(Virtual) T14P09 / Cross-sectoral coordination and institutional innovation in water governance

Topic : T14 / SUSTAINABLE DEVELOPMENT, ENVIRONMENT AND POLICY

Chair : Nicolas Jager (Carl von Ossietzky Universität Oldenburg)

Second Chair : Manuel Fischer (Eawag)

GENERAL OBJECTIVES, RESEARCH QUESTIONS AND SCIENTIFIC RELEVANCE

Water governance inherently faces many social and ecological complexities. Water provides a large diversity of ecosystem services (water for irrigation, cooling, drinking, support for biodiversity, hydropower, etc.) that are often in conflict with each other. Consequently, water is an essential resource in other sectors such as health, energy, or agriculture. With increasing pressure of climate change and biodiversity loss, not only the protection of water resources and water-related ecosystems becomes increasingly critical, but also the protection from water gains importance, for example through flood protection measures. Such measures can have consequences again for drinking water provision, agricultural land use, or the state of ecosystems, in turn affecting a wide diversity of interests and stakeholders. Thus, water governance is complex spanning multiple sectorial, territorial, social and political boundaries.
Due to its substantive importance for life and its emblematic manifestation of important governance challenges with relevance also to other fields, water has always been a key policy sector for studies of the policy process, public administration, and environmental governance. Research on the governance and management of water resources has thus traditionally contributed to new developments in these broader fields. Examples for this emblematic potential of water policy and governance include several landmark studies in policy theories such as the Advocacy Coalitions Framework or the Institutional Analysis and Development Framework. More recently, for example, network approaches have been advanced in this field providing new insights in the governance of complex systems beyond the water realm. The objective of this panel is to continue this tradition and to understand and discuss the current complexity of water governance, and to provide ways of analyzing it, in the context of broader theories, approaches and methods of governance and the policy process.
More specifically, this panel deals with the general question of how water policy and governance deals with complex interactions among the different levels of governance (from the international to the local), different stakeholders (from public administrations to research to private industry), or different sectors (from agriculture and land use to biodiversity and energy, and so forth), and others. Our focus includes both, structural aspects of the design, adaptation and innovation of institutions and governance structures, as well as procedural aspects of how actor interactions unfold and play out in dealing with these multi-faceted complexities. Potential aspects to be explored include:
i) the exploration and analysis of important trade-offs between different sources of complexity and their consequences for governance systems;
ii) the choice of policy tools and approaches (or the absence of adaptive action) in the face of increasing problem pressure and complexity;
iii) the establishment of nascent, boundary-spanning policy problems and the responses of actors and policy systems;
iv) the multi-scalar challenges of water spanning multiple environmental and political boundaries;
v) water as a key policy sectors connecting other sectors, demanding new coalitions and new forms of collective action.

CALL FOR PAPERS

Currently, water management and governance are facing severe challenges due to climatic change, biodiversity loss, urbanization, or population growth. These issues all related to the multi-sectoral, multi-level and multi-actor complexity of water management and governance. Our panel therefore focuses on issues of dispersion of authority in a multi-level, multi-stakeholder and multi-sector context, as well as questions of design, adaptation and innovation of institutions at different scales in order to deal with these challenges. Papers submitted to this panel should deal with complex interactions among the different levels of governance (from the international to the local), different stakeholders (from public administrations to research to private industry), or different sectors (from agriculture and land use to biodiversity and energy, and so forth), and other complex interactions. Papers should aim at describing and understanding the

interactions among (some of) these different dimensions, or they should deal with the design, adaptation and innovation of institutions capable of dealing with this multi-scalar complexity.
In terms of substantive issues, relevant papers could deal, among many others, i) reforms in urban water infrastructure, related trends of digitalization and needs for information sharing among levels and actors, or decentralization of infrastructure and services, and interactions with other services such as energy, communication, etc.; ii) emerging issues in water quality protection, micro-pollutants, pesticides and drinking water issues across borders and sectors, and related policies and policy mixes; iii) reform and implementation of the European Water Framework Directive (WFD) as an (evolving) institution dealing with holistic water management and governance, related challenges of harmonization and local specification of WFD policies, institutional adaptations and cross-border governance issues; iv) the implementation of Sustainable Development Goals (SDGs), specifically SDG 6 (water), as well as interactions of SDG 6 with other SDGs in other sectors, in both the global North and South, but also across countries and world regions; v) challenges related to climate change, flooding, biodiversity loss, urbanization, and related mitigation and adaptation policies and institutional innovations.
The panel aims to provide a platform to discuss new and innovative conceptual approaches and methods to understand the design and implementation of integrated modes of water governance. We thus specifically invite contributions relying on interdisciplinary approaches, new and innovative concepts, methods and empirical research, and contributions opening up the research agenda for the future.

(Virtual) T14P09 / Cross-sectoral coordination and institutional innovation in water governance

Chair : Nicolas Jager (Carl von Ossietzky Universität Oldenburg)

Second Chair : Manuel Fischer (Eawag)

Session 1Integrative water governance across scales, levels and sector

Tuesday, July 6th 16:30 to 18:30 (Virtual 05)

Discussants

Debora VanNijnatten (Wilfrid Laurier University)

Simon Schaub (Ruprecht-Karls-Universität Heidelberg)

(Virtual) Agency and Constraint: highlighting the role of individuals in delivering policy coherence for joined-up water governance.

Kerry Waylen (James Hutton Institute, UK)

It is widely agreed that water governance must enable a more joined-up approach to managing the water environment, including by better connecting sectors and policies. However, achieving this is easier said than done, so it is increasingly important to understand how policy objectives, policy design and policy implementation cohere vertically (within policy) and horizontally (between policies). The limited empirical scholarship on policy coherence tends to focus on policy documentation and/or the outcomes, with little attention to the social processes involved. Furthermore, there is little discussion of the normative dimensions of policy coherence, whether it functions to sustain the status quo or disrupts policy processes to provide spaces for more radical transformation. Therefore, our contribution considers the individuals involved in making policy coherence happen, whether making policy, designing instruments or implementing these instruments, informed by literatures on policy entrepreneurs and interface bureaucrats. Empirically, we focus on our recent mixed-method research data of policy implementers and catchment level partnerships, drawing also on other research with Scottish policy makers regarding policies acting on biodiversity, soil and water; and research conducted with EU policy makers regarding sustainable agriculture. The importance of individual agency and constraints was a strong theme in our data, across all processes and governance levels. We consider how individuals differ in their interpretations of their role within organizations; the degree of individual agency displayed when enabling policy coherence; and where policy coherence is used for more radical change. Although challenging to research such processes, our data provides insights into these policy entrepreneurs practicing transformative practices in these technocratic bureaucracies, and some ideas for institutional innovations that could further encourage this. We also consider the role of researchers in making space for individuals to step out of their bureaucratic roles and consider their personal stance on issues of environmental sustainability.

(Virtual) Water security, climate adaptation and the challenges of multi-level governance in brazilian public policies

Livia Kalil (Université Sorbonne-Nouvelle (Paris III))

Guilherme Barbosa Checco (Universidade de São Paulo)

Science points out that one of the main impacts of climate change is on the hydrological cycle, especially from extreme hydrological events which are generating significant difficulties in water management, not only in Brazil but worldwide, and projections indicate that this scenario will get even worse (IPCC, 2014 and 2018). So much so that the latest report of the World Economic Forum points out that, among the main global risks are failures in actions to combat climate change, extreme weather events and water crises rank 1st, 4th and 5th in terms of impact, respectively (WEF, 2020). Although Brazil has the largest freshwater reserve in the world (12% of the total), the impacts of climate change and hydrological extremes are already

a reality (Marengo, 2008). In 2018 alone, one million Brazilians were affected by floods, while almost 43 million were affected by droughts (ANA, 2019). The scenario presented above, leads us to question if there is a public action strategy for water security in Brazil? Does it incorporate the climate dimension, especially adaptation? What are its relevant aspects and possible limitations? In this paper we propose to assess how and whether water related public policies in Brazil are incorporating the climate variable, as well as to explore what are the possible ways to improve public policies affected by the water security agenda in light of climate change impacts, with particular attention to the instrument of granting rights to use water resources. To try to elucidate these questions, the authors will resort to some theoretical "lenses" that provide tools to help in this research, especially from the contributions of public action (Massardier, 2003; Massardier et al., 2014; Hassenteufel, 2014); the instruments of public action (Lascoumes and Le Galès, 2004) and incrementalism (Lindblom, 2009). This will be done through a review of existing literature, governmental and international documents, as well as interviews with influential actors in the area. The answer to the questions triggering this study can be elaborated in two stages. The first stems from the observation that Brazil has not yet formulated a structuring action for water security, especially with the difficulties of a multilevel articulation of its complex governance in a federated country of continental dimensions. Addressing a second aspect of the initial question, it is possible to affirm that the climate dimension is not yet introduced in the Brazilian public action in the water agenda. The way in which the instruments were constructed does not take into account climate projections that point to relevant changes in the hydrological cycle. And especially from the point of view of adaptation, actions such as sustainable water management, pollution control, protection of water sources, demand management, loss reduction and reuse are still very incipient or, in some cases, non-existent.

Key-words: public policies, climate change, water management, Brazil.

(Virtual) Evidence integration for coherent nexus policy mixes: European perspectives on managing water-energy interactions

Sarah Giest (Leiden University)

Ishani Mukherjee (Singapore Management University)

Nexus governance increasingly relies on using data to design policy measures. At the intersection of different policy fields, such as energy and water, data is seen to shed light on complex challenges and have the ability to measure both problems and solutions systematically. In order to analyze the challenges linked to data use in the context of nexus governance, we use a policy design lens and more specifically the perspective of organizational policy instruments to look at the Mediterranean region. We focus on issues related to institutional capacity that are linked to building data infrastructure and the multi-level/multi-stakeholder backdrop that can enable or impede nexus data collection efforts. We find that the institutional set-up lacks the capacity, trust and engagement to uphold regular data reporting. This limits and potentially biases the way nexus challenges are acted upon by policymakers. Given these findings, we identify future research questions around the role of organizational policy instruments in contributing to the coordination of data-driven nexus policy mixes.

(Virtual) Policy sequences for implementing modular wastewater technologies

Katrin Pakizer (Swiss Federal Institutes of Technology (ETH Zurich))

Eva Lieberherr (Swiss Federal Institute of Technology)

Urban water infrastructures are under increasing stress, as urban areas are particularly vulnerable to the megatrends of the 21st century such as climate change and population growth. These demographic and socio-economic trends as well as hydro-climatic variability will impact the supply, delivery and demand side of urban water services, as current infrastructures and treatment methods continue to age, while the demand for water services is likely to expand. Innovative technological solutions have been explored. For instance, the integration of modular rain- and wastewater technologies, which are decentralized, scalable, mass-produced and increasingly automated, into centralized infrastructures could enable more sustainable treatment of resources by requiring less fresh water.

These developments demand adaptations in the water institutions that provide the framework wherein the urban water services function. However, it is unclear what type of policies and policy instruments are needed for implementing innovative solutions that could provide the necessary systemic variation, enabling flexibility and adaptive capacities for future challenges. We thus explore the question: what policies and policy instruments have to be introduced for overcoming technical and non-technical barriers and supporting the implementation of modular wastewater technologies? It also raises the question if these policies and policy instruments change over time or are purposefully sequenced and whether there are any interaction

effects between them.

There is still limited research on policy (instrument) sequencing: Despite advances in better understanding policy designs and instrument choices, most work has ignored the temporal dimension of mixes. Usually, temporality is investigated as contextual variable, highlighting e.g. how mixes often evolve in unexpected or unintended ways during their lifespan. Consequently, there is a need for investigating the manner in which mixes evolve over time and how their various parts are sequenced.

We embrace this temporal dimension and address how systemic change and a substantial paradigm shift in the water sector could be achieved. Integrating more sustainable technologies entails a complex and long-term process, implying a variety of policy interventions to steer the direction and speed of innovative paths. We conduct a comparative case study of urban water management in Melbourne, San Francisco and Barcelona. We selected these cases, as they have already integrated modular technologies in their water infrastructures and are hence well-suited for a policy sequencing analysis. We systematically analyze each case by applying the same analytical grid, which we feed with interview data, analyzed legal documents and secondary literature. In this manner, we generate the relevant data for identifying policy sequencing, including the barriers for change and the policies that were used for overcoming them, thereby recreating policy sequences for each case study. We then compare the sequences with each other, shedding light on different pathways towards more resilient and sustainable wastewater systems in urban areas, which could be exemplary for cities aiming to diversify their water infrastructures in order to respond to socio-environmental challenges. By analyzing and comparing the policy sequences of the three case studies, this research contributes to the field of public policy, environmental governance as well as transition studies.

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Session 2Collaborative water governance (morning)

Wednesday, July 7th 10:00 to 12:00 (Virtual 05)

Discussants

Nicolas Jager (Carl von Ossietzky Universität Oldenburg)

Kerry Waylen (James Hutton Institute, UK)

(Virtual) How does cross-sector collaboration lead to quality outputs? Insights from the Dutch flood protection program

Emma Avoyan (Radboud University of Nijmegen)

Over the last decades, the practice of cross-sector collaboration has blossomed among the public administrators. Operating within diverse institutional structures of mostly single-purpose policy sectors, not only they seek to advance their sectoral goals and interests but also jointly develop solutions to problems that expand beyond the boundaries of individual policy domains. While practical motives of mutual gain and efficiency prevail, and supporting conditions might be present, maintaining collaboration and producing quality outputs/decision is not easy. Public authorities increasingly face demands for results and cost-effective creation of public values. Most academic literature focuses primarily on outcomes or end products of collaboration, while the actual process of joint deliberation on whether and when participants of cross-sector collaboration agree on target goals and a collective strategy to accomplish these target goals is often overlooked. More specifically, empirical studies on the effects of cross-sector collaboration's components as well as combinations thereof on the development and production of quality outputs are generally lacking. The present paper attempts to address this gap.

The data for this study is drawn from a survey of over 250 participants from 30 collaborative infrastructure projects in the Netherlands. These national projects involve a range of autonomous participants representing different interests and jurisdictions. They work together in the course of four years to explore various alternatives and produce a collective strategy for area specific flood protection in which water safety, sustainability, environment and spatial planning go hand to hand. The integrative framework for collaborative governance is used to operationalize components of cross-sector collaboration. We then conduct a fuzzy set Qualitative configurational analysis (QCA) of the components to explore the different pathways through which these collaborative projects do or do not produce quality decisions. The preliminary results show that capacity for joint action (establishing institutional arrangements, ensuring leadership, consolidating knowledge and resources) appears necessary in determining the quality of collaborations' outputs. At the same time, frequent changes in the leadership and resources components of capacity for joint action impact the behavioral as well as relational components of collaboration. Carefully assigned leadership roles are necessary as contract consultants/experts are consequential and their impact on the quality of collaboration's outputs is often overlooked. Finally, good interpersonal relationships between the collaborating parties is more likely to lead to development of legitimate outputs, but never sufficient.

(Virtual) How the quality of ecological dependencies influences actor collaboration

Martin Huber (Eawag (Eidgenössische Anstalt für Wasserversorgung, Abwasserreinigung und Gewässerschutz))

Environmental governance is complex because it often concerns multiple dependent ecological issues. Ecological issues are features of ecosystems that can be influenced by ecosystem management activities

within a reasonable time, such as the water quality that is affected by the operation of wastewater treatment plants. Since interdependencies between ecological issues are often vastly complex, it is challenging for actors to understand their ecosystem management activities' full impact on ecological issues. One reason why interdependencies between ecological issues are complex is that they are not binary but can have different qualities. We study how the quality of ecological interdependencies influences actors' choices of collaboration partners when carrying out their ecosystem management activities. We ask: How does the quality of dependencies between ecological issues influence actor collaboration?

We adopt a Social-Ecological Network (SEN) perspective based on Social-Ecological System (SES) theory to address this research question. SENs are a recently developed approach used to describe and analyze intertwined social-ecological interactions based on multi-level networks. We contribute to the SEN literature by assessing different qualities of dependencies in the ecological network and analyzing how they influence the collaboration patterns in the social network.

First, we can only increase our understanding of ecological systems and the interdependencies between ecological issues by acknowledging these systems' inherent complexity. When SENs are applied to study SES, the ecological ties in those networks are often binary and do not include any information about the ties' quality. However, accounting for the quality of ties can help explain why many environmental problems entail conflicts of interest. Second, a better understanding of the ecological system and dependencies between the ecological issues therein is essential to evaluate collaboration patterns. The literature on Social-Ecological Fit (SEF) emphasizes that the alignment of collaboration ties within the social network with ties among ecological issues can enhance governance effectiveness. However, current discussions on SEF often do not account for the quality of dependencies between ecological issues. This limits the power of the concept of SEF since the achievement of social-ecological alignment is not only dependent on the existence but also on the quality of ecological ties.

The methodological approach of this study combines qualitative expert interviews and quantitative survey data with statistical modeling of networks. The data is conceptualized as a directed two-level social-ecological network. To model the SEN, we apply Exponential Random Graph Models (ERGMs). Empirically, we compare governance networks in six wetlands in Switzerland. Wetlands are among the ecosystems with the highest biodiversity. The research setting is based on six separated yet comparable case study areas with around 300 actors active in the local management of these wetlands. The case studies only differ in a few aspects, such as the number of area-specific government institutions as well as the size of the study areas. In response to the call from the field of SEN studies to move beyond single case studies, our study provides an exciting opportunity to evaluate and compare SEN in a comparative setting across cases.

(Virtual) Collaborative advantage: Assessing the directionality of influences of participatory processes on decision-making using the example of German water governance systems

Nadine Schröder (Hafencity Universität Hamburg)

A common, but insufficiently answered, research question is whether and how participatory governance improves environmental outcomes. Numerous studies highlighted important variables influencing the effectiveness of participatory processes and their environmental outcomes such as process design characteristics, previous experiences of participants, power asymmetries and so on. Outputs are subsumed under categories of learning, trust-building, understanding, acceptance, legitimacy and so on. These studies are rather process-oriented than system-oriented. In this paper I analyse the role of participatory processes from a systems perspective: Where are decisions taken which affect environmental outcomes and how do participatory processes relate to the respective decision-makers? What aspects are influencing which kind of decisions?

This research is driven by a polycentricity lens focussing on the independence of decision-making in the implementation of the EU Water Framework Directive (WFD) in six German states. Case study data were collected through policy document analysis, 70 semi-structured interviews with relevant actors and participatory observation of participatory processes.

The states vary in the multiplicity, type and independence of decision-makers who take decisions regarding the realisation of WFD measures. Also, participatory processes vary in their plurality, their position in the system (e.g. state level, regional or local level) and their intentions to influence decision-making. The incentives for and expectations from actors for participating in such processes are varying across process types likewise. However, a) intentions, incentives and expectations have three distinguishable directionalities: the release (e.g. achieving acceptance) and uptake (e.g. receiving advice) of information or influencing intention or a combination of both (e.g. coordination). Furthermore, b) the analysis of the impendence of decision-making and the (non-)involvement of decision-makers in participatory led me to a typology matrix along the dimensions of process decisiveness and involvement. Most of the participatory processes found in the researched WFD implementation systems do not take decisions or take only not

binding decisions. These processes also often do not directly involve all actors who take decisions regarding the realisation of WFD measures (often the number of actors is simply too large). These actors are represented or not involved at all.

These findings have two implications: a) Regarding the directionalities, some intentions can be pursued through alternative pathways such as lobbying, while participatory processes have a collaborative advantage where no alternatives exist. b) Many studies refer to acceptance and compliance as the mechanisms which generate the positive effects of participatory governance on environmental outcomes. For studying the effects on environmental outcome research designs are suggested which put the existence of participatory processes in relation to a quantified change in the environmental status of a system. For non-decisive processes, this is only reasonable, the effects can only be traced back to a process, and the collaborative advantage is only given, if the participatory process affects a sufficiently large number of decisions in this system. The (positive) effects a process has on its participants need to be multiplied to non-participants. The multiplication from participants to non-participants will be elaborated in a follow-up paper.

(Virtual) Water governance at the local level. The role of institutional innovation for the diffusion of improved water treatment technology to mitigate water pollution

Simon Schaub (Ruprecht-Karls-Universität Heidelberg)

Jale Tosun (Heidelberg University)

Water governance at the local level. The role of institutional innovation for the diffusion of improved water treatment technology to mitigate water pollution

Jale Tosun & Simon Schaub

The pollution of surface waters, such as rivers or lakes, by contaminants of emerging concern (CECs) has received increasing political attention in the last years in Europe. There is growing evidence for the negative impact of increasing consumption of pharmaceuticals, cosmetics, detergents and food additives on aquatic ecosystems. However, most wastewater treatment plants lack the capacity to filter residues of these substances. Consequently, they still enter surface waters mostly unfiltered. Despite increasing calls for regulatory action to mandatorily improve wastewater treatment in Germany, the federal government has not adopted equivalent regulatory measures.

Nevertheless, some municipalities have started to upgrade their treatment plants and implement the “fourth treatment stage”, despite the absence of coercive regulation and high costs involved. This leads us to ask why these municipalities take significant financial risks and voluntarily take action against the entry of CECs in surface waters. In order to find answers, we shed light on municipalities in the state of Baden-Wuerttemberg and investigate which factors impede or enhance the diffusion of the fourth treatment stage. We argue that a special form of institutionalized exchange between water treatment plant operators, called “Klaerwerks Nachbarschaften”, significantly contributes to the diffusion of the new technology, mainly through learning and imitation mechanisms.

Our investigation is built on a mixed-method design. We employ event-history analysis to identify enhancing and impeding factors on the implementation of the fourth treatment stage in municipalities in Baden-Wuerttemberg. In addition, we conduct qualitative interviews with water treatment plant operators and policy-makers to trace underlying causal mechanisms. First results provide evidence for the impact of the “Klaerwerks Nachbarschaften” on the diffusion and implementation of the new technology.

Keywords: water governance, institutional innovation, policy diffusion, policy implementation, contaminants of emerging concern

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Second Chair : Manuel Fischer (Eawag)

Session 3Water governance in polycentric systems

Wednesday, July 7th 16:30 to 18:30 (Virtual 05)

Discussants

Manuel Fischer (Eawag)

Thomas Bolognesi (Grenoble Ecole de Management)

(Virtual) Digging deeper through the Network of Adjacent Action Situations framework – unravelling hidden factors explaining groundwater overuse in Azraq, Jordan

Ines Dombrowsky (German Development Institute)

The concept of Network of Adjacent Action Situations (NAAS) has been suggested as an extension of the Institutional Analysis and Development (IAD) framework in order to explain decision-making in complex polycentric, social-ecological settings. However, applications have been rare so far. A case that may benefit from a NAAS analysis is Azraq in Eastern Jordan, where households, farmers and ecosystems compete for limited resources, and where overuse is driven by multi-level and multi-sectoral decision-making. We thus make the NAAS framework practically applicable to get a deeper understanding which formal and informal factors affect groundwater overuse in Azraq. Besides a comprehensive literature review, we draw on a Social Network Analysis and 67 semi-structured interviews with relevant stakeholders.

We find that the heart of the conflict lies between a heterogeneous group of farmers, who use groundwater for irrigation agriculture, and the water authorities, which rely on the aquifer for domestic water supply at national level, but face a strong agricultural lobby. Our analysis furthermore reveals that a diversity of adjacent action situations including water, agricultural, environmental, energy, and land governance, but also monarchy's underlying social contract and the informal concept of wasta influence what happens on the ground. Through the latter concepts we include dimensions of power in the analysis, a shortcoming bemoaned in the IAD literature. Eventually, the study shows that no panacea exists, but that systems thinking may help identify a range of intervention points, some more sensitive than others that might eventually drive a social-ecological transformation.

(Virtual) Water Governance and Polycentric Institutional Designs: Connective Tissue, Coordination and Innovation Potential in the Great Lakes and Rio Grande-Bravo Water Basins

Debora VanNijnatten (Wilfrid Laurier University)

Carolyn Johns (Toronto Metropolitan University)

Water managers across the globe are struggling to maintain clean water supplies for an increasing number of users in the face of economic and demographic pressures, as well as climate change (IUCN and UNECE, 2017). Yet efforts to introduce conservation and water quality efforts are impeded by the fragmentation of authority over water across scales of governance, across economic sectors and across many users. Further, as surface waters diminish and pumping of underground aquifers increases, governance must also account for hydraulic interactions. This coordination problem is exacerbated in transboundary water basins where the international border cuts even thicker lines through governance authority, and regulatory, economic, political and cultural differences abound.

Given the absence of strong governance authorities in most transboundary water basins that can coordinate

water management in the pursuit of sustainability, adaptive water governance scholars argue for 'polycentric' approaches (Ostrom 2010) whereby multiple arenas of policy activity are coordinated under an overarching set of formal and informal institutional rules and arrangements (Pahl-Wostl, 2009; Pahl-Wostl et al., 2012; Hill & Engel, 2013). Polycentricity is a way of organizing decision systems that can allow for innovation in multiple centres, yet ensure that all centres are 'rowing in the same direction,' e.g., towards sustainability. Yet, there is considerable debate in the literature on whether and how these centres can actually be coordinated in practice. Particularly important to the effective coordination of these centres is a uniform set of rules that act as 'connective tissue' supporting and linking these arrangements across scales (Edelebos, Bressers and Scholten, 2013; Pahl-Wostl & Knieper, 2014).

This paper will explore polycentricity in practice in two transboundary water basins – the Great Lakes and Rio Grande-Bravo. First, we will locate the key decision centres for water allocation and water quality authority in both water basins. Next, we will undertake a unique mapping exercise to explore the connective tissue in both basins using an expanded analytical lens which layers: 1) formal architecture (treaty and domestic regulatory structures, processes, rules); 2) informal interactions within networks created alongside the formal regime and 3) scientific cooperation which intersects with water governance mechanisms. Third, we will use indicator analysis to characterize these different types of connective tissue in terms of intensity of engagement, direction of coordination and innovation potential.

(Virtual) The effect of Institutional governance complexities on water services delivery outcomes in Kenya

James Otieno (University of Nairobi)

Joseph Obosi (University of Nairobi)

Kenya has enacted a devolved governance framework that has opened space for various institutions to participate in the delivery of public services including water services. The institutions include a national water Ministry, local county departments response for water services, a national regulator for water supply, regional infrastructure development institutions, water utilities and community-level water service providers. These institutions are structured to be formally independent but interlinked centers of policy with different levels of autonomy to make and enforce policies in a collaborative manner so as to ensure water is available in the right quantity, cost and quality to the consumers. However, in the last seven years of implementing this polycentric governance model in Kenya, water service outcomes has been less than as expected. Several challenges including institutional cleavages and fragmentation, contestation of functions by different actors and increasing inter-governmental rivalries has persisted thus negating the envisioned benefits of the institutional reforms. This project seeks to establish how institutional structures influences water service delivery outcomes in Kenya. The specific research question shall be to examine the extent to which the nature of relations/interactions and the inherent tensions within the institutional structure (collaborative or autonomous) influences the outcomes in water services delivery (the cost of water and secondly water infrastructure development and ownership).

To answer the research questions, a mixed methods approach will be used. The study will apply both survey and Interview methods. Structured questionnaires and semi-structured interviews targeting key policy makers and service providers such as Ministry of Water officials including the minister for water and other senior ministry officials, senior manager of the water services regulatory Board, senior managers of the regional waterworks development authorities, council of governors' water committee chairpersons – current and past, county government leaders such as governors, county water executives and senior staff, water utility board of directors members, leaders of community-based water operators, development finance institution officials and water sector civil society actors to get information about how the current institutional complexities focused on autonomy of institution and propensity to collaborate among institutions affects water services outcomes. The water services delivery outcomes will be treated from both qualitative aspects and quantitative aspects. To collect data on these variables, the study will also analyze time series data on covering the period 2002 to 2018. This data set will be collected primarily from the Water Services Regulatory Board's (WASREB) Water Regulation Information System (WARIS) database and other national government and county government reports highlighting the trends and contested issues in the cost of water/water tariffs and water infrastructure development and ownership.

The expected outcomes of this research is to make both scholarly contributions and to influence policy changes in the governance of water services in Kenya. Drawing from empirical observations, the study aims at positing a new theoretical framework for understanding the synergistic influence of institutional structuring on public service delivery outcomes

(Virtual) Polycentricity through policy layers: what connects perceptions, financing, and laws of water-uses relationships?

Thomas Bolognesi (Grenoble Ecole de Management)

Governance is polycentric, involving multiple centers of decision and actors. Polycentric governance systems are often complex due to the number of interactions between these centers and actors, wildly when they are conflicting and overlap. In the case of water, this number of interactions is expanded because water uses are multiple and interdependent. Consequently, water governance became a privileged case for studying polycentricity and handling its complexities (Carlisle and Gruby 2019; Lubell, Robins, and Wang 2014; Ostrom 1990). Most studies focus on multi-sectoral, multi-level, or spatial aspects. But governance is also polycentric because combining different policy process layers, the most general being politics, policy, and polity (Hill and Varone 2014).

This paper aims to characterize how these layers articulate in a complex polycentric setting and the factors affecting this articulation. We consider multiple water uses, define complexity as a function of the number of interactions, and focus on three intricated governance layers. We assume that coordination effectiveness depends on the synchronization of the interactions among water uses within and across the governance layers (Teisman and Edelenbos 2011; Renou and Bolognesi 2019). We focus on three layers that are representative of the policy process. The first layer is the perception of interconnections intensity between water uses because perceptions are an important determinant of policy agenda by affecting political demand, policy acceptability, and policy-problem definition (Jones and Baumgartner 2004). The second layer is the financing flows, as they are a critical policy resource (Knoepfel et al. 2011; Lambelet 2019). Through formal laws, the third layer is institutions, as they shape and contribute to defining the actors' behavior.

The water management in the Geneva Canton serves our empirical inquiry. We define 19 different uses, i.e., 340 possible relations among water uses. We surveyed stakeholders to assess the perception of each relation. Then, we measure the financial flows linking each use and report each flow's legal. We use network analyses to delineate the complexity of the system. Results indicate what favors coordination and where are the most significant lack in coordination. They contribute to advance knowledge about what shape polycentric design and policy integration in complex coordination settings.

Carlisle, Keith, and Rebecca L. Gruby. 2019. “Polycentric Systems of Governance: A Theoretical Model for the Commons.” Policy Studies Journal 47 (4): 927–52.

Hill, Michael, and Frédéric Varone. 2014. The Public Policy Process. Routledge.

Jones, Bryan D., and Frank R. Baumgartner. 2004. “Representation and Agenda Setting.” Policy Studies Journal 32 (1): 1–24.

Knoepfel, Peter, Corrine Larrue, Frédéric Varone, and Michael Hill. 2011. Public Policy Analysis. Bristol: Policy Press.

Lambelet, Sébastien. 2019. “Filling in the Resource Gap of Urban Regime Analysis to Make It Travel in Time and Space.” Urban Affairs Review 55 (5): 1402–32.

Lubell, Mark, Garry Robins, and Peng Wang. 2014. “Network Structure and Institutional Complexity in an Ecology of Water Management Games.” Ecology and Society 19 (4).

Ostrom, Elinor. 1990. Governing the Commons. The Evolution of Institutions for Collective Action. Cambridge: Cambridge University Press.

(Virtual) Sustainability performance of water governance systems: a systematic review

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The global water crisis, it has been argued by the United Nations (2006), is largely a crisis of governance. Put positively, it is the way water resources and ecosystems are governed – by state and non-state actors – that makes a difference for the sustainable use of water and the wellbeing of water ecosystems. With the recognition of social and ecological complexities and multifunctional characteristics of water and societal interdependencies, new and diverse governance forms started to evolve (Pahl-Wostl, 2019; Newig and Challies, 2014; Tropp, 2007). Although the body of literature on different water governance regimes and their performance in delivering water-related sustainability has been growing since the 1990s, there is no comprehensive synthesis which would allow to draw robust conclusions on what works and in which

context. Such a synthesis would be critical for providing a sense of direction for the improvement of existing water governance institutions towards sustainability. Taking a global comparative perspective, our study aims to provide a broad synthesis by exploring the “success” and “failure” of water governance systems in terms of water-related sustainability.

Our systematic review includes all published studies listed in Scopus that provide empirical data on water governance systems and their performance on water-related sustainability. Our search string yielded close to 10,000 publications up until the year 2020, around 700 of which were retained for final comparative analysis, covering governance structures and processes from the very local to the global.

Informed by core frameworks on water governance, we present rich and nuanced findings on both the body of literature as a field of research, and on the link between elements (or modes) of governance and their performance in terms of environmental sustainability. For example, we graphically depict co-authorship and citation patterns and the geographical distribution of studies and authors. Our main results relate to patterns across modes of governance and sustainable outcomes. In particular, we investigate the performance of decentralized, centralized, polycentric or fragmented governance; of hydrological versus jurisdictional governance scales; of participatory and collaborative versus state-based governance and more generally of the role of particular private and civic actor groups in governance; of the role of adaptation, experimentation and learning; of sectorially integrated governance (as embodied in the principles of Integrated Water Resources Management and nexus thinking); and of the overall capacity of governance systems.

All in all, the findings of our systematic review allow us to identify the water-related sustainability performance of existing water governance systems, including which (or combination of which) building blocks they consist of lead to a particular water-related sustainability outcome. Through this, we aim to contribute to a better understanding of how the design of a certain water governance system with multi-dimensional interactions and embedded complexities impacts its performance in delivering water-related sustainability.