.g., medicinal products) can have unintended negative consequences for ecological and human health. These necessitate a search for suitable political solutions. The present study explores the potential for introducing MBIs in this cutting-edge policy field and poses the question: *Do policy actors opt for market-based instruments when addressing the issue of contaminant of emerging concern in water, and if so, what type of actors support market-based approaches?*

Policy instruments are typically bundled into policy programs that consist of several instruments. As a means of capturing preference profiles, i.e. an instrument mix supported by actors, the present contribution also addresses the question: *Which preference profiles do policy actors adopt and do they exhibit similarities in their preference profiles?*

To answer these questions, the present work begins by providing an overview of the various types of policy strategies and instruments available to governments for the alleviation of pollution in waterbodies. The contribution differentiates between three approaches to water protection policy: source-directed, end-of-pipe, and control. Each of these

approaches can be achieved through various types of command-and-control, market-based, and information-based instruments. The next section proposes a definition for policy preference and exposes the methodology (case selection, data gathering, methods of analysis). The results section is subdivided into three parts in order to answer each of the three research questions. First, empirical findings regarding instrument preferences in general, and actors' support for MBIs in particular, are displayed. Secondly, preferences by actor types and, thirdly, clusters of actors with similar preference profiles are analyzed. The conclusion elaborates on the potential for policy action, more specifically for the introduction of MBIs, in the emerging field of water quality policy.

2 Policy Approaches and Instruments for Emerging Water Issues

In order to secure or improve water quality, governments utilize the many policy instruments at their disposal. These can be categorized under three general approaches: source-directed, end-of-pipe, and control (Metz and Ingold 2014). While source-directed strategies aim to mitigate pollution at the source, end-of-pipe approaches eliminate pollution from wastewater. Control strategies do not prioritize pollution reduction, but rather seek to control the level of pollution for further policy action. Each of these three strategies can be achieved by means of various types of policy instruments, which include regulatory (also termed command-and-control), economic (also termed MBIs), and voluntary tools (Vedung 1998). Voluntary instruments seek to encourage desired behavior, for example by providing target groups with information or by negotiating agreements (Doris 2007; Weiss and Tschirhart 1994). By contrast, command-and-control instruments directly regulate or impose a certain behavior (Lemaire 1998). MBIs are policy tools that indirectly stimulate a desired behavior of target groups through financial incentives (Stavins and Hahn 1991; Olmstead 2010; Rogers et al. 2002). In environmental policy, MBIs incentivize environmentally friendly behavior on behalf of society or the economy by placing a price on pollution (Oates and Portney 2003). MBIs can provide "positive" incentives, i.e., promoting

desired behavior through reducing the costs of environmentally friendly practices. Examples of "positive" incentives include subsidies for "green" technologies, which intend to incentivize desired practices. MBIs can also set "negative" incentives, i.e., discouraging undesired behavior by increasing the costs for activities that pollute the environment. Examples of "negative" incentives include pollution charges or tradable permits that set a price on pollution and therefore deter citizens from treating the environment as a sink for pollution.

2.1 Source-Directed Policy Approaches

Source-directed policy approaches include policy instruments that impose, incentivize, or encourage reducing the use of CECs, or implementing emission reduction measures in order to prevent their release into water. Table 7.1 provides an overview of the different instruments (command-and-control, market-based, and information-based) that can be adopted to pursue the source-directed approach in water protection policy and explains each instrument's functioning.

As Table 7.1 shows, a number of MBIs can be adopted to effectively reduce emerging pollutants at the source (Metz and Ingold 2014). First, a substance charge can be levied to incentivize producers or consumers to reduce the use of substances that raise concern when emitted into waterbodies. The charge can also be levied on products that contain harmful substances. While charges punish environmentally unfriendly behavior, subsidies set a positive incentive by rewarding "green" action. For example, farmers can be subsidized for adopting agricultural practices that prevent field losses, e.g., increasing buffer zones, or applying fewer plant protection products. Subsidies can also be granted to set an incentive to businesses for developing water-friendly products (e.g., "green pharmacy") or adapting production chains to enable a more efficient use of relevant chemicals.

Although not listed in Table 7.1, emission control may, in theory, also be possible under a permit trading system for emerging pollutants. However, many diverse compounds fall under the category of emerging pollutants. Additionally, trading ratios between different substances,

Table 7.1 Source-directed policy instruments of water protection

Category	Instrument	Explanation
Regulatory	Substance bans	Complete prohibition of a certain compound with the goal of a cessation of pollution
	Restrictions/use restrictions	Constraints to the placement on the market or the use of a substance in specific points in time or zones (e.g., buffer zones)
	Authorization	Evaluation-dependent authorization of chemicals based on their predicted risks to human health and the environment[a]
	Best environmental practices (BEP)	Mandatory codes of conduct to reduce emissions
MBIs	Product charges	Tax levied on products containing hazardous compounds in order to incentivize consumers to reduce or change consumption behaviors
	Substance charges	Tax levied on hazardous compounds in order to incentivize producers to change production processes or substitute chemicals with less hazardous alternatives
	Subsidies for "green" action	Financial support from governments in return for environmental commitments by the private sector
Voluntary	Information campaigns	Transfer of knowledge or persuasive reasoning on how to avoid aquatic pollution
	Voluntary agreements between private and public sectors	Non-legally binding agreements negotiated on a case-by-case basis between single firms and a public authority fixing environmental targets or specific mitigation measures (e.g., changes in the production chain)[b]

[a]Such evaluations can also take into account principles of green chemistry such as "rational design" or "benign by design," i.e., easy and fast degradability of chemicals after their use. Considering the full lifecycle of chemicals leads to a different understanding of the functionality and environmental properties of chemicals and incentivizes the manufacturing of degradable chemicals.

[b]These private-public agreements can also be legally binding. In such cases, agreements do not classify as voluntary instruments.

which are necessary due to water pollution's lack of uniform mixing, have not been defined to date (Farrow et al. 2005; Hung and Shaw 2005). For example, under the US American Rock River Basin Pilot Trading Program in Wisconsin, each unit of point-source pollution corresponds to 1.75 units of non-point-source pollution (Olmstead 2010). One unit of point-source pollution abatement corresponds to more than one unit of non-point-source pollution because there remain considerable uncertainties over the fate of pollution from diffuse sources (Olmstead 2010). In general, trading ratios may vary between each pair of trading partners. Consequently, the establishment of trading ratios increases the transaction costs of water quality trading programs rendering them difficult to design in a cost-efficient manner.

2.2 End-of-Pipe Policy Approaches

In contrast to source-directed policy approaches, end-of-pipe measures focus on removing or eliminating CECs after their use or release into water. End-of-pipe policies involve different types of instruments that impose, incentivize, or encourage improved wastewater treatment. Conventional municipal wastewater treatment plants (WWTPs) have not been designed to remove most of the substances that fall under CECs, which are resistant to biological degradation. Hence, new wastewater treatment technologies must be implemented that can effectively eliminate CECs. One policy option for the reduction of CECs in water is to provide incentives for the upgrade of WWTP with new removal technologies. Another end-of-pipe option involves improvement of waste disposal where products containing CECs have been used by consumers, but their release into water is prevented by waste disposal requirements.

Table 7.2 displays the types of MBIs that can be adopted for the reduction of emerging pollutants at the end of the pipe. Corrective charges may take the form of emission charges, for example, where volumes of treated wastewater are used as a tax base. Under a more complex system, the charge could be calculated based on concentrations of harmful substances in treated wastewater. Furthermore, subsidies can be allocated to

Table 7.2 End-of-pipe policy instruments of water protection

Category	Instrument	Explanation
Regulatory	Best available technique (BAT)	Definition of the best technology for improved wastewater treatment
	Technical standards	Definition of performance standards for wastewater treatment (e.g., treatment capacity) without requiring a specific technology
	Disposal requirements	Standards of correct waste disposal, e.g., consumer-level "take-back" programs for pharmaceuticals
MBIs	Effluent/emission charges	Tax on using water bodies as a sink for discharges in order to incentivize emission reduction
	Subsidies for improved wastewater treatment	Financial support from governments to incentivize operators to invest in advanced wastewater treatment or to promote research on improved wastewater treatment
Voluntary	Advice	Support from governments in form of information, advice, and consultancy about improved wastewater treatment
	Voluntary agreements on wastewater treatment	Non-legally binding agreements negotiated on a case-by-case basis between wastewater treatment operators and a public authority to improve wastewater treatment practices

industrial and municipal sewage treatment plants in order to incentivize investments in advanced treatment technology (Metz and Ingold 2014).

2.3 Control Policy Approaches

Control measures are distinct from source-directed and end-of-pipe approaches in water protection in the sense that they do not directly reduce emissions of substances into waterbodies. Instead, control measures consist of gathering information on occurrence, fate, and risks of CECs in waterbodies in order to lay the groundwork for future pollution reduction measures. Aside from information gathering and data analysis, this approach typically involves reporting results to higher levels of government. Such accounts, in turn, synthesize information for further

Table 7.3 Control instruments of water protection

Category	Instrument	Explanation
Regulatory	Immission limits/ environmental quality norms (EQN)	Definition of a mandatory cap to concentration levels of defined substances in water bodies
	Emission limit	Definition of a mandatory cap to concentration levels of defined substances in effluents of defined sources
	Registries	Cadaster registering defined information, such as the sales or the marketing volumes of a substance, or the releases of chemicals from point sources (e.g., Pollutant Release and Transfer Registers)
	Monitoring	Mandatory gathering of information about the occurrence of substances in water bodies
	Reporting	Mandatory compilation and analysis of defined information on the state of the aquatic environment
MBIs	Subsidies for monitoring	Financial support from governments for monitoring activities
Voluntary	Voluntary agreements on control measures	Non-legally binding agreements negotiated on a case-by-case basis between polluters and public authorities on voluntary EQNs or monitoring activities

decision-making. Control instruments can take the form of mandatory or voluntary programs, both of which can be financially supported by governments (for an overview see Table 7.3).

2.4 Policy Instrument Mixes—A Task That Transcends Policy Fields

In the empirical reality, policy instruments are often combined to become instrument mixes. These are defined as bundles of several policy instrument types (Howlett 2005; Gunningham and Sinclair 1991). Likewise, policy instruments following source-directed, end-of-pipe, and control approaches are not mutually exclusive but are often bundled in the form

of policy mixes. For example, sales volumes for a specific substance could be capped on a yearly basis for a defined market such as the European Union or United States to prevent emissions into water. Above the cap, a ban could be introduced for marketing the substance and below the cap a substance charge could be put in place. The substance charge could be earmarked to subsidize advanced treatment technology, where it is necessary to use the substance (e.g., for health purposes). Companies that use the substance, but improve their production processes (where inputs into waterbodies are avoided) could be exempted from the charge if they can prove that their effluents are free of that substance through monitoring and reporting. Subsidies for advice and consulting about advanced treatment or improved production processes could also be part of the instrument mix. Consulting would support pollution reduction measures, which is preferable to a situation where companies pay the charge and continue to emit pollutants.

The example further illustrates that instrument mixes for the protection of water resources typically involve diverse, intersecting policy fields, such as agriculture, industry, health, water, and environmental protection. Another example includes information campaigns. These could be adopted in the health sector to sensitize people for green pharmacy or in the agricultural sector to raise farmers' awareness of the impact of veterinary pharmaceuticals on water quality.

3 Methodology

3.1 Case and Data Gathering

Water quality represents an example of a public good especially in the case of several countries sharing a river. In an international river setting, upstream polluters have no incentive to decrease pollution as long as they bear the complete costs of abatement, but benefits of clean waterbodies materialize predominantly downstream (Olmstead 2010). MBIs have the potential to correct such false incentives by internalizing the costs of pollution control and adhering to the polluter-pays principle. At the same time, however, transboundary settings can be particularly unfavorable to

the introduction of MBI in cases where states fear competitive disadvantages to their national economies. In exploring the prospects for introducing MBI into water pollution control, the present study takes the case of control in Switzerland, a country that lies upstream from many European rivers.

Switzerland represents one of the first countries where the issue of emerging pollutants has entered the political agenda. Between 2007 and 2015, the political debate centered on how to best address emissions from point sources of pollution, i.e., from municipal WWTPs. Since 2015, Swiss actors have searched for political answers regarding ways in which to reduce emissions from diffuse sources, including agriculture and urban areas.[1] From April to July of 2013, sixty-two policy actors who were involved in the policymaking process on emerging pollutants in Switzerland were surveyed. Policy actors are collective actors that include agencies, organizations, or associations that represent public and private sector interests. Actors were surveyed when they (a) participated at least twice in the policymaking process (decisional approach), (b) held formal regulatory competences in the field of emerging water pollutants (positional approach), and (c) were considered indispensable by experts in the field (reputational approach) (Laumann et al. 1983; Knoke 1994). With a response rate of 68 percent survey results from forty-two actors[2] (for a list of actors see annex 1) were analyzed. This provides a representative overview of the preferences of all involved sectors (federal agencies, cantons, parliament, political parties; environmental, economic, water, labor, consumer, and municipal associations).

3.2 Definition of Policy Instrument Preferences and Data

The aim of the present research is to explore actors' preferences towards a variety of policy instrument types from a policy science perspective. The following three aspects help to delimit the concept of preferences as employed here.

First, in order to grasp the concept of instrument preferences, it is useful to distinguish between attitudes and actual behavior (Ajzen and

Fishbein 1980). Research on political behavior has indicated that individuals' behavior may deviate from their reported attitudes, hence introducing the notion of "value-action gap." The term "preference" refers to attitudes and not to behavior. Instrument preferences express actors' positive *attitudes*, i.e., inclination or desire to introduce certain types of policy tools in order to address an underlying policy problem. However, actors' behavior of actively opting or voting for one policy option in the policymaking process may deviate from underlying attitudes and is not considered in this study.

Second, one can conceptualize "preferences" as attitudes adopted in a specific stage of the policymaking process, i.e., in policy formulation rather than in the phase of adoption or implementation (Dermont et al. 2016). During policy formulation, where actors review and debate diverse policy alternatives, their policy preferences come into play in the form of attitudes (i.e., positive or negative inclinations). By contrast, the terms "support" or "opposition," as employed here, refer to the voting in parliament for (or against) an actual policy decision in the phase of policy adoption; and the term "acceptance" to the change of behavior during the policy implementation stage. The term "preference" is thus restricted to attitudes of actors towards policy instruments in the policy formulation phase. Based on this definition, policy preferences can be considered a type of "opinion poll" against which the chances of introducing a policy in later stages of the policy process can be evaluated. Likewise, the present study looks at policy formulation where diverse types of state and non-state actors debate over policy options in order to assess the prospects for MBIs in water quality policy. *Policy actors* are defined here as collective entities who adopt policy preferences and have the desire to transform their preferences into public policy through their participation in the policymaking process (Knill and Tosun 2012, 41). Examples of policy actors include parliamentary commissions, governmental or bureaucratic bodies from local, regional, and national levels, political parties, and target or interest groups.

Finally, it is useful to distinguish different hierarchical levels of policy attitudes in order to define the notion of instrument preferences. The Advocacy Coalition Framework establishes a multi-tiered hierarchical concept of attitudes by broadly distinguishing stable deep core and policy

core beliefs from less stable secondary aspects (Sabatier and Jenkins-Smith 1993). While secondary aspects refer to preferences for various types of policy instruments, beliefs in general reflect the deeply rooted values underlying instrument preferences. For example, actors may value market liberties and competition very highly. Based on these market liberal values, they may favor MBIs over coercive command-and-control instruments. The present research focuses on the lowest, most concrete hierarchical level of policy attitudes by studying which instruments actors prefer in order to address a policy problem such as reducing pollution in waterbodies.

In the aforementioned survey, respondents were asked to report their policy preferences (from "strongly agree" to "strongly disagree") towards a series of policy instruments for the reduction of emerging pollutants in waterbodies. Table 7.4 provides an overview of the fifteen different regulatory, economic, and voluntary policy tools that were surveyed. The preference data was analyzed by means of descriptive statistics, including a correspondence and a cluster analysis.

Table 7.4 Overview about surveyed instrument preferences

	Variable	Description of instrument
Regulatory	authrestr	Authorization
	userestr	Restrictions/use restrictions
	disposal	Disposal requirements
	bat	Best available technique (BAT)
	bep	Best environmental practices (BEP)
	eqn	Immission limit/environmental quality norm (EQN)
	el	Emission limit
	control	Reporting, monitoring, registries
MBI	pcharge	Product charge
	wwfee	Effluent/emission charge
	subsi	Subsidies for improved wastewater treatment
Voluntary	volunt	Voluntary agreements
	info	Information campaigns, advice
	research	Research
	ppp	Voluntary agreements between private and public sectors called private-public partnerships or public-public partnerships (PPP)

Note: See boxes in Chap. 2 for an explanation of each single instrument

4 Results

4.1 Preferences by Type of Policy Instrument

In the next paragraph, policy actors' instrument preferences towards MBIs are assessed in comparison with other policy tools, including various command-and-control and information-based instruments.

Results in Table 7.5 show that among the forty-two actors who responded to the survey questions, 53.5% support MBIs for reducing emerging contaminants. More concretely, 24.3% of the actors reported to agree somewhat with the introduction of MBIs and 29.2% strongly agreed. By contrast, 46.5% of the respondents reported that they either disagree somewhat (29.6%) or strongly disagree (16.9%) with reducing emerging pollutants by means of MBIs. Although they demonstrate some support for MBIs, policy actors remain divided on the aptitude of MBI to reduce water quality issues. Figure 7.1 depicts instrument preferences in greater detail, with 75% of actors supporting an increase in wastewater fees to fund measures for reducing emerging pollutants in sewage treatment plants. Filtering pollution from wastewater constitutes a policy preference even if costs for sewage treatment increase. These results indicate that technical solutions to address water quality problems at the end of the pipe are largely accepted, even if (or because) this means that polluters do not have to change behaviors to abate pollution at the source. In contrast, only 25% of actors reject a fee that funds the technical upgrade of wastewater treatment filters.

Table 7.5 Mean preferences for grouped instruments ($N = 42$)

Instruments	Strongly disagree (%)	Disagree somewhat (%)	Agree somewhat (%)	Strongly agree (%)
Mean regulatory instruments	4.4	13.2	39.3	45.2
Mean MBI	16.9	29.6	24.3	29.2
Mean voluntary instruments	3.4	11.4	43.8	42.3

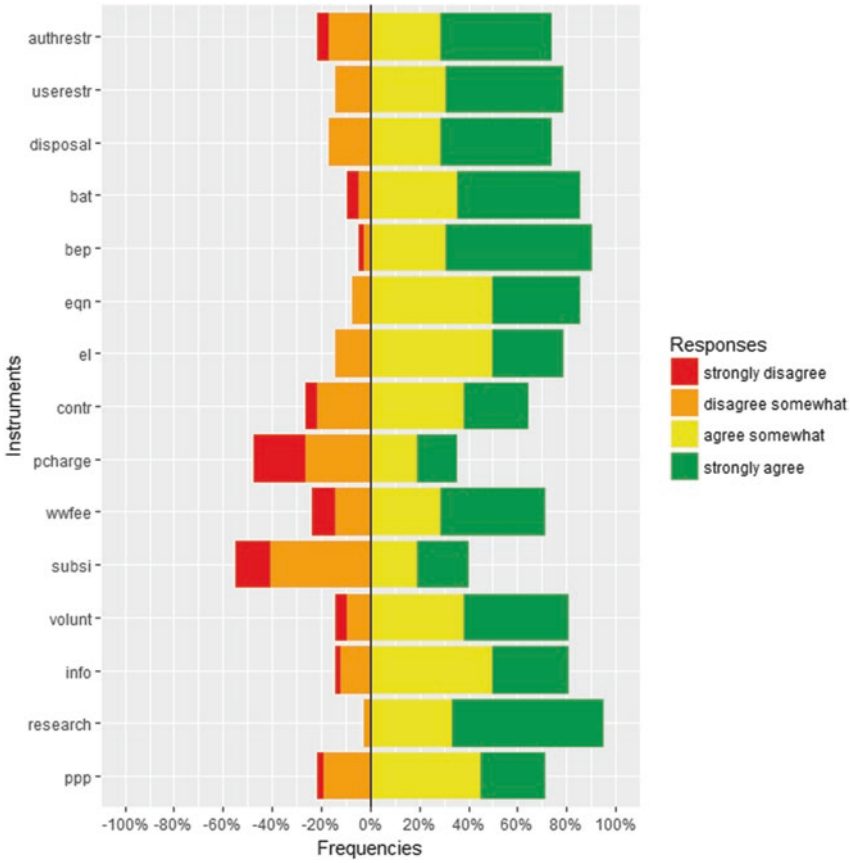

Fig. 7.1 Preferences by types of policy instruments. Note: Abbreviations for instruments are explained in Table 7.1.

By contrast, source-directed MBIs such as product charges receive less support. A product charge is a policy tool that addresses the problem at the source. Commodities that contain harmful substances become more expensive, and hence, the product charge incentivizes consumers to buy (or industry to produce) more environmentally friendly alternatives. More than half of the respondents (57.1%) rejected product charges for the reduction of pollution in waters (25.7% disagreed altogether; 31.4% disagreed somewhat). Motives included high transaction costs associated with the identification and registration of the

numerous products that contribute to pollution into waterbodies. Furthermore, the demand for some products, e.g., pharmaceuticals, is non-elastic, and therefore a charge would not incentivize consumers to reduce consumption. In addition, Fig. 7.1 shows that 57.5% of the policy actors reject "positive" economic incentives in the form of subsidies for environmentally friendly behavior, while only 42.5% of actors support it.

In summary, results indicate that Swiss actors reject MBIs in the form of product charges or subsidies to reduce CECs at the source whereas they support the increase of wastewater fees to address CECs at the end of pipe. Disputes remain concerning MBIs, especially when comparing the results for MBIs with those for command-and-control or information-based instruments. On average, 84.5% of actors support the introduction of traditional command-and-control instruments in matters of emerging concern for water quality. Examples of regulatory instruments include bans of certain contaminants or environmental quality norms that set concentration limits for selected substances in waterbodies. In Fig. 7.2, one can see that, with 95% agreement, actors' support is highest with regard to best environmental practices (BEP). BEPs are typically employed to control pollution from agriculture. Among others, BEPs define the correct application of pesticides in order to reduce runoff from agricultural fields. Policy actors also supported information-based instruments, e.g., voluntary measures on behalf of polluters, or information campaigns sensitizing people to adopt an environmentally friendly behavior. It is noteworthy, however, that almost all respondents (97.5%) considered further research essential for better understanding the risks of emerging pollutants, their sources, and their entry paths into the environment.

When comparing the results for actors' consent towards MBIs (53.5%) with actors' support for regulatory (84.5%) and information-based instruments (86.1%) it becomes evident that more skepticism exists towards MBIs than towards other policy alternatives. Actors' instrument preferences show that command-and-control and information-based instruments are still deemed appropriate for water pollution control, whereas the support for MBIs lags behind. As a consequence, the introduction of

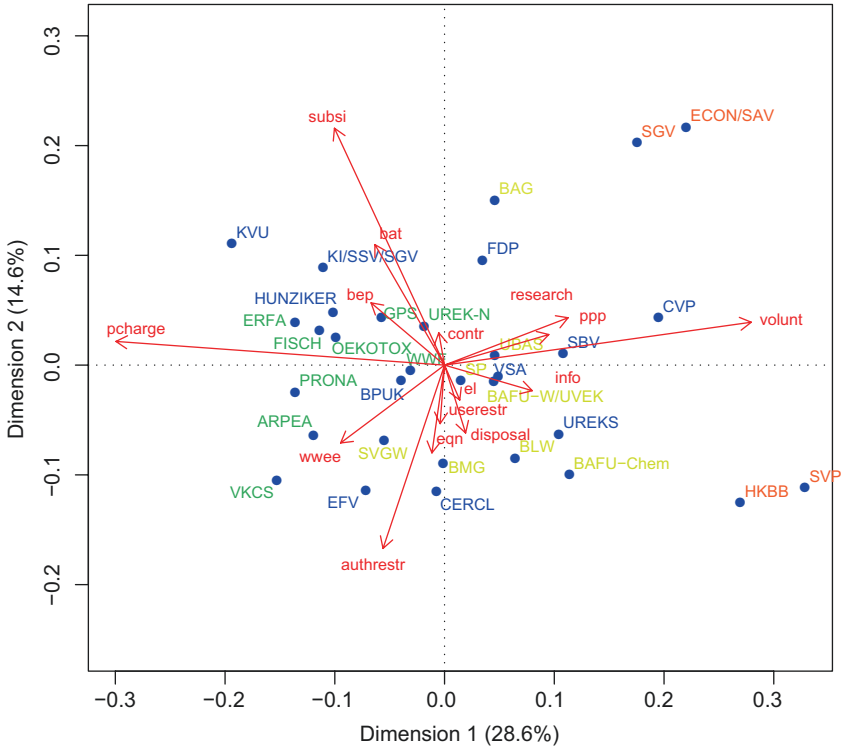

Fig. 7.2 Biplot of actors' instrument preferences. Note: Red arrows represent policy instruments; dark blue dots reflect actors' preference profile positions in the two-dimensional space; coloring of actor labels indicates membership in the clusters as illustrated in Fig. 7.4. Dimensions 1 and 2 reflect systematic, internal variance of actors' instrument preferences and are not predefined, exogenous variables (correspondence analysis)

MBIs is less likely to transpire than is the adoption of traditional or soft policy tools for the reduction of emerging pollutants in waterbodies.

In a next step, actors' instrument preferences are examined in greater detail by analyzing individual actors' preferences for instrument mixes. To do so, the correspondence analysis[3] shown in Fig. 7.2 illustrates where actors (represented by dark blue dots) diverge most. More specifically, Fig. 7.2 indicates on which policy instruments (represented by red arrows), or mixes thereof, actors diverge most. It also shows the primary preferences of each single actor.

The red arrows for product charges (pcharge) and voluntary instruments (volunt) point in opposite directions. This illustrates how those policy instruments explain most of the variation in the data. If actors diverge, they tend to favor one over the other and rarely favor both simultaneously. Subsidies for the upgrade of wastewater treatment technology (subsi) and authorization restrictions (authrestr) are orthogonally distributed to preferences for charges and voluntary instruments. Again, if actors diverge, they tend to either be in favor of technological upgrades or authorization restrictions, but rarely of both simultaneously. The four different dimensions effectively reflect varying approaches to water protection with (a) market-based approaches (represented by pcharge), (b) voluntary measures (volunt), (c) command-and-control (authrest), and (d) technical solutions (subsi). Instruments belonging to the same family point in the same direction, which means that they capture a similar dimension of actors' instrument preferences. For example, the instruments belonging to the family of voluntary instruments, such as research, private-public partnerships (ppp), or information campaigns (info), all point in the same direction. Likewise, there is a cluster of MBIs represented by product charges and wastewater fees. Of note is that Swiss actors strongly associate subsidies with technical end-of-pipe measures because other technology-promoting instruments such as subsidies for investments in advanced sewage treatment technology and best available techniques (bat), point in the same direction. Most of the variance in the cluster of command-and-control instruments is explained by authorization restrictions (authrest). Nevertheless, preferences for instruments from the same family of command-and-control instruments such as environmental quality norms (eqn), use restrictions (userestr), disposal requirements (disposal), or emission limits (el), point in the same direction and therefore capture a similar aspect of actors' preferences. All in all, results for other instruments also reflect the four clusters and further confirm that actors are most divided upon market-based, voluntary, command-and-control, and technical approaches to water protection.

Actors' location in Fig. 7.2 further illustrates their preferences in the form of instrument mixes. For example, the Christian Democratic People's Party (CVP) is positioned towards information-based instruments including research, information campaigns, and voluntary measures.

Pro Natura, an environmental protection organization, exhibits a contrasting preference profile by pointing towards economic measures including product charges and wastewater fees. It is noteworthy that associations representing the interests of cantons (e.g., KVU), large cities (ERFA), and municipalities (KI/SSV/SGV), who are responsible for the implementation of sewage treatment, support technical approaches for the improvement of wastewater technologies (bat, subsi). Finally, it is worth highlighting that actors located closest to the center in Fig. 7.2 have the most equilibrated preference profiles. The Department for Water within the Federal Office for the Environment (BAFU-W/UVEK), who led this policy process, can be located at the center of the biplot. This reflects the actor's position as a neutral coordinator of the policy process.

4.2 Preferences by Type of Actor

Figure 7.3 shows rejection and support levels of policy instruments by actor type in order to address the question of whether certain actor types prefer MBIs over others. Black to dark grey squares illustrate rejection and light grey to white illustrate support. Industrial and agricultural actors strongly refuse economic instruments including product charges, wastewater fees and subsidies. Actors representing the interests of the economy do not necessarily favor MBIs, even if these instruments are said to be economically efficient for society according to economic theory (Stavins 1989; Andersen and Sprenger 2000). These results indicate that a policy instrument's ability to target individual actors and affect their budget is what matters to them; in other words, whether an actor is on the winning or losing side of the policy. In contrast, the cost-efficiency of a policy matters less to the individual actor because cost-efficiency concerns society in general and not necessarily the individual actor. Here, actors seem to associate MBIs (product charges or subsidies) with (transaction) costs for themselves rather than with cost-efficiency.

Industrial and agricultural actors also reject strong governmental control in the form of authorization restrictions (authrestr) or monitoring requirements (contr). Additionally, federal state actors and political parties approach economic instruments consisting of product charges and

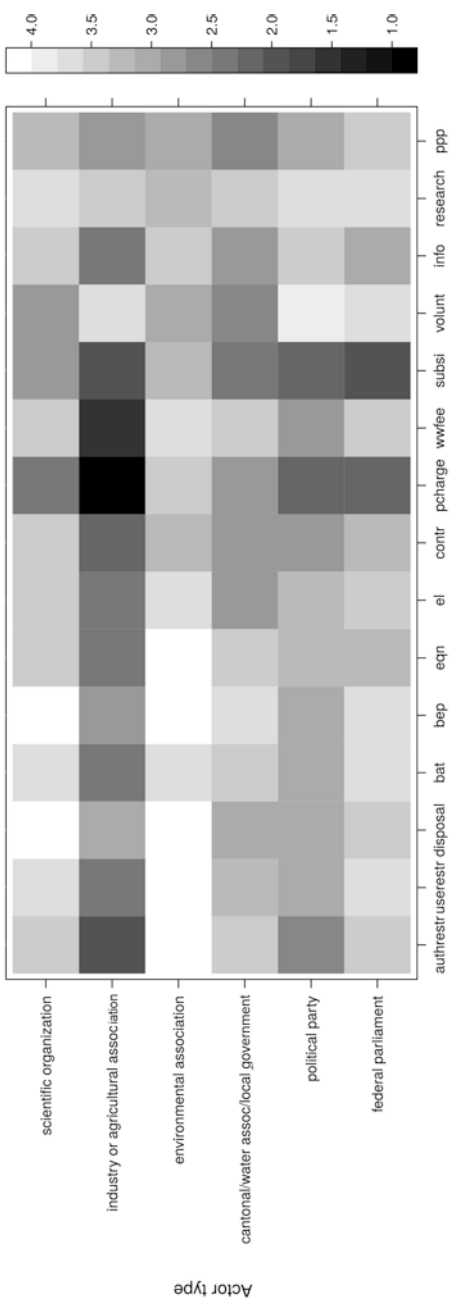

Fig. 7.3 Instrument preferences by actor type (see Table 7.4 for instrument abbreviation)

subsidies with hesitation. In most cases, all the others, i.e., scientific, environmental, water, regional, and local actors, acknowledge the need to take policy measures for the reduction of emerging pollutants in waterbodies and agree with most types of policy intervention that serves the purpose of water protection. Overall, results highlight that there is potential for concerted policy action in the underlying case. Half of the actor groups are open to varying instrument types as long as water protection is ensured. However, important actor groups especially industrial and agricultural associations and to some extent state actors and political parties, particularly object to policy intervention in the form of MBIs.

4.3 Clusters of Actors with Similar Preference Profiles

The cluster dendrogram in Fig. 7.4 illustrates (dis)similarities in actors' instrument preference profiles. Actors clustered closer together exhibit similar preference profiles. The higher one moves up on the dendrogram, the more relaxed similarity conditions become. On a general level, actors cluster into four groups. When pairing the information about clusters with the coloring of actor labels in Fig. 7.2, one obtains a detailed picture of the instrument preferences for each cluster. Accordingly, the first "orange" cluster (when reading Fig. 7.4 from left to right) consists of the Basel Chamber of Commerce (HKBB), Economiesuisse, the Swiss Employers' Association (ECON/SAV), and the Swiss Trade Association (SGV). Also located in this cluster of economic associations is the Swiss People's Party. Together they oppose most policy action in the field of emerging issues in water protection and only agree with voluntary measures on behalf of society or the economy. The second, "green" cluster includes all actors between Ecotox Centre (OEKOTOX) and World Wide Fund For Nature Switzerland (WWF). The cluster signifies environmentally oriented actors who favor concrete, binding policy action and therefore support all types of policy instruments except for voluntary ones. In the third, "yellow" cluster are state and non-state actors who do not generally object to policy action, but mostly favor soft policy instruments, which either inform about pollution (e.g., through research

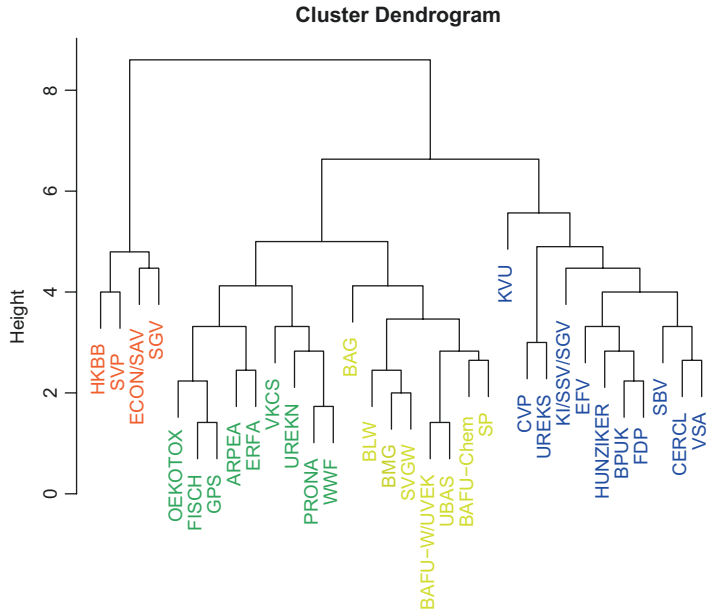

Fig. 7.4 Cluster dendrogram of actors' preference similarity profile. Note: Cluster colors correspond to the coloring of actor labels as illustrated in Fig. 7.2

or information campaigns) or control pollution in waterbodies (e.g., through environmental quality norms) but do not yet reduce pollution. The fourth, "blue" cluster includes all the actors between the Conference of Heads of Cantonal Offices for Environmental Protection (KVU) and the Swiss Water Association (VSA). This group represents a mix of actors who generally favor policy action for the reduction of emerging pollutants in waterbodies and therefore opt for a diversified instrument mix.

In summary, the orange cluster consists of opponents to policy action or advocates of non-binding measures. In contrast, the green cluster defends the necessity of political action by means of binding instruments. Illustrated in the yellow cluster are moderate actors who favor policies that lay the groundwork for future action where such action is necessary. Following the rationale where some action is still better than no action, the blue cluster is populated by actors who generally support policy action via any instrument.

5 Conclusion

The aim of this chapter is to assess the types of policy instruments that actors consider appropriate in addressing emerging water problems and to shed light on the potential for introducing MBIs by analyzing Swiss policy actors' instrument preferences. Preferences are defined by actor type and profiles for mixes of policy instruments are explored.

Empirical results indicate that there remain barriers for the application of MBIs in influencing emerging issues in water quality policy. Overall, the surveyed actors remain divided on the use of MBIs for water pollution control. Policy actors prefer wastewater fees for a technical end-of-pipe solution over source-directed measures, such as product charges or subsidies for environmentally friendly practices. Industrial and agricultural actors are particularly averse to MBIs, indicating that they associate those instruments with rising costs (for themselves) rather than with cost-efficient environmental protection (for all). In more general terms, the perception of the target group as to whether they will benefit or lose from an introduced policy clearly impacts their instrument preferences. The fact that a vast majority of survey respondents support command-and-control and information-based instruments to control pollution in waterbodies affirms their skepticism towards economic incentives.

If policy preferences are considered as an "opinion poll" on the basis of which the chance of introducing a policy in later stages of the policy process can be evaluated, one may conclude that MBIs still struggle to become a widely supported trend in water policy. This conclusion is confirmed by the 2014 revision of the Swiss Waters Protection Act (31.3.2014) for the reduction of CECs from point sources of pollution in waterbodies. Rather than introducing a market-based and source-directed approach, the Swiss policy follows a technical end-of-pipe strategy and focuses on the technical upgrade of WWTPs for the elimination of CECs from treated wastewater.

To date, it is individuals (companies, farmers, households) that profit from using the environment as a sink, whilst it is society as a whole that bears the costs for pollution abatement. Despite its potential to change

such imbalances by making polluters pay for their discharges, MBIs have thus far not successfully developed into a generally accepted water trend for the reduction of CECs in Switzerland. Present results suggest that emerging issues follow the same logic as previously made observations did in revealing the limitations of political support for MBIs. This is in comparison to the use of traditional command-and-control instruments within the realm of environmental policy (Cordes 2002; Harring 2015). As such, barriers must be broken before MBI can be successfully adopted in environmental policy (Cordes 2002). The literature has discussed many reasons why MBIs face acceptance difficulties, including policy design questions, i.e., the detailed provisions specifying to whom, for how long, and on which level a policy applies (Howlett 2011; Howlett and Rayner 2007). Crucial questions in literature remain unanswered concerning the design of well-accepted MBIs.

As a consequence, policymakers are responsible for adapting economic theory to the political reality and for designing concrete policy instruments. However, this translation process may prove difficult as policymaking follows its own rationality (Bressers and Huitema 2000). For instance, while environmental economists evaluate policy tools against their effectiveness and cost-efficiency, policymakers consider additional criteria such as preferences, equity, legitimacy, visibility, or feasibility. Thus, when market-based instruments are employed as policy tools, they transgress the institution-free world of the market and enter the broader institutional context of politics. As a consequence, the design of economic instruments may deviate from the ideal model as described by environmental economics, and also prove less effective or cost-efficient (Hahn 1989).

Hence, not only market rules but also political dimensions should be taken into consideration when designing MBIs. Further research is needed in order to understand the policy design conditions under which policy actors would be most confident when it comes to market-based approaches. Furthermore, research on the factors driving instrument preferences from a comparative perspective would aid researchers in this field to better evaluate the circumstances under which MBIs could eventually become a well-accepted trend in water policy.

Notes

1. See Website of the Swiss Federal Office for the Environment: https://www.bafu.admin.ch/bafu/en/home/topics/water/info-specialists/state-of-waterbodies/state-of-watercourses/water-quality-in-watercourses/micro-pollutants-in-watercourses.html (accessed June 27, 2017).
2. Depending on the survey question, between thirty-five and forty-two actors gave their responses.
3. The correspondence analysis in form of a biplot shows two dimensions, which explain most of the variance of actors' instrument preferences. In technical terms, the goal of the correspondence analysis is to look for systematic, internal variance in the data, without considering exogenous variables for the explanation of preferences. The two dimensions of the correspondence analysis together only explain about 43% of the internal variance, which means that actors' instrument preferences exhibit only a medium-level of systematic variance.

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Florence Metz is a postdoctoral researcher at the Oeschger Center for Climate Change Research and the Institute of Political Science of the University of Bern. Her research is about collaboration in environmental public policy with a focus on water protection policy and water policy networks.

Phillip Leifeld is a senior lecturer in research methods at the University of Glasgow. His disciplinary background is in political science and public policy, with a focus on research methodology and network science.

8

Climate Change Adaptation as a New Global Norm in the Water Sector? Between Symbolism and Dilution

Johann Dupuis

1 Introduction

The way we deal with certain social problems at subnational scales is influenced by global trends in the values and prescriptions that shape collective responses (Bernstein and Cashore 2012). Such constructs can be referred to as *common global norms*, which we define as: "intersubjective understandings that constitute actors' interests and identities, and create expectations as well as prescribe what appropriate behaviour ought to be" (Björkdahl 2002).

Common global norms are sets of influential ideas that are used to frame domestic policies (Keohane and Goldstein 1993). For instance, the call for *integrated water resource management* (see Chap. 3) after the Rio summit of 1992 strongly influenced environmental policymaking

J. Dupuis (✉)
Swiss Graduate School of Public Administration (IDHEAP), University of Lausanne, Lausanne, Switzerland

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in developed countries (Jordan et al. 2003). Old-fashioned command-and-control policies came under heavy criticism for being inefficient (Cole and Grossman 1999). As a result, voluntary and market-based instruments were widely introduced in environmental policy, notably in the form of tradable water rights (Dales 1968). Starting from the early 2000, integrated water resource management came to be seen as the best and unique way to achieve sustainable development in the water sector (Rahaman and Varis 2005).

However widespread and dominant they might be, norms are not cast in stone. They evolve through time and may fade, sometimes very abruptly. As some authors suggest, we may very well be witnessing a form of paradigmatic shift in environmental thinking. The concept of *sustainability* might be ceding ground to that of *adaptation* to environmental changes such as climate change (Theys 2014). More specifically in the water sector, concerns about climate change are allegedly fueling a change of policy perspective from integrated management towards *adaptive management* (Engle et al. 2011).

To what extent *climate change adaptation* (CCA) can be considered as a new global norm, and what this is implying for water governance, is a question that needs to be addressed. Climate change adaptation has indeed become one of the trendiest topics in international debates on water governance, and more generally, on environmental management. Until the early 2000s, adapting to climate change was considered a taboo (Pielke et al. 2007). Reducing greenhouse gas emissions (GHGs) to mitigate global warming was originally defined as the priority of the United Nations Framework Convention on Climate Change (UNFCCC) of 1992. As and when the political failure to limit the ever-growing GHG emissions grew patent, the attention of policymakers seemingly reorients from mitigation towards adaptation to the unavoidable symptoms of climate change.

It is scientifically indisputable that climate change causes significant alterations of social-ecological systems and that forms of adaptation are necessary. Climate impacts affect the capacity of ecosystems to deliver goods and services of upmost importance for the development and livelihood of societies, for instance freshwater, arable land, or natural disaster regulation (Daily et al. 2009; Schröter et al. 2005). Adaptation is hence a matter of concern for a multitude of policy sectors such as water

management, biodiversity, agriculture, spatial planning, health or economic development (Hallegatte 2009). In the water sector, climate risks are numerous, for instance: streamflow and water quality alteration, increased flood magnitude and frequency, biodiversity loss or sea-level rise (Settele et al. 2014).

The last Intergovernmental Panel on Climate Change (IPCC) report defines adaptation in a relative neutral way as: "the process of adjustment to actual or expected climate and its effects." (IPCC 2014). In substance, CCA includes all to efforts to anticipate and prevent the effects of climate change, to reduce the magnitude of climate stimuli, but also to pool the risks, or even to bear some losses (Smit et al. 2001). Article 4.1 of the UNFCCC stipulates a duty to implement and report adaptation measures. To what concerns European countries, these have been supplemented by guidelines from the European commission (Commission of the European communities 2007, 2009). However, these legal requirements are very "soft" in nature (Dreyfus and Patt 2012), meaning their coercive power remains weak.

Scientists working on adaptation have played a central role in setting adaptation on the international policy agenda (Agrawala 1998). This contributes to explain why the adaptation research community has mostly focused on the societal, economical or political barriers to the development of adaptation responses (Eisenack et al. 2014), rather than contributing to comprehensively analyze decision-making processes in relation to adaptation, or to evaluate their impacts (Biesbroek et al. 2015). If the literature generally advances the idea that climate vulnerable sectors must take stock of climate impacts in decision-making (Smit and Wandel 2006), only a few authors have discussed critically what this really implies for water governance (Becker et al. 2015; Huitema et al. 2009).

In this chapter, I will address three key dimensions in relation to the potential impacts of climate adaptation for water governance. If adaptation has become a global common norm, then we should be witnessing a process of institutionalization within states (Bernstein and Cashore 2012), which I will first discuss. Second, norms are always based on a normative justification, namely a discourse on the moral and societal imperatives implying the appropriate actions (Björkdahl 2002). I will, therefore, try to elaborate on the normative content of adaptation. Third,

a norm should provide with clear substantive prescriptions on the adequate behaviors to adopt (March and Olsen 1998). I will try to decipher what the substantive implications of adaptation ought to be with regards to the water sector. And finally, I will conclude this chapter reflecting on how this discussion draws the shapes of a future research agenda on adaptive water governance.

2 Adaptation Institutionalization in Water Governance: Integration and Interplay Management

In order to be effective, soft norms stemming from the international level must find ways to influence collective behaviour at the domestic level. Beyond cultural channels of diffusion such as the standardized language used to depict collective problems and how to solve them (Johnston 2001), one of the most direct norms diffusion pathways is the direct legal translation in national constituencies (Bernstein and Cashore 2012). Another channel is their integration in less formal institutions such as private laws, social contracts or collective norms of behaviour (Adger et al. 2013).

Empirical studies have described how adaptation is being institutionalized in developed countries (Biesbroek et al. 2010; EEA 2014). The rise in importance of adaptation in policy discourses can hardly be disputed (Schipper 2006). Most states have incorporated adaptation in their policy framework, but in current practices, adaption is seldom developed as a stand-alone policy sector. A "mainstreaming" approach is said to predominate, which refers to an incremental process where adaptation is incorporated as a new layer in the existing institutional structure rather than through dedicated administrations and policies (Lesnikowski et al. 2015). If autonomous adaptation by private actors has been observed (Tompkins et al. 2010), little evidence exists that climate impacts are yet systematically integrated in private decision-making.

Adaptation mainstreaming as a process of institutional integration leads to complex settings of rules that some scholars refer to as "regimes"

(Gerber et al. 2009; Jochim and May 2010). In these contexts, the challenge becomes to integrate and bring adaptation objectives in coherence with the existing set of rules and norms that already tend to mutually conflict. Such endeavour requires to manage the vertical interplay between various layers of institutional structures with heterogeneous attributes, and to deal with the horizontal interplay between regulations and norms with conflicting goals or effects (Vatn and Vedeld 2012; Young 2002).

Institutional coordination has precisely been identified by the literature as one of the main factors that hamper adaptation development (Krysanova et al. 2010). According to existing assessments, even recent pieces of legislation such as the European Water Framework Directive (WFD) of 2000 poorly integrate climate impacts into risk assessments and decision-making, although goal attainment by the WFD is clearly climate sensitive (Brouwer et al. 2013; Wilby et al. 2006).

Against similar backdrops, several authors proposed frameworks around the concept of "environmental policy integration," originally in order to assess the progress of states in incorporating sustainability into their development policies (Knoepfel 1995; Lafferty and Hovden 2003). Many scholars working on environmental policy integration in the aftermath of the Rio conference simply assumed a normative tone regarding the need to give priority to sustainability in the management of policy interplay. These authors suggested that environmental concerns should be integrated vertically, in all layers of governance and at all stages of policymaking; and horizontally, through the coordination of environmental and non-environmental policy, as to "minimise contradictions between environmental and sectoral policies by giving principled priority to the former over the latter"; (Lafferty and Hovden 2003, 9).

By analogy, the same principle could apply to adaptation; in order to be effective, adaptation goals should be coherently articulated with and given priority over potentially rival policies and rules. The adaptation literature hence emphasizes the need to better integrate adaptation in institutional frameworks, notably in the governance of water, and to make existing policies more supportive of adaptation (Urwin and Jordan 2008). However, under the current circumstances, it is relatively unclear

how coherence is to be reached and to what extent adaptation should be prioritized over other policy objectives.

Indeed, institutionalizing adaptation may produce erratic results. In the current context of soft obligations, high uncertainty with regards to climate impacts, and low public pressure on the climate issue, the institutional integration of adaptation is prone to symbolic policymaking (Gustafsson 1983), that is, actions intended to demonstrate government activity on a given problem, but with no hope of contributing to its resolution. Adaptation often gives rise to a process of policy recycling or relabeling, by which already-existing measures are given a second political life under the etiquette of "adaptation." Dupuis (2015), for instance, demonstrates how the huge integrated watershed management program (NWDPRA) launched by the Indian government in 1991 was first framed as sustainable development policy, before being newly presented as an adaptation measure in 2008.

Worse, when insufficiently coordinated with social welfare or environmental protection policies, institutionalizing adaptation in the water sector can lead to outcomes that are highly questionable in terms of legitimacy (see Chap. 6). The dam project of Sivens in the Tarn region of France is a sadly famous example of that. The project, financed by the water ministry, the European Union and the Tarn department, was supposed to balance the effect of climate change on water availability to the benefit of farmers downstream of the Tescou river. The most important wetland of the region was to be flooded, however, even though it contained a rich biodiversity of about ninety-four protected species.[1] The launch of the deforestation work triggered uproar and protests, which peaked with the death of a twenty-one-year-old demonstrator. Two days later, an assessment commissioned by the national Ministry of Ecology strongly criticized the project (Conseil général de l'environnement et du développement durable 2014). The project was finally abandoned two months later, leaving the wetland ecologically damaged. The case of Sivens is certainly extreme, but must be considered as a cautionary tale about the fact that the lack of institutional coordination between adaptation and environmental conservation leads to unpredictable effects on the ground. Had the planning procedures integrated biodiversity and local

people aspiration ahead in the process, alternative adaptation options with less dramatic consequences might have been advanced.

The case of Sivens strongly reminds that adaptation is being institutionalized, but without a clear blueprint on how to articulate and prioritize with existing policies (Jordan and Lenschow 2010), which can lead to erratic results in case of deficient coordination.

3 The Normative Content of Adaptation: The Attractiveness of Polysemy

Common global norms necessarily entail a form of teleology, that is a moral justification of the societal purpose or problems they were designed to address in the first place (Habermas 1998).

At the ontological level, Eakins et al. (2009) consider that adaptation goals can be viewed through at least three different theoretical lenses: the risk-hazard literature (McCarthy et al. 2001), political economy (Adger and Kelly 1999) and socio-ecological system theory (Gunderson and Holling 2002).

These theoretical frames imply different priorities for adaptation goals in water governance. The risk-hazard approach focuses primarily on physical exposure to climate impacts and involves straightforward risk reduction responses such as building dikes or giving more room to rivers (Füssel 2007). Political economy tends to adopt a more holistic approach, in which climate change impacts are just a factor that aggravates the deeply rooted social-economical vulnerabilities of people at risk (O'Brien et al. 2004). In this approach, reducing structural social inequities through empowerment and capacity building represents the cornerstone of adaptation policy. Finally, socio-ecological system theory rather puts the emphasis on water management systems that are flexible enough to absorb external shocks while retaining the same function and structure (Nelson et al. 2007). The point here is to build institutions that allow for adaptive management. Studies that systematically analyze and compare how these theoretical lenses diffuse into real-world politics, and how they impact water management, are still scarce (Dupuis and Knoepfel 2013;

Eakin et al. 2009). More work is needed to identify which policy goals seem to best work in what context as well as trade-offs and synergies.

Interestingly, adaptation seems to have generated an image far less accurate of the societal goals to be reached than the one to be avoided. The term "maladaptation" is used to designate these negative features. A plurality of interpretation certainly exists, (Magnan et al. 2016), but maladaptation designates primarily policy objectives that program large increases of GHG emissions (Hasson et al. 2010), contradict sustainability principles (Brown 2011; Eriksen et al. 2011), or lock in irreversible pathways (Hallegatte 2009). Other than the Sivens case, Barnett and O'Neill (2010) demonstrate that the water policies designed by the municipality of Melbourne to deal with climate impacts such as declining rainfalls and water availability through means of desalinization and water transport largely increase GHG emissions, and disproportionately burden most vulnerable actors. By contrast, other studies show how adaptation programs that develop irrigation potential to fight against droughts and erratic rainfalls can positively affect the social welfare of vulnerable actors, but also contribute to groundwater depletion, thereby reinforcing the adverse impacts of climate change (Dupuis and Knoepfel 2013).

Hallegatte (2009) convincingly demonstrates that positive obligations can be derived from the concept of maladaptation. He suggests that decision in the water sector should be robust to climate uncertainty by planning soft options that are reversible. He calls for a strengthening of the precautionary principle, by using safety margins for defining stricter-than-necessary targets in order to account for the additional risks of climate change. All this policy advice revolves around the concept of low-regret or no-regret strategies, namely policy options that would yield benefits even in the absence of climate change (Wilby and Dessai 2010).

Robust adaptation may seem the most policy-relevant way to frame adaptation goals. At the same time, however, it carries a conservative tone and dilutes the specificities of adaptation. The precautionary approach emphasized to deal with the uncertainty carries the risk of excluding innovative and progressive measures designed to specifically address future climate change impacts. Robust adaptation therefore leads to a focus on the most proximate causes of climate vulnerability, and omits

the systemic changes that might be needed in order to cope with future climate impacts of larger magnitude (Wise et al. 2014).

It is also questionable whether robust adaptation adds any value to current water policies. The inclusion of safety margins in the design of flood prevention systems, for instance, is not new per se. Similar advice was made to strengthen flood risk policies well before climate change became a policy issue (Burton et al. 1978). These redundancies have raised the skepticism among scholars within the disaster risk reduction community about the novelty and added value of adaptation (Mercer 2010).

In reaction to the incrementalism and precautionary approach underlying robust adaptation, the recent literature, and notably the last IPCC report, emphasizes the need for transformational adaptation (Kates et al. 2012; Klein et al. 2014; Preston et al. 2013). Transformational adaptation can be understood as the opposite image of robust adaptation. In answer to the risks of climate impacts of unpredictable magnitude, transformational adaptation are interventions of a paradigmatic nature that ambition to transfigure the existing practices in water management. At the same time, transformation is more likely to encounter resistance and typically represent less feasible options to decision-makers (Dupuis and Knoepfel 2013). Moreover, promoting transformation is more at risk of ending up in maladaptive options, if the climate and other contextual conditions evolve differently than anticipated.

Robustness and transformation form a continuum of targeted societal change in relation to adaptation. While trade-offs are inevitable between the two approaches, some scholars argue that they are not mutually exclusive and might in fact be complementary (Wise et al. 2014). Robust adaptation can constitute a first response to most proximate vulnerabilities while incrementally supporting transformation. How such pathways of change can occur in current water governance structures is an open question, since identifying the social-political mechanisms that may conduct to these pathways of change needs further research (Gillard et al. 2016).

Adaptation hence hardly comes with univocal expectations about the societal goals to be reached. This might come as a reason not to consider adaptation as a norm, since norms are precisely defined as normative "standards" that leave a narrow margin of interpretation (Axelrod 1986).

But one should also recall that contested notions such as sustainability can act as global norms, as long as they produce ethics and identities that can be appropriated (Lafferty 1996). Even more so in the case of sustainability, normative indistinctness allowed for social forces pursuing antagonist interests such as non-governmental organizations (NGOs) or business organizations to commonly support sustainability as an objective they could interpret according to their stakes. The uncertainty resulting from unclear norms in turn allows a process of translation or "transcoding" (Lascoumes 1996) through which actors strive to clarify the norm according to their own interests and beliefs, in order to strengthen their position in existing policy networks.

Turning back to adaptation, scholars make the empirical observation that adaptation initiatives are discussed almost everywhere, but the values shaping adaptation goals differ contextually (Adger et al. 2009). The norm broadness here clearly results in a process of norm translation, whereby states and private actors have an important leeway in interpreting the meaning of adaptation according to their own values and interests. For instance, the government of India views adaptation as something that would be reached through social welfare development, whereas, Switzerland defines it as a way to seize the new economic opportunities offered by climate change (Dupuis 2015). In a certain sense, adaptation can be considered as a contested norm that suffers from polysemy. Goal unclarity is paradoxically turning adaptation into a globally attractive policy idea, since it allows government or other policy actors to recycle "old wine in new bottles," and to use adaptation to fuel their own political project.

4 The Substantive Content of Adaptation: The Gospel of Flexibility and the Omission of Policy and Politics

Norms also carry expectations and prescriptions about the appropriate behaviour to adopt, the ought and the ought not, in relation to a given issue. At the policy level, norms act as a reference that bounds the choice

of desirable rules, instruments and procedures by decision-makers (Hall 1993).

In relation to climate change adaptation, a powerful discourse has emerged in scientific as well as in policy circles about the conditions enabling "the good governance" of natural resources. Inspired by the work of Nobel Prize winner Elinor Ostrom (2005), and by the literature on adaptive management (Olsson et al. 2004a), these ideas have exerted a strong influence in water policy debates and practices, where they often go by the name of "adaptive water governance."

Adaptive governance can be traced back to the work of Holling (1973), who strongly criticized centralized governance systems, fixed top-down procedures and environmental protection policies for unfitting the complex and non-linear attributes of change dynamics in ecosystems. Formal policies that aim to increase the predictability of actors' behaviour by formulating wrongs and rights were viewed as too rigid and myopic to manage always-evolving ecosystems. Holling argued that "bureaucracies are an exercise in variance reduction through regulation and control," which ultimately contributes to creating bigger environmental problems than the ones they were supposed to solve in the first place (Holling and Meffe 1996, 331). Decision-making structures deployed in water and natural resources governance were also considered as too centralized and hierarchical to leave room for deliberation with local stakeholders, which prevents the types of innovative, creative and reactive management needed in order to adapt to environmental changes (Holling and Gunderson 2002; Holling and Meffe 1996).

A growing literature sought to use cross-case comparisons and meta-case analysis to demonstrate empirical regularities between the features of adaptive governance and successful adaptation in the water sector, as well as the lack of adaptive capacity of centralized and command-and-control types of water governance systems (Huntjens et al. 2011, 2012; Pahl-Wostl 2007; Pahl-Wostl and Knieper 2014; Pahl-Wostl et al. 2012).

While this literature prudently recalls that no panacea exists, it strongly asserts that successful adaptation is both theoretically and empirically related to the existence of flexible institutions that are able to deal with complexity and uncertainty. It is claimed this requires new institutional

arrangement in many cases. Such institutions would combine three features: polycentrism (multilevel and nested structure with many centres of decision-making that are formally independent, but interconnected and partially redundant); adaptive management system; and strong stakeholder participation (Huitema et al. 2009).[2]

It is claimed that flexible policies allow for experimenting innovative policy solutions and constantly evolving practices based on permanent monitoring and knowledge management. Decision-making should occur at the lowest level of governance in close collaboration with the higher levels on cross-scale issues, as to allow both social learning across levels as well as leadership at the individual level (Armitage et al. 2008; Lebel et al. 2006). Moreover, these polycentric decision networks should facilitate stakeholder participation and the use of local knowledge to inform governance choices (see Chap. 2). All in all, adaptive management in polycentric governance settings would facilitate trust-building among water stakeholders, and enable the emergence of innovation in response to climate change impacts.

Adaptive water governance has become the dominant discourse in policy debates on climate and water (Reghezza-Zitt et al. 2012). Few scholars have attempted to challenge what seems to have become a doxa about the way to bring water governance to a climate adaptive state (Huitema et al. 2009; Plummer et al. 2012).

However, both the conceptual and methodological foundations of the prescriptions around adaptive governance remain fragile. Indeed, the implementation of adaptation initiatives in the water sector is yet too recent to allow for solid comparative analysis and outcomes evaluation (Dupuis and Biesbroek 2013). The empirical studies that posit the superiority of adaptive governance use indicators of adaptive capacity such as the existence of explicit adaptation strategies or adaptation measures, which unfortunately says very little about the effectiveness of these policy outputs to deal with climate impacts (Huntjens et al. 2012).

Another problem relates to the fact that concepts such as polycentrism are complex theoretical constructs that are difficult to apply to the social reality through easily measurable proxies. Existing studies tend to build exaggeratedly clear dichotomies between polycentric and centralized system that do not hold in reality. Centralization only opposes to

decentralization and both systems can be more or less polycentric (Pahl-Wostl and Knieper 2014). The normative tone surrounding the debates on polycentrism also eludes discussion on the drawback of this model for water governance. Polycentrism can well imply higher transaction costs, less accountability, and more coordination conflicts than a hierarchical governance with clearly divided competence and responsibilities (Huitema et al. 2009).

Advocacy in favour of adaptive management generally omits to discuss the qualities of traditional environmental policy. The formalization of environmental obligations in laws and policies impede rapid adaptation, precisely because they seek to make fundamental norms such as equal access to natural resources or just redistribution resistant to political changes (Ruhl 2012). Moreover, in many cases, flexibility has already become an intrinsic feature of water policy. For instance, the WFD, which is nothing less than a top-down policy, stipulates the introduction of water-pricing instruments and broad stakeholder participation (Aubin and Varone 2004). In that sense, neither formalization nor top-down policy precludes flexible management at the lower levels of decision-making (Ebbesson 2010).

Implementing adaptive management systems can be considered as the principal substantive prescription in relation to adaptation. However, it is important to note that adaptive governance addresses mainly the structure of governing institutions (the polity), whereas it has only little to say about policy instruments, nor does it seem to consider politics and power. For example, when the WFD began to be implemented in European states, one of the main worries of political scientists concerned the lack of policy instruments for influencing water quality in cases where water disturbances originate from private owners of adjacent land (Aubin and Varone 2004). In this situation, adaptive governance is ill equipped to advise which of water pricing, payment for environmental services or land exchange would be the most “adaptive” or effective policy instruments to solve the environmental problem.

Moreover, the idea of adaptive governance entails a very naïve vision of power relations in collective action. A very optimistic view dominates that natural resource stakeholders are rational thinkers willing to adopt innovative behaviour and strategies to sustain ecosystems, if institutions

are correctly designed (Olsson et al. 2004b). Such perspective omits agency. Collective decision-making is a process formed by actors' interactions that is at least as chaotic and unpredictable as climate change. Moreover, social learning is unlikely in polycentric networks of decisions that involve highly heterogeneous actors in terms of interest and a strong degree of power fragmentation. One just need to think about the difficulty of finding agreement on optimal environmental protection levels between small-scale resource users and multinational firms, which always have the possibility to opt out (Dupuis and Knoepfel 2015; Lima et al. 2006). In such settings, the exercise of hierarchy by public authority with democratic legitimacy might represent the only option to reach a decision outcome (Knoepfel and Kissling-Naf 1998; Papadopoulos and Warin 2007).

Finally, in complex social-political systems, implementing adaptive governance in the water sector will not necessarily benefit all actors, but implies winners and losers. In Switzerland, the third Rhone correction is a very ambitious project that aims to increase the capacity to deal with floods of a return period ranging from 100 to 1000 years. The project incorporates features of adaptive governance, notably an emphasis on social learning and flexible decision-making (Arborino 2011). Farmers of the region strongly opposed the project and felt prejudiced by it. Indeed, the proposed solution to increasing the resilience to flood risks involved using arable land as submersible zones. Yet the buildings that surrounding municipalities allowed constructing too near from the riverbed will be maintained, although it constitutes the main cause of present and future vulnerability.

As outcomes of water governance reforms always depend to some extent on past choices and on the balance of power between local stakeholders, it appears doubtful that adaptive governance will universally be perceived as a progress. Enhancing the capacity to deal with environmental changes in the water sector is certainly a good thing that adaptive governance might be able to do; but simultaneously contributing to economic development and social equity in resource access is another, which might stay out of hands. Here the case of the third Rhone correction demonstrates but one thing: that an analysis in terms of actors and politics cannot be omitted if the impacts of adaptation are to be understood.

5 Conclusion

In this chapter, I discussed whether climate change adaptation can be considered as a new global norm, and what this is implying for the water sector. I have focused on three dimensions of norms, investigating whether adaptation is being institutionalized in water governance; what normative content is being conveyed; and whether clear substantive prescriptions on the collective behaviour to adopt exist. I have reviewed the evidences, drawing from the literature and existing case studies to make the following observations.

First, adaptation acts as a global norm with respects to the fact that signs of institutionalization can be distinguished worldwide. However, this process is plagued by symbolism and coordination problems, which contributes to producing erratic results.

Second, adaptation has not yet crystallized into a common understanding of the societal goals to be reached, but several conceptions coexist. If this indicates that the normative foundation of adaptation still lacks solidity, the solubility and broadness of the concept actually participate to its attractiveness for policymakers. The diluted meaning of adaptation may very well be exploited in politics, as a way for actors to legitimate old policy solutions or to consolidate their position in policy networks.

Third, adaptation conveys strong prescriptions on the need to make water governance more flexible, polycentric and participative. Confronted to power and politics in concrete decision-making, these advices tend to lose their substance, however.

In a nutshell, adaptation to climate change can be considered as a global norm that has penetrated water governance, but symbolic policymaking, goal unclarity and abstract prescriptions contribute to creating erratic outcomes. This situation draws a clear research agenda: there is a need to analyze comprehensively adaptation processes in the water sector; to develop an in-depth understanding of the pathways of change towards adaptive governance; and to advance implementation studies that seek to identify common patterns in policy outcomes. Because adaptation has long been the poor relation in climate research, it is quite understandable that existing studies focused on providing theoretical guidance on adaptation, and on identifying barriers and deficits. It is, however, time to switch from a normative and descriptive agenda towards an analytical and explicative one.

Notes

1. www.collectif-testet.org/31+la-zone-humide-du-testet.html
2. According to Huitema et al. (2009), "bioregionalization," namely the geographical rescaling of governance institutions to ecosystem frontiers, constitutes another dimension of these prescriptions.

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Johann Dupuis is a senior researcher with the Public Policy and Sustainability unit of the Swiss Graduate School of Public Administration (IDHEAP) at the University of Lausanne. He is an expert on environmental public policy and governance. His research focuses on how to compare and evaluate the coherence of fragmented policy settings with multiple instruments. He holds a PhD (2014) in Public Administration and MA in Political Science from the University of Lausanne.

9

Water Security as a Normative Goal or as a Structural Principle for Water Governance

Thomas Bolognesi and Stéphane Kluser

1 Introduction

Arguing that water security is a new mantra to grasp and solve the so-called water crisis, international organizations and their partners often consider water security as a core notion of water governance strategies. Indeed, more and more policy-makers and national policies have a reference to water security (Bakker 2010; CGDD 2013) although water security has many acceptations (Bakker 2012; van Beek and Lincklaens 2014; Zeitoun et al. 2016). However, most academics and practitioners agree that the notion covers three main dimensions: the social one (basic needs and health), the environmental one (quality and quantity) and the approach on risk(s). Bakker, referring to Grey and Sadoff (2007) and Zeitoun (2011), gives a canonical definition considering water secu-

T. Bolognesi (✉) • S. Kluser
Geneva Water Hub – Education and Knowledge, Institute for Environmental Sciences, University of Geneva, Geneva, Switzerland

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rity as "*an acceptable level of water-related risks to humans and ecosystems, coupled with the availability of water of sufficient quantity and quality to support livelihoods, national security, human health, and ecosystem services*" (Bakker 2012, 914).

The water security literature developed over three main phases (Bakker 2012; Cook and Bakker 2012; Garrick and Hall 2014). The first phase started when the concept emerged in the 1940s, and lasted all the way until the year 2000 when significant research and publications put water security at the forefront of the international agenda (FAO 2000; GWP 2000). The second phase started in 2006 with the 4th World Water Forum (Mexico), which put water security at the top of the agenda. During this second phase, literature started linking water security to economic growth. It was under such circumstances that Grey and Sadoff (2007) published an innovative and seminal paper emphasizing the need for investments in both infrastructures and institutions to achieve a water-secure world. The third phase started in 2013 when UN-WATER stressed the necessity for compiling and analyzing indicators on water security. At the same time, the Organisation for Economic Co-operation and Development (OECD 2013) promoted a risk approach on water security that would assess vulnerability to water-insecure situations in order to stimulate policy-making. More recently, an alternative perspective, more integrative, emerged (Zeitoun et al. 2016). It takes into account the uncertainty of a narrow appraisal of water security (data collection and quality) to better face dynamics of social-ecological systems (SESs). Such a perspective is a base for considering simultaneously the strong variability of the dimensions of water security.

This chapter attempts to contribute to the latter perspective, especially by demonstrating the relevance of an integrative perspective and its possible implementation. Our two starting points are the following: first, water security remains an umbrella concept justifying a holistic approach of water challenges (Molle 2008; UN-Water 2013); and second, a water-secure circumstance is often considered as the reflection of a sustainable use of water. Water security is, therefore, mostly addressed as an objective to be reached. As the definition of a water-secure situation is still under consideration, and considering the lack of evidence on the causal relationship between water security and sustainability, this normative perspective

seems to be premature. The questioning that led to this publication is the discrepancy between the dramatic water crisis, which is occurring in the real world, and the use of an umbrella concept at the core of water governance in the epistemic world. Is it wise to use a recent ill-defined notion to streamline water governance and find a solution to the water crisis?

Most SESs involve both environmental and social spheres in the same chicken-and-egg syndrome; water governance and water security are no exception. Complexity and system dynamics are at play (Folke et al. 2005; Ostrom 2009; Duit et al. 2010). This contribution is grounded on this strong interdependency to propose a pragmatic perspective on water security (aiming at enhancing water governance). The literature mainly deals with the impact of water security on social aspects (development, growth, etc.), providing an anthropocentric view of water security. Consequently, water management aims at securing water systems. Biswas and Tortajada (2016, 19) claim that "*the world is not facing a water crisis because of physical scarcity of water. It is facing a crisis because of poor management of* water." This motivates us to shift the focus from water security to water governance: how water security helps to reinforce/reshape water governance, instead of asking which water governance leads to water security.

Our postulate is that efficient water governance spontaneously results in a water-secure situation. This axiom stands on two observations. The first one is that water security, growth and development are interlinked with governance as the greatest common denominator. The second one is that the so-called water crisis is a (water) governance crisis (OCDE 2013; Bakker and Morinville 2013; Biswas and Tortajada 2016). Consequently, rather than diluting energy in scrutinizing water security as a goal, we would recommend focusing on enhancing water governance, which seems an undoubtable source of, and solution to, the water crisis. We propose to refine the conventional approach of water governance by using water security as a management tool rather than as a goal. We explore the reciprocal relationship between regime integration and water security improvement. Integrating an institutional water regime means framing governance with the fewest inconsistencies and a wide range of regulated uses (Gerber et al. 2009; Bréthaut and Pflieger 2015; Bolognesi 2014). We argue that water security could be relevant as a tool for the

adaptive management of an institutional water regime. As a consequence, we offer the following two propositions:

Proposition 1: an integrated water regime spontaneously leads to a water-secure situation

Proposition 1 states that a water-secure situation is an output of integrated water regimes following an efficient management of existing potential rivalries. By spontaneity we mean that this achievement is reached even if not in the core of the policy goals of the regime (Young 2013). It supports the statement that management concerns prevail in the water crisis. Even if this proposition confirms that studies are worth being carried out, it has an axiom status for this chapter to emphasize the relevance of the second proposition.

Proposition 2: water security represents a crucial trigger for water regime evolution by anticipating

Proposition 2.1: issues in governance fitting and evolution
Proposition 2.2: new uses rivalries

This second proposition is the feedback loop of the first and remains unexplored in the literature.

In order to explore these perspectives, we use literature on water security (indicators and governance), as well as rational institutionalism such as institutional resource regimes (IRR) frameworks and new institutional economics theory (Menard and Shirley 2005; Vatn 2005; Gerber et al. 2009).

The chapter is structured around three main parts. In the first, we discuss quantitative assessments of water security. By doing so, we aim at emphasizing the real scope of water security and its limitations. We provide a critical outlook on water security measurement confirming to be careful when using water security in a normative perspective due to the non-systematic way measures are taken and communicated (black box). Based on this initial discussion, we open the black box exploring our two propositions. The second part highlights how water security could

spontaneously emerge from water regime integration (proposition 1). The third part focuses on the feedback loop to identify how water security could help in integrating water regime (proposition 2), by being combined with adaptive governance processes.

2 Measuring Water Security: Taking Stock and Main Limitations

2.1 Measuring Water Security

Water security measurements aim at assessing water security across the world to grasp the so-called water crisis. It contributes to giving insights on human-water interactions. There are more and more assessments of water security, but only a few are multi-criteria and most are built on their own conceptual framework, which can limit comparison. In other words, water security assessments suffer from a large methodological diversity, which can prevent or bring complexity to international comparison. Therefore, water security assessments are generally characterized by a high subjectivity, which can reduce the relevance of their normative use, especially when they are not counterbalanced.

The contributions to water security measurements can be sorted in three categories. The first category encompasses water (in)security-related risks. The second one focuses on environmental concerns (such as water quality and quantity). The third category links water security and governance.

Falling under the first category, recent research has a tendency of expanding from this delimitation. OECD (2013, 13) states that water security "*is about managing risks*," which can be detailed in the following two points. First of all, water-related disasters are growing in frequency as well as in impact inducing social and economic losses (CGDD 2013; Gersonius et al. 2013; Kundzewicz et al. 2014; Bolognesi 2015). As a result, better prevention and resilient strategies facing these new conditions are needed. It is expected that by reducing vulnerability to risks, livelihoods and development may increase (Rose and Liao 2005; Grey

and Sadoff 2007; Allan et al. 2013). Water security indicators are then used in many ways (Garrick and Hall 2014). Academics have previously focused on dense and large watersheds, however, recent progress in geospatial referencing and analysis can contribute to refining assessment to smaller scales (Lawford et al. 2013). Governmental and development agencies are credited for their ability to implement development policies referring to water security in dense and risky water basins, especially in Southeast Asia (van Beek and Lincklaens 2014; Sadoff et al. 2015). The business sector operationalizes water security metrics in supply chain assessment to prevent state failures in order to address water-related risks. The World Economic Forum (WEF) publications on global risks encourage businesses to internalize such risks. It is worthwhile to note that risk and probabilistic perspective frame these indicators and the underlying conception of water security. On the one hand, it is very handy for policy-making, facilitating the prioritizing of issues and measures. On the other hand, it appears reductionist in view of the very limited knowledge accumulated on SESs. (Garrick and Hall 2014; Zeitoun et al. 2016). Complexity and uncertainty challenge water security indicators (Simonovic 2009). Consequently, if risk perspective on water security would help identifying investment sequences to minimize exposure (Grey and Sadoff 2007; OECD 2013) it is of paramount importance to keep in mind these limitations.

The second category of metrics informs water security stressors (Vorosmarty et al. 2010; Lawford et al. 2013). Pollution and growth of water use are pointed out as two crucial triggers of water insecurity. Vorosmarty et al. (2010) show that 80 percent of the world's population is located in water-insecure areas and that 65 percent of biodiversity is located in threatened water bodies. Norman et al. (2013) suggest the Water Security Status Indicators, which open the door to multi-criteria indicators and aim at supporting policy-making at the local level.

The third category clearly articulates metrics with water governance questions. The Global Water Partnership (GWP 2014) surveys seven significant reports/papers linking water security assessment with governance issues. They all provide international comparisons (Chaves 2014; Lautze and Manthrithilake 2012; Mason and Calow 2012; ADB 2013; Dunn et al. 2013; Willaarts et al. 2014; Warner 2013). Figures 9.1 and 9.2

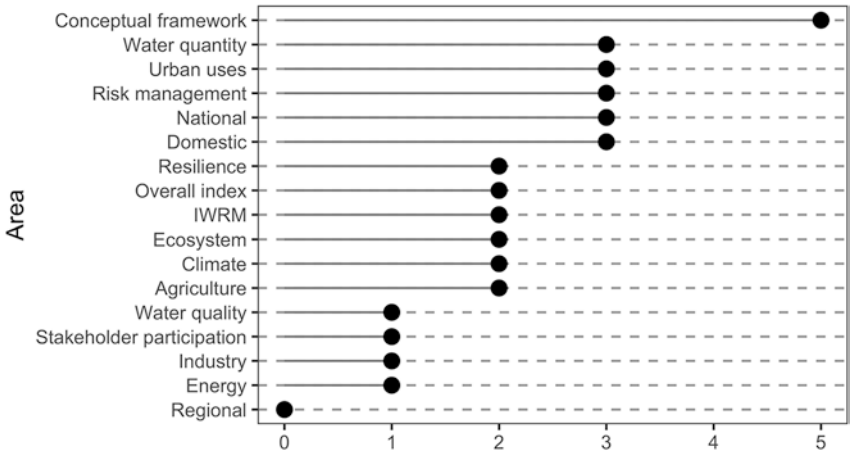

Fig. 9.1 Areas of concerns of water security indicators surveyed by GWP (2014). Source: Adapted from GWP (2014)

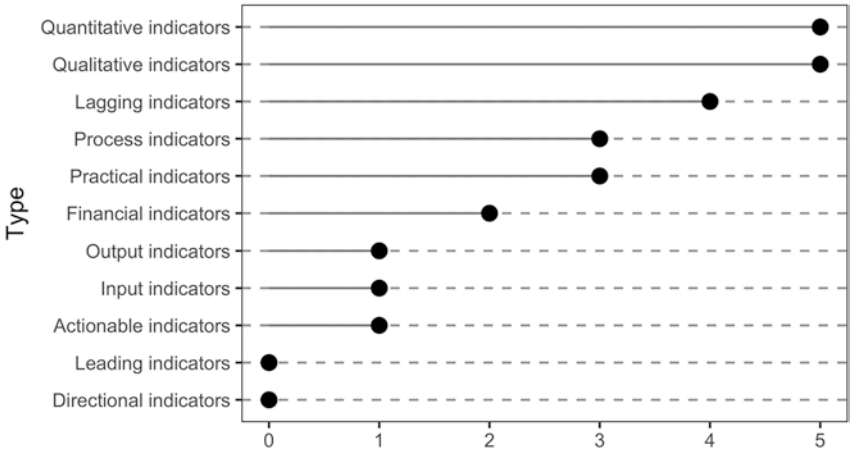

Fig. 9.2 Nature of water security indicators surveyed by GWP (2014). Source: Adapted from GWP (2014)

report the areas of concern and the nature of the indicators proposed by authors. Box 1 clearly shows the typology of the nature of indicators adopted by the GWP.

Box 1 Nature of indicators

- Quantitative indicators can be presented as numbers.
- Qualitative indicators cannot be presented as numbers.
- Leading indicators can predict the outcomes of a process.
- Lagging indicators present the successes or failures post hoc.
- Input indicators measure the amount of resources consumed while generating the outcome.
- Process indicators represent the efficiency or the productivity of the process.
- Output indicators reflect the outcomes or results of the process activities.
- Practical indicators interface with existing institutional processes.
- Directional indicators specify whether or not an organization is improving.
- Actionable indicators are sufficiently under an organization's control to effect change.
- Financial indicators are used in performance measurement and when looking at an operating index.

Source: GWP (2014, 3).

It appears that all water security assessments do not provide leading or directional indicators and solely Lautze and Manthrithilake (2012) set up input indicators. Lagging, process and practical indicators are globally preferred. This can be seen as a confirmation that, for most academics and policy-makers, water security constitutes a goal and not a tool. The most frequently covered areas, among seventeen indicators, are domestic, urban uses, water quantity and risk management, while industry, energy and stakeholders are often left aside. In terms of scale, indicators are all calculated at the national level, which looks consistent with the goal of finding water governance planning bearings. Each surveyed assessment goes with its own conceptual framework underlining that water security is not a "stabilized concept" ("nirvana concept"), even if it is often seen as a new mantra of water governance. This points out a crucial limitation of water security metrics. They do not converge, and one could assume that they could be tautological in the way they reflect a hidden definition of what authors perceived as good governance.

2.2 The State of Water Security Globally

Indicators provide information on the state of water security in different areas. By aggregating three consistent multi-criteria indicators (Lautze and Manthrithilake 2012; ADB 2013; van Beek and Lincklaens 2014), we aim at presenting the largest international comparison of water security possible. The previous section has shown that these three indicators offer the most robust appreciation of water security, both in terms of thematic and geographic extent. They cover the broadest area of concern through six to seven types of indicators. We focus on them to quantify water security across the globe. Such an exercise offers a good support to discuss water security indicators' quality and highlight associated uncertainty.

Figure 9.3 shows the main characteristics of each indicator. Considering forty-nine countries, the Asian Development Bank (ADB 2013) has the widest sample, followed by Lautze and Manthrithilake (2012) with thirty-three countries and van Beek and Lincklaens (2014) with twenty countries. All three indicators cover a large part of Southeast Asia and Oceania countries and van Beek and Lincklaens' (2014) also extends to a few other countries of each continent. It is worth noticing that ADB (2013) and van Beek and Lincklaens (2014) focus on the same five dimensions of water security (household, economic, urban, environment, resilience). Also considering household and environment, Lautze and

	Lautze (2012)	ADB (2013)	Van Beek et al. (2014)
Dimension	Household needs Food production Environmental flows Risk management Independence	Household Economic Urban Environmental Resilience	Household Economic Urban Environmental Resilience
Area	South-East Asia Oceania	South-East Asia Oceania	Asia Oceania America Europe Africa
Main summary statistics	N=33 Mean : 3.09 Min : 1 Max : 4 Std : 0.76	N=49 Mean : 2.43 Min : 1 Max : 4 Std : 0.71	N=20 Mean : 2.55 Min : 1 Max : 4 Std : 0.88

Fig. 9.3 Summary statistics of selected water security indicators

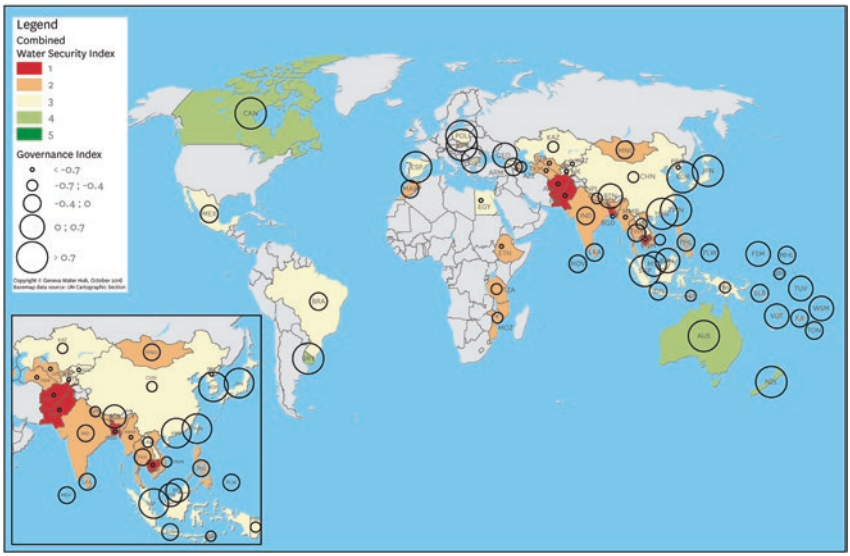

Fig. 9.4 Overview of water security globally

Manthrithilake (2012) prospect different aspects as well (food, risk, independence). Combining these three water security indicators leads to a large overview of water security in the world (Fig. 9.4).

The density plot (Fig. 9.5) presents the structure of these three different water security assessments. On the x-axis is the total score of each country, not the final indicator, and the y-axis reports the distribution of countries according to their score. This figure highlights significant divergences among the three indicators, reinforcing the need to use water security statistics cautiously. ADB and GWP (van Beek and Lincklaens 2014) show a similar structure, while Lautze and Manthrithilake (2012) present a much more secure situation with greater variations among countries.

These observations are confirmed by the summary statistics. Lautze and Manthrithilake's rating presents a more water-secure world than ADB (2013) and van Beek and Lincklaens (2014). This is not solely induced by the different samples considered, but also by the different methodology, which have an impact on results. As an illustration, Lautze and Manthrithilake rate Vietnam, Thailand and the Philippines with 3.4,

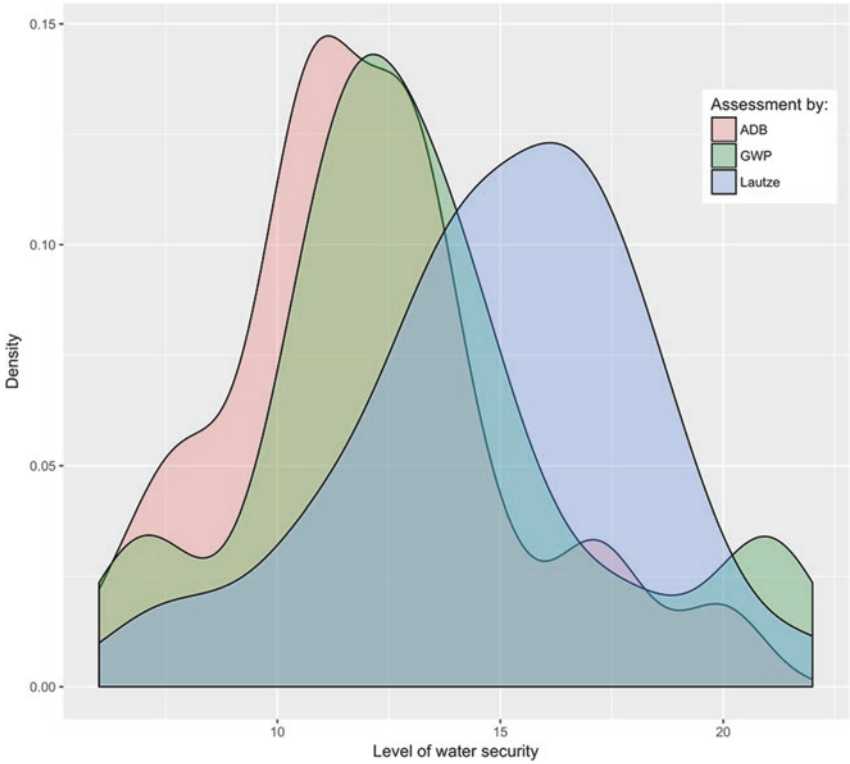

Fig. 9.5 Variation in water security assessments

while ADB's rating reaches only 2.2. Kyrgyzstan is another interesting example. ADB (2.6), Lautze and Manthrithilake (3.6) and Van Beek et al. (2.2) rates imply significant differences in final scores, respectively 3, 4 and 2 (on a scale from 0 to 5). This is of paramount importance since according to Lautze and Manthrithilake there is not much concern with water security in Kyrgyzstan, while Van Beek et al. conclude on an alarming situation. It underlines to which extent water security metrics are not stable and highlights the risk of using water security in a normative manner. The concept should therefore be used with caution. Such variations among indicators advocate for a unified and global assessment of water security. Finally, it appears that the smaller the sample the greater the

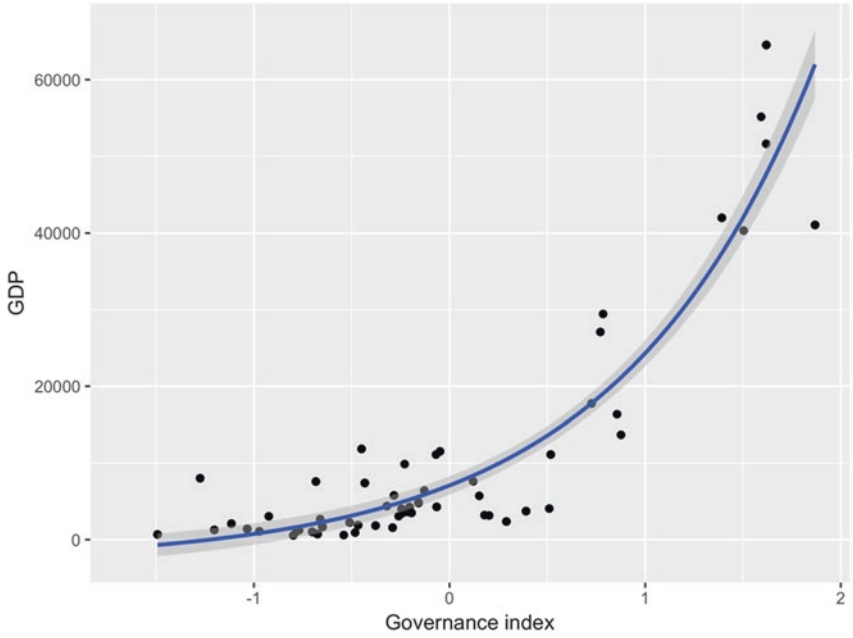

Fig. 9.6 Relation between governance quality and GNP per capita

standard deviation. This can be explained by the heterogeneity of the sample, which is erased by its size.

van Beek and Lincklaens (2014) cover a wider area than Lautze and Manthrithilake (2012) and ADB (2013), contributing to a larger diversity in sampling cases. The three indicators mostly focus on Southeast Asia and Oceania countries, i.e., regions that have contingencies impacting on water security assessment. The most significant ones are development patterns and climate and hydrological characteristics. Figure 9.6 plots the development patterns of the sample according to governance "quality" in 2015, measured by the Worldwide Governance Indicators (WGI)[1] and level of wealth, (GDP current dollars, from the World Bank). Countries with weak governance and poverty issues constitute most of the areas covered by the three water security indicators. In parallel, the graph illustrates the strong relationship between governance

quality and GDP. The selection of sample countries can influence the interpretation of water security issues. Indeed it is well known that low development stage contributes to weak water governance (Saleth and Dinar 2005; Ménard and Saleth 2013). Climate and hydrological characteristics are the second specific characteristics of the sample. In reference to the Köppen-Geiger climate classification (Peel et al., 2007), selected countries are mostly under equatorial or arid climate conditions inducing high variability in water precipitations favouring floods and droughts. Such conditions favour water insecurity, more or less directly for each dimension. Additionally, Bolognesi (2015) demonstrates that these regions combine structural characteristics that considerably increase vulnerability to water hazard and reduce water security.

3 Institutional Resource Regime and Water Security

3.1 Water Security and Governance Design

The first proposition states that an integrated water regime spontaneously leads to water-secure situations. It is very similar to the problem setting from the water security indicators' perspective. We want to grasp to which extent this reductionist approach of water security remains relevant. The proposition is based on the fact that water governance can be defined as a set of water-specific regulations and generic aspects of governance (Saleth and Dinar 2005). These generic aspects form an institutional matrix more or less favourable to development (North 2005); in our case, water security. Figure 9.7 links water security scores available from Lautze and Manthrithilake (2012), ADB (2013) and van Beek and Lincklaens (2014) with governance scores in 2015 or the latest available year, calculated from the WGI dataset. Figure 9.8 links water security scores with GNP per capita in 2015 or the latest available year.

Both plots illustrate a positive relation between water security, on one side, and governance index and GDP, on the other. It appears that the

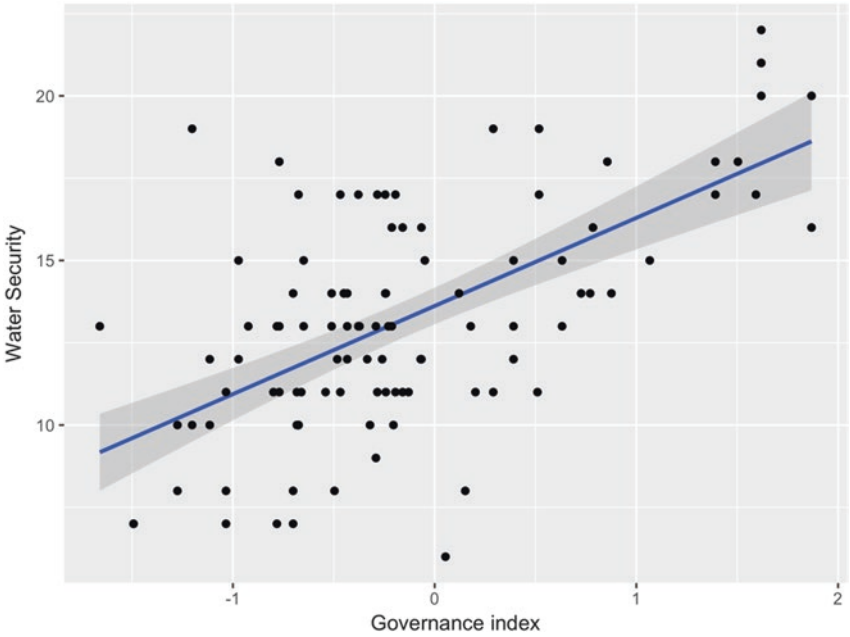

Fig. 9.7 Relation between water security and governance

relation is rather strong, even when considering residuals. Regressions confirm the observation (Fig. 9.9). Significance of regressors is high and adjusted R-squared limited to 0.37 and 0.32. In other words, governance and GDP are key triggers of water security, which tends to validate the relevance of the reductionist approach. At the same time, it highlights that this narrow focus on governance remains too simplistic to understand and implement water security. This confirms our first proposition: an integrated resource regime is a strong favourable terrain for water security, but, if necessary, it is not sufficient condition. The integrated resource regime notion refers to a governance setting where coherence and extent are high (Gerber et al. 2009; Bolognesi 2014), e.g., property rights and public policy are clear, not conflicting and covering a wide area of use rivalries. We now focus on how IRR could spontaneously enhance water security by increasing extent and coherence of governance.

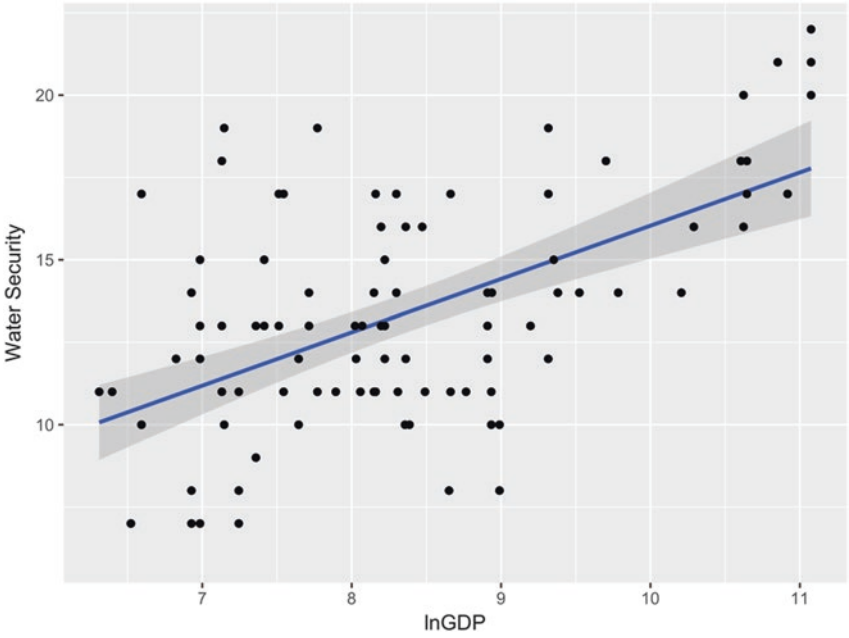

Fig. 9.8 Relation between water security and GNP per capita

	Dependent variable:		
	ln GDP	Water security	
	(1)	(2)	(3)
World Governance Index	1.281***	2.677***	
	(0.091)	(0.345)	
ln GDP			1.616***
			(0.243)
Constant	8.528***	13.617***	–0.129
	(0.074)	(0.281)	(2.044)
Observations	94	102	94
R^2	0.685	0.376	0.325
Adjusted R^2	0.682	0.370	0.318
Residual Std. Error	0.702 (df = 92)	2.787 (df = 100)	2.913 (df = 92)
F Statistic	200.079*** (df = 1; 92)	60.317*** (df = 1; 100)	44.331*** (df = 1; 92)

Note: *p<0.1; **p<0.05; ***p<0.01

Fig. 9.9 Governance, GDP and water security

3.2 Benefits of Governance Extent

The link between water security and regime extent is rather straightforward since water security issues spontaneously lead to extend regime, i.e., regulate new uses. The second hypothesis of an IRR framework supports this relation. It stipulates "*that the greater the threat to stability of a resource, the more it will be perceived as a relevant collective problem to be resolved and the more likely it is that attempts will be made to increase the extent of the IRR (new regulations for new uses)*" (Gerber et al. 2009, 807). By defining the pattern of coordination on collective water use problem, IRR extension should impact water security. As an illustration, Bréthaut and Pflieger (2015) highlight how water governance and use rivalries are intertwined. They relate new economic uses to collective problem definition and governance structure, processes they called *shifting territorialities*. Such shifting territorialities hardly contributed to defining and modifying water use in the case of the Rhône River, especially in terms of quantity and quality. That way governance spontaneously modifies patterns of water security in any given area.

Looking at IRR evolution on the long run leads to identifying four water governance phases in Europe and Switzerland (Reynard et al. 2000; Aubin 2007; Bolognesi 2014). Figure 9.10 relates collective problems with water regime planning in Switzerland between 1870 and today. Since 1953, water quality appears to be the main challenge that the Swiss water regime faces. The first phase focuses on economic uses and water-related risks. The second deals with water consumption. It is a period where water connections and water quality rises to high level, considerably increasing households' water security. Starting in the 1970s, the third phase reflects a reaction to environmental degradation and impulses a strong extension of the Swiss institutional water regime. Innovative acts have been enacted and incentivizing measures such as the polluter-pays principle adopted. The fourth phase reaffirms environmental focus and changes the water governance paradigm to eliminate earlier failures. The development of governance during the 1990s brings about a special focus on water quality, with around ten structural water acts. It contributes more to water regimes' coherence than to their extent, the latter being high since.

Periods	Collective problem	Property rights	Public policies
1870–1912 Protection from water	-Floods -Fish deaths	-Absence of national Law -Implementation of Federal State sovereignty (water and hydro-electricity)	Emergence of indep PP with 3 main goals: -flood protection -urban pollution -electricity
1912–1953 Economic exploitation of water	-Energy and food security	-Swiss civil code (1912): public and private waters separation -Implementation of PPP systems for hydro	Sectorial separation of PP: -protec against water -water exploitation -water protection
1953–1975 Protection of water quality (1)	Polluted waters	Restriction on specific uses	-Reinforcement of sectorial PP, esp. water protection -No regulation of agricultural non-point source pollution
1975–1991 Protection of water quality (2)	Polluted water	Extent to quality and quantity	-Efforts pursuit (2nd water protection act 1971) -Implementation of polluter -pays principle (1995)
1991–2008 Protection of the all hydrological system	-Qualitative and quantitave stresses on waterPol. -Storm related pollution -Dams and ecosystems -Agricultural pollution -Floods and climate change	-Reinforcement of disposal and use rights restrictions in 3rd water protection act (1991)	Sectoral policies nexus in Water act (1991)

Fig. 9.10 Evolution of collective problems and water governance in Switzerland since 1870. Source: Adapted from Reynard et al. (2000), Knoepfel et al. (2010)

The Swiss Federal Office for the Environment (FOEN) uses twenty-six water indicators that have the objective of assessing the status and trends of environment in the water area.[2] These indicators cover most of the scope of water security variables falling under the "driver, pressure, state and impact" classification. For instance, variables such as "production of hydroelectric power," "water use," "nitrate in groundwater" and "flood events" inform economic, household and environmental and risk dimensions of water security. They illustrate a positive impact of water regime extent on water security. As an illustration, in the late 1970s and early 1980s, one can observe a significant decrease of the concentration of hazardous substances, such as phosphorus or nitrogen, within water bodies (FOEN website, Björnsen Gurung and Stähli 2014). Along the national legislation, international laws could enhance the integration of water regimes. Recently, the Protocol on Water and Health, signed in 1999 and ratified in 2006, grasps all dimensions of water security and contributes to enhancing it while not mentioning the concept (FOEN 2013).

The extension of the Swiss water regime spontaneously improved water security in the country. Nonetheless, several challenges remain. Nowadays, five principal domains hamper Swiss water security:

- Nitrate in groundwater
- Organic trace materials in surface waters
- Plant protection products in groundwater
- Floods
- Temperature of watercourses

Traces of organic material in surface waters is a recent case where water security had the consequence of expanding the Swiss water regime. The Water Protection Act (1991) aims for a nationwide wastewater levy, but, because it fell short of expectations, on 3 March 2014 supplementary financial efforts were accepted to upgrade quickly 100 wastewater treatment facilities. This contribution should result in significant elimination of micropollutants. On the quantitative side, since the 1970s, flood frequency increased and the three most serious ones took place between 1999 and 2014. Consequently, flood-related damages remain considerable. In 2005, they exceeded three billion Swiss francs. Droughts are costly too. In 2003, their costs reached 500 million Swiss francs. Nevertheless, water security of the Swiss water regime is more vulnerable to qualitative issues than to quantitative ones (Volken 2012). Then, uncertainty on the changing context and on implementation success/failures will legitimate adaptive measures to recalibrate planning. The decision of the Swiss national council and the Swiss council of states' in March 2014 illustrates such a type of adjustment.

3.3 Benefits of Governance Coherence

Extension is the main channel by which water regime planning produces spontaneously positive output in terms of water security. The other way to enhance regime integration is coherence. National regulations still struggle to deal with coherence issues. Our perspective is that it is the actual specific governance area where adaptive governance proves to be relevant. This concept is advocating for an integrative perspective on

water security, and it refers to noise occurring in the relation between governance and water security (Figs. 9.7 and 9.8).

Unexpected disturbances can come up from implementation. For example, the difficulty to ensure credible command-and-control policies in polycentric SESs, the misalignment between public policies and organizational structures, and property rights allocations and cross-sectorial nexus (Menard and Shirley 2005; Ostrom 2010; Bakker and Morinville 2013; de Strasser et al. 2016). In practice, coherence issues mostly relate to cross-sectoral and multilevel unexpected impacts of a given regulatory item (Reynard et al. 2000; Aubin 2007; Knoepfel et al. 2010; Bolognesi 2014). The 1991 Water Act and integrated water resource management (IWRM) documents are examples of central policy planning that take into account coherence issues, but they stand out as isolated initiatives. Coherence remains a persistent challenge to long-term planning within institutional regime.

Authors of the Swiss research project PNR61 on sustainable water management provide valuable tables on intersectorial linkages (Lanz et al. 2014). Using such tables would enhance water regime coherence and result in more secure patterns of use. Matrices show how sectorial collective problems would affect other sectors from quantitative, qualitative, hydromorphological and ecosystemic or territorial perspectives. Conflicts, synergies and processes are detailed. For example, externalities of agriculture on others sectors are underlined and classified as very conflictual. Urbanization and industry appear less conflictual, but in regards of the specific water security issues of Switzerland, this relation could be better kept under review. Indeed, industrial uses and urbanization patterns contribute to dissemination of micropollutants in water. Resulting in local and short timespan impacts, urbanization and industry collective problems were classified as non-major sources of intersectorial conflicts.

We showed that water security should be a spontaneous output of integrated water regimes. It appears that, by consistently regulating a wide range of uses, integrated water regimes provide very favourable conditions to reach a water-secure situation. This tends to consolidate the first proposition. Nonetheless, this statement must be tempered as implementation issues or unexpected behaviours can remain in integrated regime. These two factors may interfere in the transition towards a water-secure situation.

4 Water Security and Adaptive Governance to Enhance Governance Integration

4.1 Water Security and Adaptive Governance

Proposition 1 has been confirmed as a structural trend. However, in the day-to-day practice of governance, we observed that implementation issues, among others, limit the robustness of the proposition. We firstly show that governance design is crucial to achieve water security but remains insufficient. Our second proposition outlines that water security could be a crucial trigger for water regime improvement by anticipating issues in governance fit (H.2.1) or new uses rivalries (H.2.2). To address this proposition, we adopt a more integrative perspective on the link between water security and governance. Special focus is given to the feedback relation between governance and water security, namely how water security perspective could support governance development. Integrative appraisal of water governance requires an insight to issues that articulate generic and specific governance components (Saleth and Dinar 2005; Ménard and Saleth 2013). The data noise in Figs. 9.7 and 9.8 may be mostly due to this articulation, context specificities and actors' behaviours resulting from inconsistencies in the institutional water regime. To grasp these phenomena, we stand on the Ostromian approach of governance crafting. Such approach states that adaptive governance would put in practice crafting within policy-making, and complement it to avoid maladjustments of governance design with local implementation.

The potential benefits of adaptive governance on water security have already been emphasized (Bakker and Morinville 2013; Pahl-Wostl 2016). In a nutshell "*water security approaches […] place the emphasis on the need for adaptive management, as a responsive approach that can reduce vulnerability and increase resilience in the context of evolving uncertainty*" (Bakker and Morinville 2013, 4). Our perspective is complementary. We shed light on the potential of water security to improve water governance by framing adaptive governance processes. More specifically, we argue that water security assessment could frame an adaptive governance process by providing stakeholders with pieces of reality and depicting general scenarios.

SESs involve complex interactions across nested scales between components, which reduce predictability of future outputs. If long-term planning designs key attributes of governance and defines tangible caps, adapting governance allows fine-tuning in respect of evolving constraints and contexts. "*There is a need to champion approaches to governance capable of supporting ecosystem management in a manner both flexible enough to address highly contextualized social–ecological issues and responsive enough to adjust to complex, unpredictable feedbacks between social and ecological system components*" (Chaffin et al. 2014, 55).

Adaptive governance is a form of bottom-up management of SESs that seeks to develop flexibility and adaptability, stands on self-organization of local actors and considers nested institutions both in time and scales. It is a deliberative and iterative process that allows focusing on adaptability rather than on performance per se; such a mechanism fits well with the uncertainty and complexity of SESs (Folke et al. 2005). It implies collaboration, experimentation and a holistic approach to resource management (Huitema et al. 2009). It is generally recognized that five items constitute adaptive governance: (1) stakeholders' involvement, (2) objectives definition, (3) management action, (4) models and (5) monitoring plans (Williams 2011). Water security appears very suitable to frame items 2 to 4, with possible positive outputs on water regime coherence and extent, contributing to put in practice proposition 2.

4.2 Benefits for Governance Coherence

Adaptive governance can enhance coherence of water regimes thanks to its diagnosis approach (cf. steps 2–4) and water security should be helpful to ensure that governance fits for purpose (Rijke et al. 2012) (proposition 2.1). Indeed, water security and its five key dimensions (household, economic, urban, environment, resilience/risk) are suitable to reach multiple objectives. First of all, as these dimensions and their interactions are simple, they facilitate the definition of objectives with a variety of stakeholders (even in a deliberative manner). Second, water security could deliver heuristic virtues to establish scenarios and clarify interdependencies among objectives, which would feed into participatory processes. Third, performance and coherence of governance options could be experimented

and assessed locally. Adaptive governance consists in combining these three advantages in an iterative fashion, which favours inclusion of context specificities and search for coherence.

Adaptive governance aims at involving local actors, framing the network differently from the classical hierarchical top-down process. Therefore, new actors could emerge and create a local leadership. It is proven that local leadership could be of paramount importance in facilitating local coordination and improving governance coherence (Gupta et al. 2010; Rijke et al. 2012). The Commission internationale pour la protection des eaux du Léman (CIPEL) case is an illustration for Switzerland. This commission focuses on the quality of Lake Geneva and advises contracting governments. Its scope is in line with most of water security dimensions. The CIPEL conducts in-depth analysis of governance and water-related issues, which leads to recommendations regarding the improvement of water quality. It plays a role to frame participatory process around Lake Geneva by providing stakeholders with information and facilitating their discussions. With that focus, water security attached to adaptive governance principles contributes to coherence of water regimes.

Involving stakeholders should benefit to water regime coherence in two other ways. First, it may fasten or anticipate identification of inconsistencies within the frameworks. In the case of the sediment flushing of the dam of Verbois (Switzerland) in 2012, public authorities held a public enquiry (Bolognesi and Bréthaut 2017). It resulted in a signed agreement between Switzerland and France to coordinate the flushing, with no inconsistencies in regard of use rivalries, technical constraints and existing legal frameworks. The flushing operated well with no disputes. The second main positive impact of stakeholders' involvement for water regime coherence is access to practical and local knowledge. It is clear that water use and related economic activities rest on strong technological and technical know-hows. Local and practical solutions could be unknown/not implementable by central policy-makers, which limit efficiency and/or simplicity of adopted solutions (Brown and Farrelly 2009).

Adapted governance provides a collective arena of measures helping to deal with such barriers. The case of Munich, Germany's drinking water delivery reform is symbolic of this opportunity. By opening the public

consultation and creating trade-offs with other sectors (mainly agriculture), the mayor of Munich engaged a reform that led to maintain cost of water, protect water resource and ecosystem and ensure social acceptability of the new organization (Krimmer 2010; Grolleau and McCann 2012). Swiss water regime should gain a lot in that perspective. As an illustration, operators that drive water services are multisectoral. They may be in a position to improve governance coherence by implementing technical novelty or to clearly display occurring interlinkages in such complex systems. Water security would contribute to frame trade-off consistently.

4.3 Benefits for Governance Extent

Adaptive governance framed by water security may have positive impacts on water regime extent (proposition 2.2). Water security forces to adopt a multidimensional perspective on water governance. It contributes to shed light on new areas of possible use rivalries. At the same time, participation induced by adaptive governance provides an arena to stakeholders that are usually out of the decision-making process. As we have seen, extent is the safest option to prefigure when planning evolution of water regime. Therefore, adaptive governance has less interest in that dimension than about coherence. Nonetheless, adaptive governance combined to water security could positively impact water regime extent. It is expected that enlarging participation guarantees taking into account new or forgotten use rivalries (Schultz et al. 2015). Increasing the number of stakeholders favours pointing out non-identified use rivalries. Information campaigns or involving civil society are generic tools in that respect.

5 Conclusion

This chapter shows that even if water security appears as a new mantra for water governance, cautious use is recommended. The current approach of water security, with both the assessment and governance perspective,

includes a normative standpoint: a water-secure world should solve the water crisis. Accordingly, water security becomes a target for water governance. Nevertheless, we argue that governance remains the key trigger of water crisis and that focusing on water security raises the risk to divert from water governance failures and functioning. We therefore elaborate on two propositions. The first proposition states that an integrated water regime spontaneously leads to a water-secure situation (proposition 1). The second proposition states that water security is an essential contribution of the evolution of water regime by anticipating issues in governance fitting and evolution (proposition 2.1) and new uses rivalries (proposition 2.2).

The chapter discussed the water security concept and emphasized the need for an integrative perspective (Zeitoun et al. 2016). The chapter defended the following main idea. Water crisis mainly results from governance issues. Consequently, it is of paramount importance to focus on governance per se. The question is rather how water security can support water governance improvement, than how to design governance to achieve water security. Most of the literature focuses on the latter question with the risk to diverting efforts. The great variations and disparities among water security assessments we observed strengthen our claim.

The analysis confirms our first proposition; it shows that measures of water security face high uncertainty because of data quality and knowledge of SESs. As a consequence, comparison of water security metrics highlights significant heterogeneity in evaluation. Besides, it appears that governance quality and level of wealth are key triggers of water security. The development of both coherence and extent of governance have positive impacts on water security, making the focus on governance even more relevant. We therefore explored the feedback loop, i.e., how water security can contribute to governance improvement (proposition 2). The combination of water security with adaptive governance has been identified as a promising source of water governance improvement, especially on the coherence dimension. We pointed out four key channels: (1) framing multisectoral and multilevel issues, (2) involving local knowledge, (3) creating leeway to adapt governance design to context specificities and (4) experimenting governance to ensure it fits for purpose.

Notes

1. The World Bank and the Natural Resource Governance Institute produce the WGI. The indicators assess six dimensions of governance (voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, control of corruption) and cover 215 countries over 1996–2014. We aggregate the value of these six dimensions to have a proxy of governance quality in the present study.
2. Indicators available at: www.bafu.admin.ch/umwelt/indikatoren/08605/index.html?lang=en

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Thomas Bolognesi is a scientific collaborator at the University of Geneva (Institute for Environmental Sciences/UNESCO Chair in hydropolitics). His fields of research are political economy and institutional economics focusing on water utilities regulation as well as on linkages between water security and water governance.

Stéphane Kluser is a part-time scientific collaborator for the Geneva Water Hub at the University of Geneva and independent consultant developing in-depth geographic data analysis and layouts, impactful visual communication products and sound information management guidance. His contributions strive to optimize project coordination and planning, to raise awareness of the successes and needs of stakeholders and help improve the impact of sound environmental management and disaster risk reduction amongst others.

10

Politicizing the Water-Energy Nexus: Hydropower and Instream Values in Two Swiss Cantons' Water Strategies

Luc Tonka

1 Introduction

The Water–Energy–Food Nexus is the latest integrative framework to have caught academic attention in natural resources management. For those working in the fields of water and energy, the buzz word is hard to ignore (Cairns and Krzywoszynska 2016). The Nexus comes in many different shades, but often starts from the premise of large resources interdependencies. Paradoxically, this approach focused on the analysis of physical resource flows across systems points at the institutional setting surrounding the Nexus as a crucial element for resources efficient use. This chapter aims at expanding the current institutional explanatory capacity of the approach by proposing a case study of two water strategies adopted by

L. Tonka (✉)
Institute for Environmental Sciences, University of Geneva, Geneva, Switzerland

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Swiss cantons. It tries to show which characteristics of such processes and of their context are conductive to the adoption of a Nexus solution.

At heart, the Nexus calls for greater integration of resources management, with the promise that synergies thus elicited will help overcome scarcity issues. The Nexus approach is fundamentally about the interdependencies across resources and the sectors that rely on them. For water, food, and energy alike, the framing of this interdependency underscores the security of supply (Leese and Meisch 2015; Beck and Walker 2013). Scarcity resulting from such drivers as climate change, urbanization, and economic development is seen as the primary threat to security (Hoff 2011). The Nexus thinking is starkly systemic, and therefore apprehends both institutional and physical aspects with an overarching stance (Wallis 2015). This systemic approach is a condition to outline synergies across sectors but also, this study contends, a central limitation in that it completely bypasses the logic inherent to each sector.

This chapter attempts at answering the call for more detailed institutional and political studies of the Nexus (e.g., Bazilian et al. 2011; Allouche et al. 2015), taking up the situation of water management strategies in the two Swiss cantons of Bern and Valais. In following the rationale that led to the adoption of a hydropower plan in Bern and a similar albeit less successful attempt in Valais, the present study highlights the conditions that are amenable to institutional reform in a "nexused"[1] direction. In accounting for discrepancies across cantons, attention is paid to the institutional regimes, the political economy of each context, and the interests of the involved actors.

This case study allows to counterbalance some tendencies of the Nexus approach because it does not present the usual synergies made available by technological improvement. Indeed, Switzerland is prone to neither water nor energy scarcity, and the focus on hydropower and instream river values provides a setting to concentrate on trade-offs around allocation between uses, rather than overall availability. The chapter relies on interviews and document analysis and draws on insights from theories of the policy process broadly speaking (Sabatier and Weible 2014).

The following section exposes the main tenants of the Nexus approach, and discusses in some details the various contributions recently made to the literature. In the second section, the rationale for case selection and

methodology are exposed. The third section presents the empirical cases, from the national context to the detailed process of the water strategy development in both cantons of Bern and Valais. The analysis is followed by a short discussion and a conclusion.

2 The Water–Energy–Food Nexus

The recent emergence of the Water–Energy–Food Nexus "buzz word" (Cairns and Krzywoszynska 2016) can be traced back to the food crisis of 2007/2008 as prices for staple food increased in developing countries (Gyawali 2015; Allouche et al. 2014). It was further popularized in international and business circles by conferences and particularly supported by the German government as a preliminary contribution to the Rio+20 International Conference in 2012, as well as several others since (Hoff 2011; Leese and Meisch 2015; Muller 2015; Benson et al. 2015). The Nexus has recently gained much attention in the academic world, as evidenced by a series of special issues and edited books focusing on the theme (e.g., Allouche et al. 2015; Keskinen et al. 2016; Hussey and Pittock 2012; Pittock et al. 2015).

Despite this growing body of literature, it is still hard to come by a unified definition and the Nexus remains very much a "theory in the making" (Gyawali 2015, 17). This stems in part from the multitude of Nexus "scopes" found in the literature (Benson et al. 2015), ranging from water-energy to climate–energy–food–water—and even propositions to extend the Nexus further to non-resource sectors such as education, health, and poverty (Boas et al. 2016). In a nutshell, the Nexus approach is concerned with natural resources scarcity and their management, with a strong focus on the security of their supply and use. It argues that given the interdependences across resources and in a context of growing scarcity, sectors currently managed in silos should be integrated to explicitly account for trade-offs and to uncover synergies, which would result in more efficient use of resources and thus contribute to a more sustainable development (Hoff 2011; Leck et al. 2015). Key components of the Nexus approach include the reliance on ecosystem services (also referred to as "natural infrastructures") and more efficient processes ("creating

more with less"), while development represents an important domain for its application given that the poorest often suffer simultaneously from water, energy, and food shortages (Hoff 2011, 14). Although the way forward is not explicitly laid out, references to the "green economy" and market incentives (see Chap. 7) indicate that the Nexus relies extensively on technological innovations and commodification to make resources uses challenges manageable (Hoff 2011; Ringler et al. 2013).

At present, it is variously referred to as "Nexus thinking" (e.g., Ringler et al. 2013), "Nexus approach" (e.g., Hoff 2011; Allouche et al. 2015), or "Nexus discourse" (e.g., Leese and Meisch 2015; Muller 2015), and appears more as a call than a theory. As noted by Keskinen and colleagues (2016, 3), three dimensions can be derived from the current state of the research: the Nexus appears as an analytical tool, as a governance framework, or as a specific framing of problems. As these dimensions sometimes intertwine in the same study, the approach displays a normative edge when it comes to institutional aspects. Indeed, from a social science perspective, the early literature on the Nexus seems to have confined the analytical part essentially to the material interdependencies across sectors, whereas the governance framework seldom went beyond a prescriptive solution (i.e., "more integration"), thus raising questions as to the motives behind the approach. The present study aims at providing a basis for the analysis of existing governance structures, in order to realistically address the challenges of interdependent resource uses while considering the wider context of power and politics—what some have termed "the political economy" of the Nexus (Allouche et al. 2015).

2.1 Limits of the Nexus

Based on this recent body of knowledge, a number of remarks can be made about the Nexus approach, in the twin hope that it can contribute to its further refinement and provide the reader with a better understanding of the concept itself.

The Nexus across two sectors, understood simply as resources interdependence, is not a recent discovery (Ringler et al. 2013), and some link the concept to work on water use in agriculture as early as the 1980s

(Scott et al. 2015, 17–19). The recent case for the Nexus approach builds on the impressive quantification of (apparently) unrecognized interdependencies across sectors, especially in the water and energy sectors (e.g., Stillwell et al. 2011; Kenney and Wilkinson 2011). However, beyond "hard statistics" (Allouche et al. 2014, 9) the newness of the approach is questioned. The Nexus distinction from integrated water resource management (IWRM) (see Chap. 3) is particularly discussed since they both look at integrating natural resource management (Benson et al. 2015; Allouche et al. 2014; Gyawali 2015). An important difference, however, lies in the supporting logic of the two approaches: where IWRM embraces a logic of cooperation, the Nexus is about resource use efficiency (Ringler et al. 2013, 619). Ringler and colleagues state that while economic incentives may hold the promise of an easier implementation of Nexus solutions, this is by far "not given" since markets are still anchored in their respective sector (2013, 622).

The IWRM and the Nexus calls for integration are wanting in their institutional diagnosis, as the questions of "who does the integration?" and "how?" remain unanswered (Gyawali 2015, 6). This striking absence of actors in the original proposition of the Nexus approach (Hoff 2011) can in my view be traced back to three of its characteristics; namely scarcity, security, and its system level focus.

With the *increasing scarcity* of natural resources, the Nexus provides a compelling narrative to act and adapt the existing institutions governing resources use (Cairns and Krzywoszynska 2016; Hoff 2011). But the conception of scarcity embodied in the Nexus approach rests on a logic of availability—whereby access depends solely on the overall presence of resources (Allouche et al. 2015, 616). It has the effect of framing crises as a future threat (rather than a current issue) and eludes the impact of resource uses and the question of distribution among (evanescent) actors.

As pointed out by Leese and Meisch (2015), the focus on *security* operated by the Nexus discourse has in turn particular effects in terms of issue framing and available solutions. The security frame brings the debate on resource management to the national level and favors an economic reading of problems; with issues defined in aggregated instead of individual access terms, thus evacuating actors.

Part of the appeal of a Nexus approach lies in its resolutely positive outlook towards the identified challenges of resources management, as if they were all manageable (Foran 2015). Indeed, as Hoff (2011, 5) puts it, "[the] focus on […] system efficiency rather than on the productivity of isolated sectors" allows the Nexus to identify possible *aggregate-level solutions* and to provide hints to synergies avoiding wasteful use of water and/or energy resources. Often, the implementation of those "win-win solutions" requires the elimination of a mismatch between the institutional setting and effective use of the resources through a theoretically simple omnibus solution: greater integration (e.g., Bazilian et al. 2011; Olsson 2013; Scott et al. 2011). But institutional reform is seldom simple, and putting the analysis of resource systems and governance systems on a par could perhaps improve the implementation of "nexused" solutions.

2.2 Nexus and Institutions

The Nexus approach clearly points at the institutional setting as a crucial element in tackling issues of sustainability. This is an engaging perspective. In its current state, however, power relations need to be better accounted for (Gallagher et al. 2016). The outlook of the Nexus on institutional silo organization and its evolution with empirical studies is a telling example. Initially seen as an impediment (Hoff 2011; Wallis 2015, 253–257), silos are now increasingly seen as a logical—and to some extent inevitable—development since it correlates with administrative expertise and efficiency (Gallagher et al. 2016; Gyawali 2015, 18). Going against such administrative silos might in the end be neither productive nor feasible. A more detailed analysis of the institutional setting and of the actors' interactions it generates can also reveal what is obstructing change. It is therefore likely to uncover trade-offs across and within sectors (Hussey and Pittock 2012; Pittock et al. 2013). Perhaps the best measure of a successful Nexus approach would be its ability to prevent the adoption of maladaptive policies (Barnett and O'Neill 2010)—policies that in the context of climate change prove detrimental in the long run because they address consequences of environmental change with means that reinforce its causes (see also Pittock et al. 2013).

Despite these prospective research avenues, the approach remains centered on natural resources and provides little tools to apprehend institutional aspects. Hence, most studies have combined the Nexus focus with additional theoretical frameworks. Matthews and Motta (2015) rely on a political economy of the energy sector in China, Cambodia, and Laos to explain the implementation gap between discourse and practice in large-scale hydropower development in the Mekong basin. Villamayor-Tomas et al. (2015) use the Institutional Analysis and Development framework (IAD) to explain the different routes followed by irrigators in four countries. Similarly, methodological articles aimed at implementing a Nexus approach on the ground have followed traditional steps in policy process analysis, albeit with a broader, intersectoral, and transboundary scope (e.g., de Strasser et al. 2016). The present study follows this trend by combining elements of policy process theories (Sabatier and Weible 2014; Knoepfel et al. 2011) and property rights (Gerber et al. 2009).

In sum, a more institutionally savvy Nexus approach would highlight political choices (Gyawali 2015), recognize the role of power politics (Keskinen et al. 2016; Gallagher et al. 2016), and look not only at trade-offs in resource terms but also at how these translate into power and financial consequences.

3 Case Selection and Methods

Keskinen and colleagues (2016) have convincingly argued that the selection of empirical cases has implication for the application of the Nexus approach. In particular, the context of the study will highlight the role of certain actors over others. Given the criticism expressed towards the current state of the Nexus analytical capacity, this section exposes the rationale supporting the cases selected for this research. This chapter is focused on an Energy-Water Nexus, specifically concerned with hydropower and rival instream uses of water, and takes the case of two water strategy plans developed in Switzerland. Each is taken up in turn, before the method is presented.

Despite the attempts at an all-encompassing definition of the Nexus, which is supported by a similar resource dependency across sectors, the

institutional structures of the Food–Water–Energy and Water-Energy Nexuses may be quite different. Indeed, as noted by Allan and colleagues (2015), the former is likely more fragmented with numerous individual food producers, while the latter is generally more centralized with large-scale utilities. Because the Energy-Food interactions are currently limited in the Swiss context, this chapter is focusing on the Energy-Water Nexus.

This choice is further warranted in light of the ongoing policy debates in those two sectors, notably in the face of climate change adaptation and mitigation policies (Hussey et al. 2015). It is therefore subject to a lot of legislative attention, and possibly substantial policy change, with the ever present risk of maladaptive choices—such as a focus on the CO2 emissions of power plants without consideration of their water-related impacts.

As part of this Energy-Water Nexus, the selection of hydropower may at first appear at odds with the Nexus rationale. After all, it is probably the most obvious use of water in energy production—and the added-value of the Nexus is often to *uncover* interdependencies. In this case, the energy generated is a simple function of the amount of water and of the elevation differential (head). And because the water is the very fuel that powers turbines, there seems to be little potential technical gains. So then, what can hydropower bring to a *Water-Energy*[2] Nexus?

There is actually more to a Water-Energy Nexus than the amounts of either water or energy required for the provision of the other. Temperature, variations in flow timing at various scales, sediment load, and ecosystem dynamics—all are qualitative aspects of water that can bring attention to distributional issues, away from a simple logic of availability. Despite the non-consumptive nature of its water use,[3] hydropower is not exempt of adverse effect. Indeed, there is now consensus on a range of hydropower impacts on rivers (Poff et al. 1997; WCD 2000; Postel and Richter 2003). Because these impacts are not purely linked to water quantities, they escape the assumption that system-level optimized efficiency can solve interdependency issues. It brings attention back to actors and requires some elaboration on the issues at stake.

Hydropower and water ecosystems have already been studied as part of the Nexus literature (e.g., Opperman et al. 2011, 2015; Orr et al. 2012; Matthews and Motta 2015; Pittock 2015). This body of work shows that,

indeed, trade-offs are notably present. These trade-offs have so far been mostly expressed in quantitative terms, but what is compelling about them is the unperceived dependency rather than the numbers themselves. Relying solely on numbers entails the risk of putting some values above others simply because they are more easily assessed: measurement possibilities do not apply equally to all resource uses. Hydropower is a case in point, with its direct ties to electric market prices, whereas biodiversity is much harder to monetize (Allouche et al. 2015; Pittock 2015). Synergies, on the other hand, can be found provided broader perspectives and creative solutions are worked out, such as basin-wide studies and changes in ownership of facilities. Hence, in a case study of Maine, USA, Opperman et al. (2011) show that a dam removal inconceivable at the project scale was actually made possible thanks to a scale shift, allowing several dams within the river system to increase power output while some reaches of the water system are restored to natural dynamics. In other cases, hydropower is such a dominant use that its adverse impacts are neither recognized in discourse nor taken into account in project implementation. The Mekong region is an illustration of such financial stakes and power politics at play (Matthews and Motta 2015).

This study of the Nexus focuses on two specific water strategy plans developed in Switzerland, where hydropower is a primary contributor to the electric supply. The Swiss federal state issues framework legislation regarding energy and water protection, but each canton (subnational entity) is in charge of implementation and has its own way of managing water resources. The interest of this study thus lies in the comparison of closely related cantonal processes, which nevertheless resulted in different assessment of water use priorities.

Studying the Nexus in a non-scarce context such as Switzerland highlights the issue of distribution among uses, and forces to move away from a logic of availability. Therefore, it extends the scope of the Nexus approach beyond water-stress-prone regions where problems might be more immediately[4] potent. This seemingly trivial fact, like the non-consumptive character of hydropower, also redirects attention to actors. Moreover, a temporal shift is also effectuated: whereas the Nexus original proposition gives a sense of *future* challenges, distributional issues are in fact already present. The crucial element becomes "who gets what" instead

of an abstract notion of availability. In sum, it gives more room to the political choices involved (see also Keskinen et al. 2016).

This case study also has its restrictions. Because there is limited guidance in the literature as to what would qualify as a "nexused" solution, and because it is empirically difficult to differentiate it from other integrative frameworks, the evaluation of the two water strategies under study as a Nexus case remains tentative. It must also be mentioned that these two examples are largely centered on water, and that they do not cover the full extent of possible "nexused" initiatives in the cantons. They are by no means the only strategy documents developed by the cantonal administrations. They, however, closely look at cross-sectoral dynamics contrary to previously published energy strategies in those cantons (BE 2006; VS 2011).

Looking at the methodological aspects, this analysis is based upon data collected by the author through semi-structured interviews. Interviewees are (or were) involved in water management in cantons of Valais and Bern, as well as at the federal level. Information was also gathered through document analysis, in particular the strategies developed by the cantonal administrations and records of parliamentary debate. The interviews were focused on the development and implementation of the water strategies, as well as the motives that led to their design. The balance between hydropower and landscape or ecosystem values was of particular interest.

4 Energy-Water Nexus in Switzerland

Switzerland stands at the head water of five major rivers in Europe. The Alps in particular receive important precipitations. Available water per capita amounts to 5'100 m^3/year, three times the average of the Organisation for Economic Co-operation and Development (OECD) countries (OECD 2015, 2; OFEV 2012, 21–23). There is thus little water scarcity in Switzerland, albeit some seasonal shortage is locally possible (OFEV 2012, 43–44).

Turning to the energy sector, Switzerland is characterized by the absence of fossil fuel resources on the national territory. The Swiss energy policy landscape is thus dominated by the electricity sector (Kriesi and

Jegen 2001, 256). Hydropower is a central pillar of the national supply, providing 56 percent of the electric generation—another 38 percent being covered by nuclear plants (OFEN 2015).

On the institutional side, Switzerland is a regime of implementation federalism: the federal state issues general framework laws, and the cantons are responsible for the implementation of policies (Knoepfel et al. 2014). This is also true of both the water and energy domains (Sager 2014). Accordingly, the sovereignty over streams and rivers belongs to the cantons (art. 76 al. 4 Cst), which may further devolve responsibilities to lower-level entities. The energy supply is a shared responsibility between the federal and the cantonal states (art. 89 cst), and, apart from nuclear plants regulation, the Confederation only issues framework legislation.

Given this distribution of competencies between cantonal and federal states, the core of the analysis is centered on the cantonal level. A cursory look at the federal landscape of water policy and electric power production can nevertheless give a general sense of the Swiss situation.

4.1 Swiss Water Policy and the Nexus

Water policy has been recognized as the most integrated natural resource policy in Switzerland to date (Knoepfel et al. 2010, 256); in large part because the adverse effects of water exploitation on water stream protection are reflected in the Water Protection Act of 1991.[5] This seems in line with a Nexus approach, with clear statement of the needs of each type of use, the provision of data, and calculation of trade-offs. Indeed, the potential conflicts between hydropower production and minimum instream flows have been at the center stage, with flow needs clearly expressed (art. 31 LEaux) and related costs in energy terms evaluated to 6 percent of the national hydropower generation.[6]

Despite this, implementation of mitigation measures for hydropower's adverse environmental impacts at the cantonal level has been lagging (OFEV 2013). Indeed, the water rights system that allows the exploitation of water power actually grandfathered the provisions of the concessions contracts.[7] In other words, the conditions set in the concessions cannot be modified in their substance by legislation enacted thereafter.

Because water concessions are usually renewed only after eighty years, a transitory regime was put in place (art. 80 LEaux) to partially alleviate impacts, pending the full implementation of minimum flows. Due to the lack of financial compensation, the implementation of this provision has proven difficult (Schweizer 2015). Only recently has the federal court ruled on the issue,[8] stating that the extent of the mitigation should adjust to the economic profitability of each hydropower plant (Largey 2013). Measures must thus reflect economic factors regardless of the ecological condition of particular river stretches.[9] Given the recent evolution of European electricity market prices and the resulting economic downturn of major Swiss electric utilities, the issue is likely to remain controversial until the renewal of hydropower concessions.

Thus a Nexus solution is not yet in place, despite encouraging provisions of the federal law. Recent development in the Swiss energy policy could in fact increase pressure on river environments and the legislative provisions that protect them.

4.2 The Swiss Electric Sector

The Swiss hydropower production is highly fragmented, as each hydropower plant constitutes a distinct company. These *Partnerwerke* are in fact owned by several larger utilities, and their sole purpose is to operate the facilities with the lowest production cost. The generated power is not sold on the market. Rather, each shareholder receives a share of power (instead of money) corresponding to its participation in the venture, which is then either distributed to its customers or sold to other suppliers.

The ownership fragmentation of the sector contrasts with a geographically quite centralized production. The Alpine cantons are the main providers of hydropower, in particular Valais, Graubünden, Ticino, and Bern, which together represent 68 percent (SWV 2015). Furthermore, 90 percent of the power is provided by the larger 10 percent of the plants (SWV 2015). The hydropower potential is already highly developed, with only 10 percent remaining for development—mostly in preserved areas.[10,11]

Recent concerns regarding the availability of water resources for hydropower in light of climate change led to the National Research Program on

water management (PNR61). Its main conclusions are that seasonal change is to be expected, although the overall availability will not be altered until 2050 (SSHL and CHy 2011). Despite these findings and the planned increase of hydropower output as part of the federal energy strategy, a more flexible implementation of the minimum flow provisions is not foreseen.[12]

5 Cantonal Case Studies

How is the current competing use of water for power and for nature being handled at the cantonal level? The cantons of Bern and Valais display differences in the hydropower economy as well as in their administrative organization. They have adopted strategies that more or less closely match the principles enunciated in the Nexus literature, such as the recognition of resources boundaries, the statement of (possible) trade-offs, or a broad consideration of resources users. Each case is presented in turn, and a summary is provided in Table 10.1.

5.1 Bernese Cantonal Context and Water Strategy

Bern is the fifth largest producer of hydropower in the country, providing about 9 percent of the national production. The hydropower sector in Bern is quite centralized in national comparison, with one complex (Kraftwerke Oberhasli—KWO) accounting for 57 percent of the annual production. The KWO is owned in majority by BKW, itself controlled by the canton of Bern (52 percent of the shares). Furthermore, in Bern, the jurisdiction over the rivers and streams rests with the cantonal state, making it the sole authority that grants water power concessions.

Bern has adopted an energy strategy in 2006 and a water strategy in 2010. While the former addresses hydropower as the main domestic contributor to the electric supply and aims at increasing its output, the focus is on production efficiency rather than water resources (BE 2006).

The Bernese water strategy of 2010 encompasses all aspects of *water use* management—but not flood control[13] (BE 2010a, b). The strategy covers the three main fields of drinking water, waste water, and water use. While

Table 10.1 Summary table of Bern and Valais Water Strategies' main characteristics

	Bern 2008–2011	Valais 2012–2013
Context	Cantonal sovereignty over water	Split sovereignty over water (municipalities and cantons)
	Increase in small hydro-applications	Increase in small hydro-applications
	Hydropower as a central actor (19 projects >10 MW, 9% of national production)	Hydropower as the dominant actor (50 projects >10 MW, 27% of national production)
	Canton is a direct and indirect owner of hydroprojects	Overall, canton and communes only hold a slight share of the hydropower fleet
Process	Executive and legislative support	Executive support
	High-level administrative and political involvement	High-level administrative involvement
	Public consultation parallel to the process (Advisory Group)	(limited) public participation in the process (steering committee)
	Jurisdiction mostly split within a single department (Construction, Transportation, Energy Directorate)	Jurisdiction split within and across multiple departments (Economy, Energy, Territory/Transportation, Equipment, Environment/ Education and Security)
	Iterative process (every 5 years)	One shot action (although legislative work should follow)
	Moratorium on concession grants	–
Content	Scope: drinking water, waste water, uses of water	Scope: broad inclusion of all aspects (education, drinking water, floods, energy, ecosystems, data management)
	Not fully integrated	
	Administratively mandatory content	Programmatic
	Ranking of priorities	Partial ranking of priorities
	Territorial planning (map), with exclusion zones	No a priori exclusion zone
	Sets production goals (+300 GWh/year in 2035)	–
	Sets size limit of >300 kW	–
	Target: water users	Target not defined
	Rationale: "Trade-offs are inevitable"	Rationale: "All uses must be satisfied"

Source: Authors own compilation from interviews, COPIL (2013), and BE (2010b)

the two first domains already had planning documents, which were mostly left unchanged, the real novelty comes for the water use domain. The central aspect with regard to energy production is its study of the hydropower potential left for development in the whole canton. A map was issued that clearly lays out the stretches of rivers that are protected from further development and those that may be developed. This instrument is the focus of the attention in this section as it materializes the trade-offs between water uses and ecosystem protection.

5.2 The Water Strategy Process (BE)

The impetus for the water strategy can be found in a reform of the administrative structure within the Directorate for Public Works, Transportation and Energy in 2006–2007. Staff turnover was the main opportunity leading to the merging of the Office of Water Protection and Waste Management, and the Office of Water Management (AWA) and a new head of office was appointed.[14]

One central concern for the administration at the time was the indication that the number of applications for the federal electric feed-in tariff subsidies (KEV)[15] were substantially growing—the cantonal administration in charge of concession grants would soon have to review close to 100 project proposals, far exceeding its staff capacity. A small-scale project was developed to see what could be done for a given sub-watershed (Lutschine river), before the process was extended to the whole canton.[16]

The administration started developing the water strategy in 2008, supported by both the executive and the legislative through a motion.[17] A task force was formed within the administrative section and worked in close collaboration with other offices as well. The office in charge of water uses (AWA) was leading the project and coordinated in particular with the Office of Energy and Environmental Coordination (AUE) as well as the Fisheries Inspectorate (FI). Monthly reporting was established with the head of the Directorate for Public Works, Transportation and Energy of which the AWA is part.

The project also involved an advisory group with invited parties such as environmental nongovernmental organizations (NGO)s, energy

producers, fishers associations, and local communities. The advisory group was presided by the same head of the Directorate (member of the cantonal executive) and held three meetings during the process (2008–2010). In 2009, the cantonal executive established a moratorium on new concession grants to allow for a consistent implementation of the strategy.[18,19]

The final decision on the water strategy was taken by the cantonal parliament in March 2011, with each part subject to a separate vote (drinking water, water treatment, and water use). Water use was accepted with eighty-nine votes in favor and forty-four against. The other components were unanimously accepted.[20]

5.3 Central Features of the Water Use Strategy

The water use strategy is particularly interesting because it lays out very clearly the trade-offs between the various use sectors. The outlook of the strategy is that "[…] water users must accept that some waters will not be exploited, and representative of water protection interest must tolerate the systematic use of some river stretch" (BE 2010b, 18).[21]

Following the adoption of the strategy, the administration can no longer grant concession for project of less than 300 kW capacity.[22] These are the most numerous projects but contribute only a minimal amount of power (roughly 1 percent) and still have important environmental impacts (BE 2010b). Despite this limitation on the development of hydropower, the strategy calls for an increase of 300 GWh/year in cantonal generation by 2035. This objective is in line with the energy strategy of 2006, which aims at increasing domestic and renewable electric supply, and in accordance with the aims of the federal energy strategy. Indeed, the figure roughly corresponds to 10 percent of the expected national increase in hydropower generation and matches the current cantonal contribution.[23]

The map reproduced in Fig. 10.1 is a new instrument brought by the water use strategy. It is a tool summarizing the balancing decisions made by the administration with regard to the conflicting uses (and protection) of water. The strategy is also straightforward in recognizing the many trade-offs existing among users (BE 2010b, 14). The factors used to build

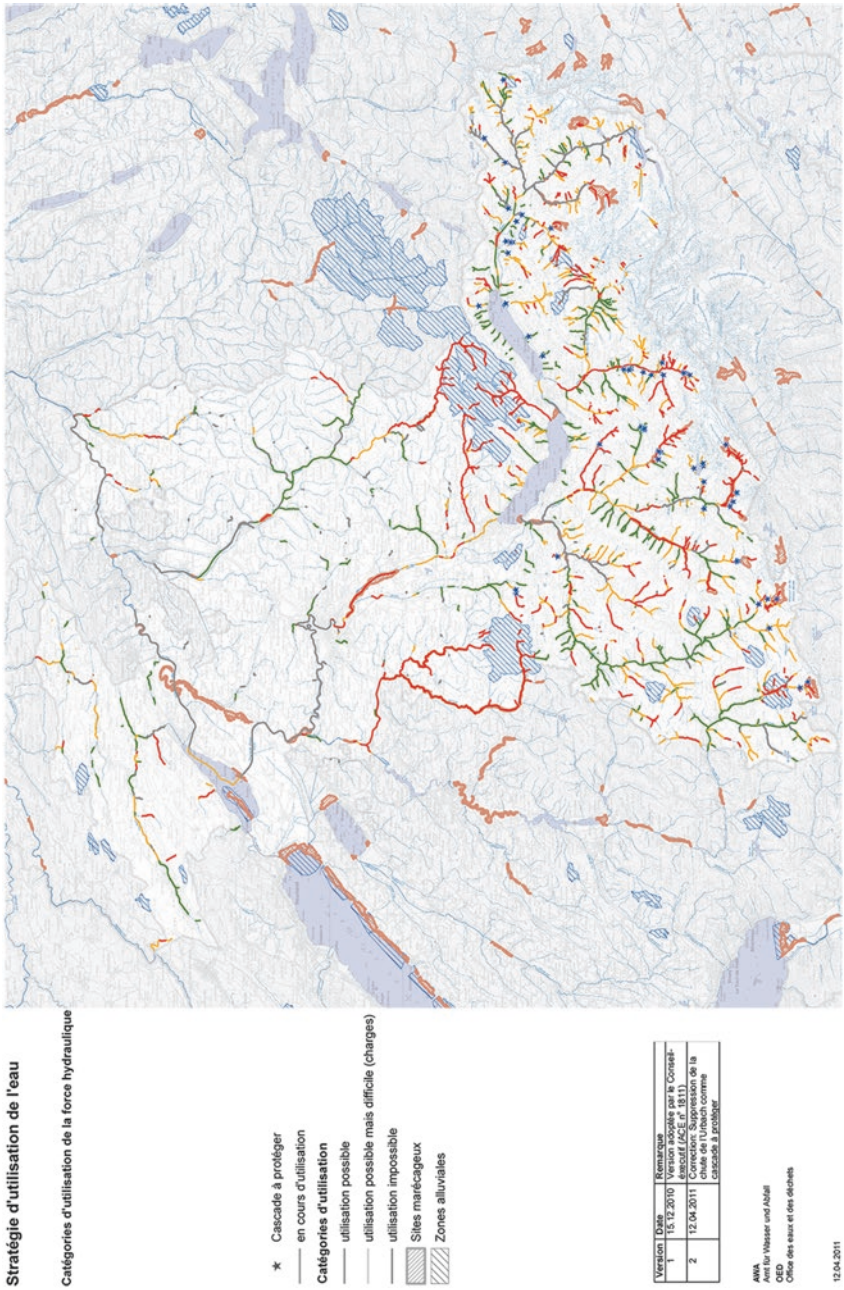

Fig. 10.1 Map of river streams available for power development, Canton Bern. (Source: BE (2010b))

the map are not laid out in details in the accompanying text of the water strategy, but they include fishing and scenic (landscape) as well as ecosystem considerations. In particular, the federal legislation on moorlands and alluvial zones is very clear and provides increased protection from water development.[24] Importantly, the objective of a 300 GWh yearly increase was set after the map was developed, making a change of targets unlikely without a complete revision of the strategy.[25] Even though the strategy is not a legislative act, it is mandatory for the administration and must be updated every five years (BE 2010a).[26]

As shown in Fig. 10.1, the number of green stretches where development is theoretically admissible is quite reduced. Many of the stretches still available for development would actually not allow to meet the 300 kW threshold and are therefore also unlikely to be developed. While the strategy and its map help avoid a number of applications for non-viable projects, those that are proposed for available stretches are not necessarily accepted. In the words of the current head of the AWA: "The red stretches, [for them] all services have accepted that there will not be new installations. But the green ones, we start as before the strategy with discussions [with all services]. It does not help us."[27] This is corroborated by the representative of the cantonal main operator who was clearly not satisfied with the consultation process and especially with the establishment of a temporary moratorium on new concessions. In the end, he finds the strategy has only limited the ability to propose projects while not easing in any way the application process, still mired with oppositions.[28]

5.4 Energy-Water Nexus in Bern

The water use strategy closely matches the principle of a Nexus approach with its adamant recognition of trade-offs between a diversity of uses, its broad territorial planning, and its iterative process.

The map in particular is a transparent indication of the areas where power development is allowed or not. It embodies the trade-off decisions made by the state, where it deemed preferable to limit development to protect values such as landscape and ecosystem, in spite of its objective to increase power production. It should be noted that while the decisions are

new, the factors and legislation upon which they rest are not. And it does nevertheless change the process: whereas previously any application for a water-power concession would have had to be considered by the administration, applications that do not stand a chance are now prevented.

Its significance is further reinforced by the consideration that the water strategy is regarded as a blueprint in neighboring canton Valais,[29] and the advanced planning process for power generation is taken up by the federal energy strategy. Both the result and its effects, but the reasons that led to its adoption as well, are of interest in the Nexus perspective, as it may explain resistances to its adoption (Table 10.1).

5.5 Valais Cantonal Context

Valais is the leading canton in hydropower production thanks to its location in the Swiss Alps, providing 27 percent of the national output. The ownership of large facilities is fragmented, and many companies are involved in the fifty projects above 10 MW located in the canton (VS 2011). The cantonal and municipal authorities control only 20 percent of the hydropower production on their territory.

Valais is also particular for its constitutional allocation of water jurisdiction: the cantonal state only has jurisdiction over the main river, the Rhône, and the part of the Lake Geneva that is within its borders. The local authorities (municipalities) have sovereignty over the tributaries to the Rhône. These later actors are also entitled to the royalties paid annually for the use of the water power (Tonka 2015, 543). The project sponsors must consequently secure the water rights from as many communes as the water courses they intend to use flow through, each commune being theoretically free to enter into contract with any company (Fig. 10.2).

The canton of Valais has recently launched a series of working groups to devise its water and energy policies. One group was mostly focused on the forthcoming water concessions' end, which provides an opportunity for the cantonal state as well as the communes to increase their ownership of hydropower projects (VS 2011). Another group, on which this research focuses, is more broadly concerned with the elaboration of a water strategy, encompassing all aspects of water management (COPIL 2013).

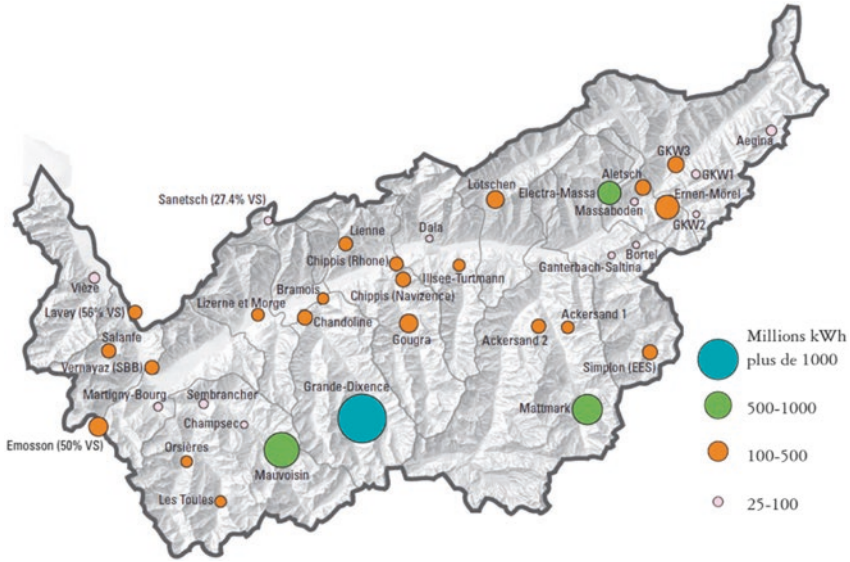

Fig. 10.2 Map of canton Valais with hydropower plants >25 MW (Source: VS (2011, 21))

This later endeavor is partly inspired by the strategy realized in neighboring canton of Bern.[30,31]

5.6 Valais Water Strategy Process

The development of the water strategy in Valais is the latest, broadest and so far most successful endeavor in a series of similar attempts.[32] The impetus came with the observation that water issues were dealt with by a number of services within the administration, making it difficult to adequately address requests for information—even for internal purposes.[33,34,35] A taskforce at the operational level therefore studied the possibility of grouping all competencies in one platform.[36,37,38,39] Later, as the location of this competence center within the administration and the possible associated changes in resources and responsibilities proved to be an issue, the cantonal executive decided to broaden the scope of analysis and to devise a more encompassing strategy for the management of water.[40,41]

The process implied a series of three meetings in 2012 and 2013 with a diversity of interests, including the heads of administrative services dealing with water, the secretaries of the three concerned departments, the president of the cantonal power company, as well as environmental interests[42] (COPIL 2013). The involvement of high-level administrative staff was important in keeping everyone at the discussion table. The resulting strategy is not mandatory despite its adoption by the executive in December 2013, but it paves the way for future legislative work.

5.7 Valais Water Strategy's Main Features

The water strategy is very broad in scope as it touches upon many water-related issues, from information, education and research, to natural risk disaster, and water uses (COPIL 2013). The strategy sets overarching priorities in dealing with water, making drinking water the number-one priority, protection of the resource (i.e., from pollution) and protection from water (i.e., floods control) come second, and water uses are last.

The strategy does not expressly rank water uses nor does it fully integrates the separate SWOT analysis presented (COPIL 2013, 21). The tables display each sectoral use analysis, with surprising asymmetries among their assessment of interactions with other water uses. For instance, energy production is mainly focused on hydropower. The energy market and legislative aspects are identified as the main threats and opportunities, with little or no mention of other water uses. In contrast, the protection of ecosystems mentions the impacts of hydropower and flood control structures, as well as micro-pollutants as conflicting elements (COPIL 2013, 11–41).

The strategy does not exclude any stretch of river from development. The decisions regarding small hydroprojects are individually put in balance with their financial and environmental costs.[43] Such projects, which are popular with communal authorities, are not subject to a moratorium but the cantonal services do not encourage them in light of their small contribution and comparatively sizeable ecological impacts. Small hydro-applications have had an overloading effect on the administration in Valais as well, but the aim of the strategy was never to stop their increase.[44]

5.8 Energy-Water Nexus in Valais

The Valais water strategy is very programmatic and seems not to carry much power as the document leaves future actions to be completed later on through legislative development (COPIL 2013, 25–55). A striking element is the development-oriented notion that "all users should dispose of water in appropriate quantity and quality to carry out their activity" (COPIL 2013, 20, 56). Trade-offs are not clearly stated, and remain latent threats rather than actual or pressing issues (COPIL 2013, 11–19). Because a new cantonal water legislation is expected, no revision of the strategy is foreseen. While the overarching priorities stated in the document may seem obvious to many, as the president of the advisory group reportedly put it "[…] In Valais, until today, when we spoke about water, one thought mostly about [hydropower] dams…" (Parvex 2014).

In Nexus terms, the Valais water strategy seems not to have taken the limits of the resource into account. While it certainly improves the recognition of uses, it falls short of articulating them in a clear priority order.

6 Discussion

The strategies studied in this chapter do not exhaust the full range of instruments put in place to balance hydropower and ecosystem or landscape values. Indeed, as the latter two have taken more importance in societal and political debates, so has the regulation. All instruments do not point in the same direction. Localized arrangements can allow a more intensive exploitation of a river provided another part of the watershed receives a greater protection.[45] Non-development zones voluntarily designated can lead to financial compensation,[46] albeit the revenue is less than what power use would generate. Hydropower is excluded from some areas to protect their scenic or biodiversity values.[47] And in some places, hydropower revenue contributes to stream revitalization. The Bernese water strategy encompasses some of these measures, but not all of them.

The water strategy in Bern is the closest to a Nexus approach, with its mandatory, clear-cut, trade-off decisions. It is nevertheless limited in scope: to the extent that it alters the balance between water power and ecosystem protection, it only concerns small hydropower. As noted in the background to the case study, the potential for hydropower is largely tapped through major hydroprojects that will not be affected by these water strategies in the immediate future.

Other venues are currently engaged in balancing the relative place given to hydropower and river ecosystems and landscapes; with potentially further reaching consequences. At the federal level, in the discussions on the energy strategy of 2050, the parliament has so far made a similar choice between small and large projects. It accepted to grant renewable energy projects a status of national interest, opening the way to easier authorization renewals of large projects located in protected scenic areas (IFP/BLN). It also proposed to suppress support for new hydroprojects below 1 MW capacity in the feed-in tariff subsidy program and conversely adopted the principle of a financial support for large hydroprojects in light of their difficult financial situation (OFEN 2016). At the cantonal level in Bern, a reduction of the water royalty has been accepted in parliament for plants above 10 MW. This differentiated treatment of small and large projects is not surprising given the major interests at play and the large consensus among power companies, federal MPs, and environmental groups. They all regard small-size projects on relatively minor and pristine river streams to be counter-productive.[48,49,50]

This broader vision is perhaps an example of what Gallagher et al. (2016) call for: to follow the hegemon—the dominant player—may after all bring progress, even if every interest is not considered on an equal footing. Similarly, the 2011 inclusion of constructive mitigation measures paid for by every final electricity costumer in the federal water protection legislation illustrates the apt statement of these authors that "[…] someone pays the balance […] in one form or another" (Gallagher et al. 2016, 3). Much of the hydropower development was done with little consideration for the environment—giving it a seat at the table today requires some degree of sacrifice from someone else.

7 Conclusion

This chapter started out with a review of the Nexus approach and raised some issues with its definition, especially the entanglement of resource-flow analysis, prescriptive governance solutions, and specific framing of discourse (Keskinen et al. 2016). It proposed to focus the analysis more on the institutional setting—without normative statement—by bringing actors back to the foreground. The empirical choice of hydropower and values affected by its development as well as the location of case studies in a non-water-scarce region provided the opportunity to do so.

As with any integrative framework, the questions of "who should do the integration?" and "how?" were raised (Gyawali 2015). With the Nexus literature providing little guidance to identify nexused governance cases, this study takes a resource interdependency issue and identifies how clearly the policy design dealt with trade-offs. This chapter showed that the state and particularly the different components of the administration are central actors as they can influence the priority-order of existing rules and foster a more or less coherent implementation of scattered legislative provisions. In this respect, the Swiss case in general is a useful reminder that the analysis cannot stop at legislative principles but must turn to actual practices.

The empirical analysis brings attention to the context of decision, the process that led to the adoption of the policy, as well as its reach—the extent to which it alters the previous situation. The results show that the motives of the strategy development are contingent on internal factors to the administration. In one case (Bern), the incentives created in the energy sector are clearly at the origin of the water strategy development, whereas in the other (Valais) the fragmentation of water jurisdiction proved too complex to manage. High-level involvement was necessary to carry out reforms in both cases, and large participation seems to have limited the scope of the decisions. In terms of the extent of the strategy, contextual factors appear to weight particularly strongly. Property rights over water are determining from the outset the reach that can be expected. Furthermore, some degree of control over the main operators of large

hydropower seem to allow more political room for maneuver. Yet it should be stressed that central interests are not directly hurt in the balancing act.

This case study is based on strategies of cantonal administration to implement preexisting rules, which somewhat limits the changes that they can be expected to make. The development of the two strategies shows that some room for decision-making exists even in the absence of major modifications of overarching principles. As was noted in the case of Bern, the strategy operates a change in the scale at which the various uses are balanced and in the timing of this decision: from a case-by-case, haphazard basis, to a preemptive canton-wide planning. This required no legislative change; the existing provisions of the laws that apply are simply weighted in advance. In Valais, the water strategy awaits the passage of new legislation to actually alter the administrative practice. It is further limited by the shared jurisdiction over water, enshrined in the cantonal constitution. In the absence of strong external shocks or chronic resource stress, these strategies already represent a surprisingly successful, if limited, move towards a more "nexused" solution to energy and water management.

The Nexus appears as an ambiguous approach. Rooted in material interdependencies across sectors, it stresses the limits of resources availability only to push them further—literally to do more with less. Embedded in its conception of resource use efficiency are principles that tend to eclipse actors and their motives to favor system- and aggregate-level technical analysis. And yet, what emerges is the deeply political nature of trade-off choices. Despite the risks associated with such quantification and its objectivity claim, the Nexus remains intuitively appealing in its evocation of interdependent resources and their common management.

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Notes

1. The term is borrowed from Gyawali (2015).
2. A food-energy or land-energy nexus would likely show unexpected impacts of hydropower plants, as in the 2012 study of Mekong's hydro-developments' consequences on fish and local people's diet by Orr et al. (2012)
3. The consumptive part of water use by hydropower plants is linked to evaporation and therefore varies with the surrounding climate of each project (Opperman et al. 2015, 86).
4. The shift is also temporal: as noted in the theory section, the Nexus initial proposition gives a sense of *future* challenges, whereas in fact distributional issues are already present.
5. RS 814.2 Loi fédérale sur la protection des eaux du 24 janvier 1991 (LEaux).
6. Equivalent to 2000 GWh/year. Mo Speck 03.3096. Loi sur la protection des eaux. Révision. Conseil national. 20 mars 2003. It. Teuscher. 03.3158. les disposition relatives au débit résidel remplissent-elles leur rôle? Conseil National. 21 mars 2003.
7. Concessions grant exclusive use rights on a given amount of water. They are devised according to the Water Right Legislation (RS 721.8 Loi fédérale sur l'utilisation des forces hydrauliques, LFH). See Reynard et al. (2000) for a distinction between license, permit, and concessions.
8. Arrêt du Tribunal fédéral 1C_262/2011 du 15 novembre 2012, Misoxer Kraftwerke AG.
9. Interview with the scientific officer at the Energy and Water Power Office and acting Chairman of the Water Strategy taskforce, Canton du Valais/Sion, Switzerland/4 April 2014.
10. Interview with the executive director of the Schweizerische Wasserwirtschaftsverband (SWV) (Swiss Water Use Association)/Baden, Switzerland/26 September 2013.
11. Interview with the project manager for Water Protection and Energy policies at ProNatura/Basel, Switzerland/26 September 2013.
12. Interview with the head of Hydropower and Water Remediation Section, Water Division, Federal Office of the Environment (OFEV)/Bern, Switzerland/24 October 2013.
13. Interview with the former head of the Water Use Division and then project manager of the Water Use Strategy development, Office of Water and Waste, Canton de Berne/Bern, Switzerland/8 January 2014. Flood protection was left out of the process because of conflicts within the administration.

14. Interview with the former head of the Water Use Division and then project manager of the Water Use Strategy development, Office of Water and Waste, Canton de Berne/Bern, Switzerland/8 January 2014.
15. The feed-in tariff subsidies or *Kostendeckende Einspeisevergütung* (KEV) are the main federal measure encouraging development of new renewable energy (small hydro, wind, solar, biomass, geothermal). It guarantees a fixed price for the producer over a period of twenty to twenty-five years that allows the deployment of otherwise uneconomical projects. Feed-in tariffs vary with each technology. For small hydropower, only projects of 10 MW or less are eligible. (www.stiftung-kev.ch)
16. Interview with the former head of the Water Use Division and then project manager of the Water Use Strategy development, Office of Water and Waste, Canton de Berne/Bern, Switzerland/8 January 2014.
17. Motion Kipfer, M 222/2008, "stratégie de l'eau." Grand-Conseil, Berne. The motion is centered on drinking water, but the government supported the adoption of this proposal because of the development of the strategy already under way.
18. Interview with the former head of the Water Use Division and then project manager of the Water Use Strategy development, Office of Water and Waste, Canton de Berne/Bern, Switzerland/8 January 2014.
19. Interview with the head of Hydroelectric Power Division, BKW/ Fribourg, Switzerland/23 November 2013.
20. http://www.gr.be.ch/gr/de/index/sessionen/sessionen/sessionen_2011/april-session_2011/sessionsprogrammmaerzsession.html [accessed 16 May 2016]
21. Author's own translation for all interview and administrative documents material presented.
22. Exceptions are possible for conduit projects and in remote areas (BE 2010b, 18)
23. Interview with the current head of the Water Use Division, Office of Water and Waste, Canton de Berne/Bern, Switzerland/8 January 2014.
24. Interview with the former head of the Water Use Division and then project manager of the Water Use Strategy development, Office of Water and Waste, Canton de Berne/Bern, Switzerland/8 January 2014.
25. Interview with the former head of the Water Use Division and then project manager of the Water Use Strategy development, Office of Water and Waste, Canton de Berne/Bern, Switzerland/8 January 2014.
26. Interview with the former head of the Water Use Division and then project manager of the Water Use Strategy development, Office of Water and Waste, Canton de Berne/Bern, Switzerland/8 January 2014.

27. Interview with the former head of the Water Use Division and then project manager of the Water Use Strategy development, Office of Water and Waste, Canton de Berne/Bern, Switzerland/8 January 2014.
28. Interview with the head of Hydroelectric Power Division, BKW/ Fribourg, Switzerland/23 November 2013.
29. Interview with the consultant and scientific advisor to the Water Energy Steering Committee of the Canton du Valais / Bern, Switzerland/14 March 2014.
30. Interview with the consultant and scientific advisor to the Water Energy Steering Committee of the Canton du Valais/Bern, Switzerland/14 March 2014.
31. Interview with the head of Natural Disaster Section and chairman of the Water Strategy taskforce, Office of Forestry and Landscape, Canton du Valais/Sion, Switzerland/19 December 2013.
32. Interview with the head of the Water Protection Section, Office of Environmental Protection, Canton du Valais/Sion, Switzerland/24 March 2014.
33. Interview with the consultant and scientific advisor to the Water Energy Steering Committee of the Canton du Valais/Bern, Switzerland/14 March 2014.
34. Interview with the head of the Water Protection Section, Office of Environmental Protection, Canton du Valais/Sion, Switzerland/24 March 2014.
35. Interview with the scientific officer at the Energy and Water Power Office and acting chairman of the Water Strategy taskforce, Canton du Valais/Sion, Switzerland/4 April 2014.
36. Interview with the head of Natural Disaster Section and Chairman of the Water Strategy task-force, Office of Forestry and Landscape, Canton du Valais/Sion, Switzerland/19 December 2013.
37. Interview with the head of the Water Protection Section, Office of Environmental Protection, Canton du Valais/Sion, Switzerland/24 March 2014.
38. Interview with the scientific officer at the Energy and Water Power Office and acting chairman of the Water Strategy taskforce, Canton du Valais/Sion, Switzerland/ 4 April 2014.
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40. Interview with the head of the Water Protection Section, Office of Environmental Protection, Canton du Valais/Sion, Switzerland/24 March 2014.
41. Interview with the scientific officer at the Energy and Water Power Office and acting chairman of the Water Strategy taskforce, Canton du Valais/Sion, Switzerland/4 April 2014.
42. Interview with the scientific officer at the Energy and Water Power Office and acting chairman of the Water Strategy taskforce, Canton du Valais/Sion, Switzerland/4 April 2014.
43. Interview with the scientific officer at the Energy and Water Power Office and acting chairman of the Water Strategy taskforce, Canton du Valais/Sion, Switzerland/4 April 2014.
44. Interview with the head of the Water Protection Section, Office of Environmental Protection, Canton du Valais/Sion, Switzerland/24 March 2014.
45. Schutz- und Nutzungsplanung, Art. 32, let c. LEaux.
46. RS 721.821 Ordonnance sur la compensation des pertes subies dans l'utilisation de la force hydraulique du 25 Octobre 1995.
47. Federal Landscape Inventory (IFP/BLN) does not currently allow development of hydropower projects (OFEN 2012, 6)
48. Interview with the scientific officer at the Energy and Water Power Office and acting Chairman of the Water Strategy task-force, Canton du Valais/Sion, Switzerland/4 April 2014.
49. Interview with the executive director of the Schweizerische Wasserwirtschaftsverband (SWV) (Swiss Water Use Association)/Baden, Switzerland/26 September 2013.
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Luc Tonka holds a MA in political science from the University of Geneva. His research focus is on the balance set in policy between hydropower and in-stream values in Switzerland and the United States. He is currently a scientific collaborator at the University of Geneva and a researcher at the University of Lausanne (IDHEAP).

11

From the Promises of International Water Management Trends to the Reality of Policies and Practices: Some Conclusive Thoughts

Rémi Schweizer and Christian Bréthaut

It is widely recognized that water management has been influenced by certain trends developed at the international level. In fact, during the last few decades, the water research and the practitioner communities have exceled at co-developing innovative ideas to address persistent situations of water crises. From integrated water resource management (IWRM, see GWP 2000a; Hering and Ingold 2012) to adaptive water governance (Huitema et al. 2009), from water security (GWP 2000b) to the Nexus (Waughray 2011), multiple alternative approaches have been proposed to

R. Schweizer (✉)
Natural Resource Policy Group (NARP), Swiss Federal Institute of Technology (ETH), Zürich, Switzerland

C. Bréthaut
Geneva Water Hub, UNESCO Chair in Hydropolitics, Institute for Environmental Sciences, University of Geneva, Geneva, Switzerland

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govern water resources. All in all, the more integrated, adaptive or cooperative nature of these new modes of governance, the greater the claim that they can handle the wicked, uncertain and changing nature of environmental and social pressures on water. Bäckstrand et al. (2010) refer to these normative assumptions as "the promise of new modes of governance."

Setting objectives and suggesting pathways to achieve more sustainable or resilient water use, these different approaches are referred to as *international water management trends* in the present volume. They qualify as *international* because they are globally promoted and are seen as easily transferable from one place to another, and as *trends* because they have gained momentum, leading to lively policy and academic debates. They gather strong networks of actors, forming heterogeneous communities where researchers and policymakers, but also non-governmental and corporate actors, interact (and sometimes compete) around the definition of shared visions regarding problems and possible solutions.

These trends are expressed in discourses, principles and best practices, but also in frameworks with a more analytical nature. By doing so, they convey both an analytical dimension—providing conceptual tools to make sense of the social reality—as well as a strongly normative standpoint—stating the direction this social reality should evolve. This dual nature—normative and analytical—is not so clear-cut and both dimensions interact and nourish each other. They even have, in some cases, become conflated, providing "a framework, which lends itself to a 'vision', which is normatively goal-oriented" (Cook and Bakker 2012, 98 about water security).

A number of publications critically explore the origins, interplays and shortcomings of these management trends—from IWRM (Biswas 2008; Petit 2016) to water security (Cook and Bakker 2012; Zeitoun et al. 2016) or the Nexus (Allouche et al. 2014; Benson et al. 2015). Among other things, the following key aspects have been question: their novelty (are they really new or do they represent old wine in new bottles?); their ability to be implemented (to what extent do they structure real-world policies and practices?); and their ability to improve our understanding of the real world (to what extent can they lead to indicators and criteria to assess the empirical reality?).

With this volume, our intention was to contribute to such endeavours. More precisely, we have asked the authors to combine theoretical and conceptual inquiry of water management trends (how things are supposed to be according to them) with reflexive and empirical investigations of how things are observed in the real world, respectively of how these trends are helpful to make sense of empirical reality. This strategy was inspired by a general intuition: the things that are called for do not always correspond to what can be observed in reality. Evidence of this can be found in a number of schools of thought that emphasize the complex pathways between what is designed or thought at a higher level and what actually happens on the ground. International (Bernstein and Cashore 2012) and domestic (Hill and Hupe 2014) implementation studies, as well as cognitive approaches focusing on discourses and ideas (Molle 2008), have shown interest in such questions, demonstrating the discrepancies that can result from implementation or transcoding processes.

Starting from these premises, this book transcends the compartmentalized perspectives that usually predominate through a collection of contributions that cuts across management trends. The central aim is to critically scrutinize the "promise" of these trends around three research questions:

1. *The nature of international water management trends*. We wanted to explore the normative and analytical assumptions that these trends entail, as well as the way they are based on scientific knowledge, represent the expression of an ideological project in the long run or remain an evanescent—but influential—fad.
2. *Their analytical potential*. We wanted to assess their analytic and explicative power and, on this basis, build recommendations for water research as well as for practitioners, policy- and decision-makers that are confronted with such trends in their everyday practice.
3. *The diversity of their real-world transposition*. We wanted to assess the extent to which these often abstractly formulated trends influence domestic policymaking, the (sometimes unintended) consequences their implementation reveals, and the perceptions that actors have of them.

The nine chapters—each focusing on a specific management trend: local community governance (LCG), IWRM, transboundary water management, multi-level governance (MLG), water privatization, market-based instruments (MBIs), climate change adaptation, water security, and the Water-Energy Nexus—are the result of these endeavours. They represent a heterogeneous collection of contributions coming from diverse disciplinary backgrounds (political science, economics, political geography) and diverse ontological and methodological approaches, revolving around Switzerland as a "laboratory" for studying international water management trends—with the mirroring case of Ecuador in Chap. 5, which reminds us of the risk of cultural bias. The authors were left a great deal of autonomy in the preparation of their chapters, and the book truly benefited from the variety of their perspectives.

In this concluding chapter, we discuss the lessons that can be drawn from these contributions with regards to the research questions outlined earlier. Of course, the limited number and the heterogeneity of the chapters, as well as the narrow focus on Switzerland, do not allow for any definitive and comprehensive answers. Some key concepts (e.g., resilience) and instruments (e.g., payments for ecosystem services) are not or are only peripherally addressed, and most of the contributions cover only specific aspects of the trends they are concerned about. Their strong theoretical foundations and sound empirical analyses allow us, nonetheless, to draw some general conclusions and to highlight some future research avenues.

We proceed in three steps. In the first part, we propose a way of organizing international water management trends around a series of narratives that emphasize the need of a governance shift and hold the promise of more sustainable water governance. The second part highlights the analytical limits that the trends generally convey (normative fuzziness, polysemy in practice and difficulties of measurement), questioning their capacity to produce informed recommendations for policymaking. In the third part, international management trends are assimilated to global norms whose linear transcoding may be disrupted by three sets of domestic variables: domestic institutional regimes, policy structures and political games. This leads us to conclude, in a last part, with a plea for social science-based analyses of water management trends in order to produce a better-informed understanding of these institutional, political and social dimensions that may disturb rational problem-solving.

1 Narratives, Nirvanas and Water Management Trends

The international water management trends explored throughout this volume appear quite diverse. In the different chapters, the authors qualify these trends here as global norms (Chap. 8) or nirvana concepts (Chaps. 3 and 9), there as mobilizing banners (Chap. 2) or buzz words (Chap. 10). Their interplay is also divergently perceived. Some seem to be complementary or embedded within each other: Chap. 9 emphasizes the potential benefits of adaptive governance for water security, while local community governance (LCG) calls for a decentralization that is also often associated with IWRM. Conversely, other trends are built in opposition or at least in answer to each another: LCG and privatization represent alternative modes of governance; the Nexus is generally seen as calling for an even greater integration (including stakes that go beyond the water sector) than IWRM (which takes water as its unique entry point); and adaptive governance emphasizes adaptation over integration.

In this section, we take a step back and put this heterogeneous overview in perspective. By doing so, we go beyond the explicit content of each chapter and provide a subjective reading of what can be, in our view, read between the lines. Our thesis revolves around the idea that the nine water management trends are structured around a series of four "narratives" that act as crucial common ties. These narratives give them sense, emphasizing their anchoring in nirvanas ("*an ideal image of what the world should tend to*," Molle 2008, 132) that permeate policy debates.

1.1 The Power of "Narratives"

International water management trends are, and this is perhaps their most obvious common tie, all embedded within the sustainability realm. Popularized in 1987 by the Brundtland report and recognized as a global principle by the United Nations five years later (Rio Conference in 1992), the notion has been widely used ever since. The water research and practitioner community embraced it as a new policy paradigm, i.e., as a global

framework of ideas according to which the nature of problems is interpreted and solutions are designed (to follow Hall's 1993 definition). The (apparent) simplicity and all-encompassing nature of the notion carries out a semantic attractiveness, well-illustrated by the fact that all chapters refer, more or less explicitly, to sustainability-related stakes (see index).

The narratives that structure the trends explored in this volume consist of storylines that help providing a logical interpretation of social reality and, as such, contribute to legitimize political action (Roe 1991; Swift 1996). Some of these storylines are sustained by scientific theories (e.g., the Theory of the Commons), while others have been developed firstly as an answer to practical and empirical concerns (in particular in the case of IWRM, water security or the Nexus). Often self-validating even if they stem from well-established theories (Molle 2008), these narratives rely on reduced and distorted images providing evidence and standards of action. In other words, they serve as simplifications that symbolically condense facts and values (Fischer 2003) in order to make sense of complex situations that could otherwise instill policy paralysis (Shanahan 2012).

An example of a narrative that is embedded in scientific research can be found in the case of local community governance, with the *homogeneous community* storyline. As shown in Chap. 2, one can argue that it embodies a simplistic representation of reality based upon a romanticized and depoliticized image of agro-pastoral communities. Conceived as an answer to the "Tragedy of the Commons" popularized by Hardin (1968), or as an alternative to a storyline advocating the privatization of water resources (what we will call the *water pricing* storyline), the story emphasizes the capacity of individual resource users to form a community within which solidarity, traditions and/or endogenous systems of rights are crucial in preserving and providing water to the community members. This narrative is rooted in the Theory of the Commons (Ostrom 1990), and research strongly contributed to shape its formulation. It has been highly theorized and reflected upon and led to strong normative perspectives on how natural resources should be governed (showing how analytical and normative dimensions can become conflated).

We argue that such narratives are essential in building, diffusing and maintaining international water management trends. Their ostensible

evidence, anchored in common sense, has a strong gathering power (Lejano et al. 2013) and plays a crucial role in explaining the robustness and the wide diffusion of these trends. In clearer words, the approaches explored in this volume qualify as "trends" precisely because they rely on strong narratives. These trends have, at some point, gained momentum (Elinor Ostrom received, for instance, the Nobel prize of economics in 2009), generating a pervasive consensus among researchers and practitioners, leading to the implication of major actors (such as the World Bank, for example) and to the production of a vast array of publications, white papers or best practices.

This proliferation of content develops, nourishes and sustains the narratives while simultaneously being legitimized by them. This process, supported by specific goals and agendas, evolves in a closed circle that is hard to break. Although some of these trends are supposed to be out of fashion or have been challenged by more recent ones (this is the case of IWRM), they generally remain rather robust in influencing management practices and policy systems, illustrating the capacity of certain actors to define what should be the norm.

1.2 Four Narratives and Nirvanas of International Water Management Trends

The narratives implicitly or explicitly found throughout the volume are summarized in Table 11.1. They confirm the unanimity with which water management trends recognize that the most persistent obstacles to sustainable water uses are governance related. In the words of Pahl-Wostl et al. (2012, 24), many problems that these trends pretend to solve can "be attributed to governance failures rather than the condition of the resource base itself." More precisely, each narrative is based on a negative storyline emphasizing a pitfall, a current water governance failure, as well as on a mirroring positive storyline providing a logical solution: the *homogeneous community* storyline answers to the *Anti-Leviathan* narrative; the *functional fit* to the *misfit*; the *water pricing* to the *free water* storyline; and the *gospel of flexibility* to the *anti-command-and-control* (see Table 11.1 for the formulations of each narrative).

Table 11.1 Four nirvanas and narratives of international water management trends

Nirvana concepts	Narratives	Management trends
Communalization	Negative: "*anti-Leviathan*" *storyline* Centralized state interventions are rigid and distant, inducing important administrative and transaction costs and disregarding localized resource specificities Positive: "*homogeneous community*" *storyline* Community solidarity, traditions and local endogenous systems of rights are crucial in preserving water for community members	– Local community governance (Chap. 2)
Integration	Negative: "*misfit*" *storyline* Mismatches between the geographical extent of a resource and the territorial scope of institutions, or between the socio-ecological processes occurring at specific scales and institutional settings dealing with other scales, are responsible of negative externalities Positive: *"functional fit" storyline* Institutions and rules that match the space and scale of water resources reduce negative externalities and restore ecological functions	– IWRM (Chap. 3) – Transboundary water management (Chap. 4) – MLG (Chap. 5) – Nexus (Chap. 10)
Commodification	Negative: *"free water" storyline* Public goods and services tend to be wasted Positive: "*water pricing*" *storyline* The pricing of water is crucial for demand management and conservation	– Privatization of water supply (Chap. 6) – MBIs (Chap. 7)

(*continued*)

Table 11.1 (continued)

Nirvana concepts	Narratives	Management trends
Adaptation	Negative: "*anti-command-and-control" storyline* Centralized, top-down and rigid policies are unfitting to the complex, non-reducible, uncertain and variable dynamics of water resources Positive: "*gospel of flexibility" storyline* Polycentric, flexible and collaborative arrangements that emphasize learning through structured experimentation are crucial for adapting policies and practices to the complexity, non-reducibility, uncertainties and variability of water resources	– Climate change adaptation (Chap. 8) – Water security and adaptive governance (Chap. 9)

The pitfalls of conventional (top-down and centralized) water governance represent a common starting point. These weaknesses have been exposed by successive water crises and amplified by climate change impacts and related new requirements. They resulted in persistent environmental degradation and inequities, proving—it is argued—the inadequacy of command-and-control government to deal with the wicked nature of water-related issues. These issues, like other environmental problems, are flawed with complexities and uncertainties that are perceived as uncommonly difficult to tackle when applying existing modes of governance. For example, according to the *misfit* storyline, mismatches between the geographical extent of a resource and the territorial scope of institutions, or between socio-ecological processes occurring at specific scales and institutional settings dealing with other scales, are responsible for negative externalities (harming those beyond the reach of existing institutions and leading to ecological degradation).

The second common feature of these narratives is to suggest "alternatives" to the perceived weaknesses of current modes of governance (the positive storylines). International management trends entail a normative assumption about how water governance should be, about the horizon

that it should reach. More precisely, they are symptomatic of a supposedly global shift away from command-and-control to more decentralized, integrated or adaptable forms of management (Engle et al. 2011). Here for example, the *functional fit* storyline, which is at the basis of the call for more integrated models of governance, represents an answer to the misfit problems outlined earlier.

Nirvanas (left column of Table 11.1) and management trends (right column) extend from these narratives. Upstream are nirvanas (Molle 2008), defined as overarching concepts that strengthen and are simultaneously sustained by narratives. The four nirvanas that we identify are the following: communalization, integration, commodification, and adaptation. Although their diffusion and structuring power are contrasted, although they may be complementary or antagonist, these four concepts are similar in the way they…

> … embody an ideal image of what the world should tend to. They represent a vision of a "horizon" that individuals and societies should strive to reach. Although, just as with nirvana, the likelihood that we may reach them is admittedly low, the mere possibility of achieving them and the sense of "progress" attached to any shift in their direction suffice to make them an attractive and useful focal point (Molle 2008, 132)

Downstream are the nine management trends explored throughout the volume, which are rooted in the narratives and consist of more concrete practices, models and declinations of the nirvana concepts. These trends are more or less specific in their perimeter and ambition. They refer to processes, modes of governance or particular kinds of policy instruments. Four of them are associated with *integration*, probably one of the most structuring and encompassing nirvanas of the last two decades. They envision it from different angles (sectors, scales, territories) and amplitudes (centred or not on the water sector). With commodification come different declinations of privatization models and market-based instruments (MBI) while communalization is associated with local forms of community governance. Adaptation, finally, represents perhaps the new overarching nirvana of water governance in relation to climate changes dynamics (Engle et al. 2011).

2 Normative Fuzziness, Polysemy in Practice and Difficulties of Measurement

Although the narratives they are based upon appear quite straightforward, international water management trends represent complex analytical and normative constructs that are difficult to define, measure and compare. In other words, their analytical potential and normative objectives are not self-evident. Several authors underline or suggest such limitations in their chapters. International water management trends are presented as notions that convey an attractive plasticity (Chap. 2), that are not stabilized (Chap. 9) or that have yet to have a unified definition (Chap. 10). Just as sustainable development, these trends represent contested concepts (Connelly 2007) that became fashionable despite or, perhaps, precisely because of their ambiguities and uncertainties.

This conceptual broadness and fuzziness is nothing exceptional. What is striking, however, is the capacity of these trends to drive policy diffusion and knowledge production without consideration of their contested nature. On the one hand, they demonstrate durable capacities to influence policy programs without being necessarily based on evidence. On the other hand, they shape scientific debates, resulting in publications that adopt either a critical perspective or apply analytically concepts that have been primarily developed with a normative viewpoint. Considering evidence provided by the different chapters of the volume, three major conceptual and operationalization limitations become explicit.

Conceptual ambiguities can be linked, first, to a form of *normative fuzziness* that materializes in the diversity of strategies and goals that can be associated with international water management trends. Climate change adaptation, for instance, hardly comes with univocal expectations about the societal goals to be reached; it has, to the contrary, generated a far more accurate image of what should be avoided (Chap. 8). This controversial observation can, to some extent at least, be transferred to other trends. IWRM has been linked to thirty-five sets of issues that should be integrated (Chap. 3) and water security has been shown to cover a broad range of areas (Chap. 9).

It is interesting to note that, more generally, the exact same fuzziness can be identified with regards to the broader sustainable development paradigm. There is, indeed, "still no consensus over the societal goals that would count as sustainable development" (Connelly 2007, 259). The goals differ in relation to the theoretical perspective (risk-based management, political economy, socio-ecological systems theory), the specific values that are emphasized (equity, legitimacy, efficiency, etc.) or the places where they are implemented. Different frames, values or contexts imply different priorities.

Conceptual ambiguities and normative fuzziness are echoed, secondly, by a form of *polysemy in practice* that is revealed by the diversity of experiences that are subsumed under a similar label. In Chap. 6, Eva Lieberherr emphasizes how privatization is in fact used to designate very different organizational forms: material privatization (a full transfer of infrastructure ownership and operation to private actors) remains rare in comparison to less extreme models such as delegated private management (private actor's right to sell water services within a public ownership frame) or formal privatization (shift from public to private law). In a similar vein, Florence Metz and Philip Leifeld (Chap. 7) give a comprehensive and systematized appraisal of all the different forms of instruments that are considered as MBI. Again, this holds true for several other notions that are dealt with in this volume: the concrete declinations of LCG appear quite diverse in empirical reality; transboundary water management or IWRM take many different forms, are considered from a great diversity of perspectives and lead to many debates regarding how they should be analyzed, understood and implemented in the field.

These conceptual ambiguities, normative fuzziness and polysemy in practice explain, in our view, a lot of the operationalization and measurement problems that are often associated with international water management trends. In Chap. 9, Thomas Bolognesi and Stéphane Kluser provide a convincing appraisal that emphasizes the need to be careful when using water security as a normative goal. They underline the non-systematic way with which measures are conceived, taken and communicated. Each attempt of measuring water security is built on its own framework and this heterogeneity makes comparison difficult. In their view, water security assessments face a high level of uncertainty and are

generally characterized by high subjectivity, reducing the relevance of their normative use and questioning evidence that supports policy action. In a similar vein, Johann Dupuis underlines the way in which proxies sometime exaggerate dichotomies and contribute to create a compartmentalized perspective. This echoes the results of other studies (e.g., Petit 2016 on the difficulties to build indicator for measuring IWRM) and emphasizes the need to carefully and transparently design indicators and proxies in order to provide relevant assessments, robust comparisons and, in the end, informed recommendations.

3 Global Norms, Transcoding Processes and Domestic Variables

In this book we have seen a wide range of observations about how empirical reality fails to "fit" prescribed notions: the entangling of private, public and community logics at the local level (Chap. 2); the distance between integration goals and the water strategies or legislation of subnational entities (Chaps. 3 and 10); the wide range of organizations that have been established to deal with transboundary water management issues (Chap. 4); the diversity of experiences that qualify as privatization (Chap. 6) or as MBI (Chap. 7); the diverging interpretations of adaptation objectives (Chap. 8). All these observations emphasize, on the one side, the discrepancies between the abstractly defined "nirvanas" and management trends (see Table 11.1) and, on the other side, the heterogeneous reality that can be witnessed on the ground. This finding comes in a direct line with our initial intuition: the things that are described and called for do not correspond to what can be observed in reality.

Real-world policies are never as integrated, adaptive or commoditized as they are conceptualized to be, and the question arises regarding how to explain these discrepancies. As suggested by Johann Dupuis in Chap. 8, we argue that it helps to read international water management trends as global norms (Bernstein and Cashore 2012). They are *global* because they are generally developed and advocated by international organizations (GWP, UNEP, WEF), researchers (in international academic conferences),

nation states (in multilateral negotiations, or as integrated in the agendas of development and cooperation agencies), NGOs and even multinational companies. They stand as *norms* because they are normative—they define and regulate appropriate practices for domestic policies—but they do not necessarily have a legally binding nature (by contrast to formal rules). Their influence is not dependent on their enshrinement in hard law (e.g., in a multilateral treaty) but on discursive and deliberative efforts to diffuse them, with the support and financing of strong international actors.

Global norms are, however, subject to implementation (Hill and Hupe 2014)—or transcoding (Lascoumes 1996)—processes just as formal rules are. It is through such processes that gaps appear between the universal remedies that norms entail and the concrete policies and practices that are elaborated on the ground. Domestic policies and instruments are, indeed, designed through a process that follows its own rationality. Global norms are constantly reshaped, reinterpreted and torn to fit local beliefs, interests and power balances. Multiple criteria (equity, legitimacy, feasibility, efficiency, etc.) may be mobilized, disturbing the linear transcoding of global norms. Results of these processes represent regionalized compromises that are distinct from abstractly defined models. In other words, transcoding implies power games and trade-offs among a diversity of goals and interests.

In this section, we propose to explore three groups of domestic variables that intervene during implementation or transcoding processes and contribute to explain discrepancies: national and subnational institutional regimes and values; sectoral, scalar and territorial structures; power relations and social interactions between actors.

3.1 National and Subnational Institutional Regimes and Values

Water governance remedies are not implemented in a vacuum. To the contrary, domestic policies and water right systems clearly matter in the way global norms penetrate national, regional and local practices. In Chap. 10 for instance, Luc Tonka clearly shows how the fragmentation of

water jurisdictions (both across municipalities and sectors), the structure of property rights and the degree of control over the main hydropower companies influenced the room of manoeuver to implement a "nexused" solution in two Swiss cantons. In a similar vein, Arnaud Buchs, in Chap. 3, highlights how the administrative structures (strong sectoral divisions) and the sharing of competencies between governmental levels (principle of municipal autonomy) weighed on the institutional compromise that was reached when it came to the renewal of a cantonal water act.

These two chapters reveal how, in nation states applying the rule of law, water issues are addressed by a set of domestic regulations that prescribe rules of behaviours to water users. These regulations can rely on different modes of interventions (top-down, market-based, voluntary) and be enshrined in public policies (public law) or in property regimes (private law). They aim to protect the environment as well as to organize the exploitation of water resources by granting and limiting use rights. The aggregation of these rules forms what some authors have called a (domestic) institutional regime (Gerber et al. 2009) that can be more or less extended (i.e., covering a more or less wide range of water-related issues and rivalries) and coherent (i.e., more or less coordinated).

These institutional regimes, and this is of primary importance for our demonstration, can also be more or less in line with the normative goals that global norms entail. In fact, as this is often a governance shift that is called for, *it is likely that global norms advocating alternative modes of governance and domestic institutional regimes within which current modes of governance are enshrined will be in confrontation*. Because they strongly influence domestic actors' behaviours, power relations and administrative structures (see later in the chapter), domestic institutional regimes represent crucial mediating variables for the implementation of global norms. Transcoding processes may encounter strong opposition due to the (often pre-existent) contradictory objectives of domestic institutional regime and path dependencies dynamics.

In addition to that, if international water management trends are intended for global outreach, their conceptualization results from specific (and often western) perspectives regarding the meaning of water governance and the nature of issues to be solved. Yet the values that are shaping their interpretation are very likely to differ contextually (Adger et al. 2009),

leading to a risk of cultural bias. Focusing on MLG and on the blind spots of this conceptual framework, Emilie Dupuits, in Chap. 5, illustrates this risk by mobilizing the notion of "neo-extractivism." Developed in a Latin-American context, this concept allows an increased understanding of the dynamics of rescaling at play in the region: neo-extractivism analyzes how post-neoliberal nation states justify a centralization of natural resources exploitation based on the need to obtain income for social development, and helps understanding why local communities in Ecuador tried to bypass the central state. Its use demonstrates the added value of combining different perspectives and supplementing globalized trends with additional analytical tools that are anchored in regional concerns and perceptions of stakes at play. Contexts and values are key elements when considering the transcoding processes of nirvanas and models.

3.2 Sectoral, Scalar and Territorial Structures

The focus of domestic institutional regimes is to organize water governance across sectors, scales and institutional territories. Competencies are attributed; action is compartmentalized and structured. Political spaces of regulation are created that are very far from an ideal type of functional regulatory spaces (Varone et al. 2013), i.e., from spaces that are thought to be functionally appropriate to deal with water-related issues. This is in line with the *misfit* and the *functional fit* storylines identified in Table 11.1. The risk of tension between functional objectives and political structures is strong. Hence, rather than pretending as if the development of alternative—allegedly more functional—spaces of regulation will occur automatically, we argue that the structuring roles of policy sectors, levels of government and institutional territories should be recognized.

3.2.1 Policy Sectors

Interactions and political negotiations remain, despite many calls for integration, largely influenced by sectoral dynamics. Even if the narratives of integration or adaptation are influential, each sector is likely to remain structured by its own system of values, orientated towards the

pursuit of its own public interest (agriculture, environment, energy production, public health). In that game, each sector speaks its own language and is sustained by its own administrative structures (Sabatier and Jenkins-Smith 1993 talk about policy subsystems). Some are likely to be dominant while others will appear more isolated. In this regard, integration is not self-evident and intersectoral dynamics may reveal, on the ground, more trade-offs (with winners and losers) than synergies (win-win situations). The complexities and cross-cutting dimension of water-related problems only increase such governability issues. Moving towards integration will, hence, require more than discourses and good will. Based on existing belief systems, administrative structures and power relations, the prospect of integration (or even coordination) will appear impossible on certain topics ("no-go" configurations), while other areas will offer greater potential ("go" configurations). The exploration of the mechanisms leading to such configurations represents thrilling avenues for more informed and focalized policy and research (Gallagher et al. 2016).

3.2.2 Levels of Government

Water issues are scale sensitive. They stretch across multiple levels, increasing the need for coordination and articulation (Moss and Newig 2010). At the same time, however, their governance remains strongly influenced by the distribution of competencies as determined by domestic institutional structures. In Switzerland, for instance, constitutional principles such as subsidiarity (the idea that decisions should be devolved to the lowest appropriate level), federalism of execution (giving the main implementation competencies to cantons) and municipal autonomy strongly influence the level at which environmental problems are dealt with. A redistribution of competencies represents a political stake in the face of which narratives—as convincing as they may be—will not suffice. In that respect, and as shown by Emilie Dupuits in her contribution (Chap. 5), multi-level challenges and rescaling processes should not be seen as a matter of finding the best level at which to address water issues, but rather as an object of political strategies to overcome or reinforce structural constraints.

3.2.3 Institutional Territories

While functionalist perspectives argue that sustainable water management should be based on specific and presented as "natural" territories of regulation (e.g., the river basins), the concrete implementation of such spaces is very likely to meet strong obstacles related to existing administrative and political boundaries. Indeed, water management cuts across different institutional territories that are characterized by specific rules and authorities. As shown by Arnaud Buchs (Chap. 3), the implementation of the river basin as a relevant space of regulation will not only depend on the functionalist will to adopt "natural" perimeters, but also on political compromises between this objective and existing administrative, technical and social boundaries. These will explain, in the end, the discrepancies between the "natural" and the "institutionally defined" perimeters. In addition, the coordination between different institutional territories does not come without difficulties and depends on multiple operational procedures, distribution of competencies and institutional and legal frameworks. Transboundary water management is not only a matter of coordination, but also of political relations, social interactions and institutional compromises (Chap. 4). In this regard, institutional territories should be considered as the relevant analytical entry point in order to understand the processes leading to the definition of water management boundaries.

3.3 Power Relations and Social Interactions Between Actors

Finally, the implementation of global norms appears strongly influenced by the political games that their transcoding processes involve. What global norms, nirvanas and management trends are about is, as we have seen, policy changes and innovation: they identify governance weaknesses and promote alternatives (again, see the narratives in Table 11.1). These changes and innovations are very unlikely to stem from naturally occurring and apolitical activities. To the contrary, they result from an "inherently disruptive process […] that challenges incumbent interests and status quo defenders," as Jordan and Huitema (2014, 909) have nicely

put it. (Water) governance shifts are contested, easily hijacked and potentially conflictive. They gather actors with diverging interests, beliefs and capacities for action.

The different contributions in this volume provide sound empirical evidence to back up this claim. Christian Bréthaut (Chap. 4), for instance, emphasizes how the transboundary management of the Rhône River reveals—and somehow constitutes a result of—power relations and strategies to secure water needs. He underlines the relevance of a perspective that is not limited to legal framework analyses but also integrates the power struggles between non-state actors, as well as the evolving roles played by central states. We can find similar reasoning in several other chapters that are transcended by pleas to redirect attention to "who gets what" and to give more room to the political choices involved by "nexused" thinking (Chap. 10), to consider IWRM as a regionalized institutional compromise (Chap. 3), to analyze LCG as embedded in a set of more or less formal arrangements that are reached within an heterogeneous community (Chap. 2), or to highlight the power relations and socio-political interactions related to rescaling processes (Chap. 5).

Political dimensions are also very present in other contributions. In her chapter, Eva Lieberherr underlines the trade-offs related to *democratic (or input) legitimacy* (Scharpf 1999), measured based on citizens' ability to influence decision-making, and *efficiency*, which is often seen as requiring less democratic control and more freedom of choice to improve operational performance. The arbitration between these two objectives is complex and depends on political compromises. In the end, organizational forms are numerous and their implications in terms of democratic legitimacy not linear, and sometime surprising. Florence Metz and Philip Leifeld focus, for their part, on *policy preferences*. Those are crucial when it comes to implementation processes because they strongly influence the political acceptance of one or another instrument. In that respect, policy instrument mixes are presented as crucial not only because they are preferred by actors, but also because they are seen as better equipped to generate compromise.

Irrespective of their scales of analysis (transnational negotiations, national policymaking, cantonal legislative processes, local issues), the chapters emphasize the importance of the *politics* of water governance,

i.e., of the way political interactions, actors' strategies and resources of action are constitutive of water governance and strongly influence its declinations on the ground. They highlight the role of a wide range of actors, from public authorities and private actors from different sectors, to international organizations, environmental NGOs or local communities.

4 Conclusion: Beyond Narratives and Nirvanas

The contributions collected in this volume have provided sound empirical evidence confirming findings from several previous studies. They have emphasized the need to consider water crises as crises of governance while, at the same time, urging for caution regarding international water management trends promoted as universally applicable and easily transferable. To some extent, the governance shifts and promises associated with international water management trends have been relativized. Water governance is complex and diverse, it involves many actors and instruments, and is hardly reducible to simplistic narratives.

Calls to move beyond panaceas (Meinzen-Dick 2007) or universal remedies (Ingram 2008) were, in addition, largely echoed and reflected upon. Because of path dependency dynamics, of the strong structuring role of domestic institutional regimes, of the weight of sectoral, scalar and territorial divisions, and of the specific configurations of actors and political games that intervene during implementation processes, "no two circumstances are identical" (Nature 2016a, 170). Water governance would thus better be seen as an open and site-specific process that is "frequently distorted by lopsided power relations and traversed by frontal, and sometimes uncompromising, oppositions of viewpoints and ideologies" (Molle et al. 2008, 3).

Everything is, in sum, political about water governance. In fact, "even the definition of water governance is political" (Nature 2016a, 170). This holds true both during policy formulation and implementation. Power struggles intervene at the global level, where international management trends are developed, promoted and diffused, as well as during their

domestic transcoding processes. "Questions over who governs, whose system framings count, and whose sustainability gets prioritized are [thus] all pertinent" (Smith and Stirling 2010, 1) and should be put back at the centre of water governance analysis in at least two ways.

First, *one should enrich the analysis of international water management trends with frameworks pointing to institutional, political and social dimensions*. We argue that, "like the most distant stars, [nirvana] is best viewed only with peripheral vision: we can see it's there, but we shouldn't focus our gaze directly on it lest its true nature slips from view" (Nature 2016b, 140). Analyses should rather focus on the institutional dynamics promoting or hindering social changes, on the ideological objectives that are targeted behind global norms and international management trends, on comparative explorations of their transcoding processes, on highlighting patterns in actors' configuration, power relations or strategies, on identifying "go" and "no-go" configurations. Rather than being obscured, "the reality of the (hard) choices and trade-offs that have to be made" (Molle et al. 2008, 4) when governing water should be made explicit.

Second, when dealing with water governance—but this is certainly the same with governance issues in general—*one should put analysis at the service of prescriptive statements rather than the other way around*. Rather than being conflated, analytical and normative dimensions should clearly be distinguished. This implies that analyses "of" policies should prevail over analyses "for" policies (Botterill and Fenna 2013). That does not mean that scientists cannot develop recommendations, but that these recommendations must be based on a strong understanding of what is actually happening rather than on pre-conceived orientations. Narratives, as influential as they are, should be treated as the object rather than as the rationale of analysis; purely instrumental approaches to institutions should be avoided; and the inherently political nature of water governance should be recognized. Such perspectives will only reinforce and encourage science-policy interplays.

These findings and recommendations underline, in our view, the crucial role of social sciences in engaging with analytical (and sometime also critical) endeavours of international water management trends. The challenges of governing water sustainably will most certainly not be addressed through technocratic and depoliticized management (Gupta et al. 2013)

but require, in addition, a sound understanding of political dynamics, institutional constraints and opportunities, and social dimensions. A great diversity of social science disciplines and analytical approaches (from political science to anthropology, economy or political geography) can help in that quest.

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Rémi Schweizer is a senior researcher and lecturer at the ETH Zürich. His research focuses on environmental and food governance, with an interest in power relations, policy implementation and innovation and local community governance. Author of several books and articles, he conducts research with a strong empirically grounded approach.

Christian Bréthaut is an assistant Professor at the Institute for Environmental Sciences at the University of Geneva. He leads the Education and Knowledge component of the Geneva Water Hub and co-leads the UNESCO Chair on Hydropolitics from the University of Geneva. His work focuses on challenges interlinked with transboundary contexts and with intersectorality. He is a co-editor of the Palgrave Series in Water Governance.

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