

Boundary Spanning through Engagement of Policy Actors in Multiple Issues

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Abstract

Prominent current policy problems such as climate change, migration, or the financial crisis embrace a multitude of issues that are tackled within single or multiple policy subsystems. However, interdependencies among actors that arise due to their multi-issue engagement are often discounted when studying policy processes, including learning dynamics and alliance or trust formation among actors engaged in multiple issues. Various issues compete for actors' attention, and actors need to choose an appropriate set of issues to deal with given their scarce resources. In this, why do actors engage in multiple issues? We present an innovative inductive approach that identifies policy issues related to Swiss water politics and actors involved therein. We use a two-mode exponential random graph model to estimate actors' multi-issue activity. Results show that 39% of actors engage in more than one water-related issue and that cross-subsystem and homophily clustering and clustered issue popularity drive this issue engagement.

Keywords. policy subsystem; policy issues; issue engagement; collaborative governance; collective action; policy network

1. Introduction

Since the publication of Downs's (1972) "issue-attention cycle" or Lowi's (1972) work about issue salience and complexity, the nature of, and view on, politically relevant issues has changed dramatically. "Issues" in this case are elements describing the content of a political interaction or negotiation among actors (in contrast to institutions or procedural principles that describe the context for these interactions). Such issues are no longer under the exclusive purview of governments, but rather a wider array of public and private actors, experts, and individuals engage with issues and aim at putting them on the political agenda (Newig et al. 2018; Hamilton and Lubell 2018; Baumgartner and Jones 1991; Gormley 1986). Issues might simultaneously be dealt with in multiple subsystems, and thus in polycentric, decentralized, or multi-level forms of policy making (Galaz et al. 2012; Keohane 2005). Typical subsystems embracing a multitude of issues are climate change (land use, deforestation, adaptation, mitigation etc.) or water (drinking water, recreation, hydropower production, urban water management etc.). Some issues are absorbed by existing subsystems while others provoke the emergence of nascent subsystems (Ingold et al. 2017).

While concepts of collaborative and multi-level governance seem well-positioned to grasp this complexity of issues and actors (Gerlak et al. 2013; Ansell and Gash 2008), little is known about how and why political actors find themselves linked to several issues in parallel. Issues compete for actors' attention, as actors do not have enough resources to engage in a large set of issues simultaneously (Zhu 1992). The goal of this article is to provide empirical evidence about actors' (potentially limited) multi-issue activities. We ask: Why do actors engage in multiple issues?

To answer this question, we rely on a literature review of how issues are dealt with in policy studies and formulate hypotheses based on transaction cost arguments. We use an inductive and

exploratory empirical procedure based on discourse network analysis (Leifeld 2013): We identify all issues related to Swiss water politics at the national level. Examples of issues in the dataset are “landscape protection”, “pollution of protected areas”, “fish mortality”, and “threats of natural water bodies to geological repositories”. Two or more issues can belong to the same or to different subsystems. For example, “hydropower plant concession” and “the construction of new hydropower plants” both belong to the same subsystem of hydropower production. We consider actors that are politically involved in these issues, for instance by drafting policy proposals (typical for lead agencies), lobbying in parliament (typical for environmental NGOs), supervising administrative tasks (typical for peak associations), or that represent the government or parliament (e.g., political parties). The result is a two-mode network of actor–issue involvement that spans 11 subsystems and contains 195 actors and 94 coded issues. We use exponential random graph models (ERGM) (Cranmer et al. 2017) to analyze the structure of the actor–issue network and subsequently suggest reasons for why actors engage in multiple issues.

With this analysis, we make a threefold contribution to the literature. First, we show how actors and issues can be identified taking into account the complexity of modern policy making. Most existing studies consider one single policy subsystem—not least for methodological or resource-related reasons. The approach presented in this paper shows a systematic and practical way to gather data *across* subsystems. Second, our analysis and results contribute to the literature on complex policy making by showing empirical evidence on how and why actors engage in multiple issues at a time. Evidence from our analysis suggests that structural (besides individual or institutional, see Carlsson 2000; Lubell et al. 2012; Lubell 2013) effects such as cross-subsystem closure or issue popularity play an important role in policy making. Third, this study focuses on actors and issues. In contrast with the wide array of literature on polycentric, collaborative or participatory governance (Ostrom 2010; Emerson et al. 2011; Newig et al. 2018), it thus places

particular emphasis on a topic that has, to date, received less scholarly attention than for example actors and institutions (Lubell 2013; Hamilton and Lubell 2018) or direct actor interactions (Leifeld and Schneider 2012; Fischer and Sciarini 2016). We postulate that empirical studies, focusing on policy networks and their engagement in the policy making process, need to openly address multi-issue engagement of actors and factor in this additional layer of complexity. Shared issue engagement offers an additional explanatory factor for understanding alliance or coalition formation and fosters policy learning across subfields. Neglecting it may bias empirical results or misattribute more weight to other factors fostering collaboration patterns among policy actors.

2. Literature on Issues in Policy Making

One central concept in policy making is issue attention (Howlett 1997; Down 1992). Public policies are only formulated if an issue generates enough attention to be put on the political agenda (Baumgartner and Jones 1991). In this context, a core assumption relates to actors' limited capacity to deal with multiple issues at a time: Actors involved in policy making do not necessarily have enough resources such as knowledge, personnel, time, or money in order to engage in several issues in parallel (Zhu 1992; see also Henning 2009).

Different policy process theories provide diverse interpretations of how actors are able to deal with different issues simultaneously. Following punctuated equilibrium theory (Baumgartner and Jones 1991), issues that generate a high level of public attention are the ones which also receive attention by political actors (e.g., experts, actor groups; Howlett 1997) and thus get (re-)formulated. Following the advocacy coalition framework, issues are dealt with in so-called policy subsystems. A policy subsystem is the unit of analysis to study advocacy coalition formation or maintenance, policy learning and change (Sabatier and Jenkins-Smith 1993). A subsystem spans a geographical

area (e.g., local, regional or national jurisdiction), includes actors involved in the specific policy making, and is about one specific topic or content (e.g., migration, water, energy; Jenkins-Smith et al. 2017). In this regard, issues (i.e., drinking water or hydropower) are a subset of this subsystem topic (i.e., water). An issue is absorbed by an existing subsystem (or even creates a new subsystem) as soon as it i) goes along with a societal problem that asks for a political solution (i.e., a policy); and ii) poses a threat to the beliefs of one or more coalitions in the subsystem (see Weible and Ingold 2018). Following the multiple streams framework, policy issues are part of the policy stream. The policy stream exists alongside the problem and the politics streams; all three streams develop in parallel and are relevant in policy making. Only when a window of opportunity opens (through an external shock or new evidence, for example), do the three streams come together, enabling policy change. In this situation, an issue rises to “the top of the primordial soup” and thus becomes well-positioned to get public attention, the support of key actors, and potentially a policy solution (Kingdon 1984; Zahariadis 2007).

Policy process theories thus consider issue (re-)framing, issue absorption by subsystems, or issue processing as crucial preconditions for policy formulation, learning, and change. For a variety of reasons, such as limited attention, limited threat, limited resources, limited salience, among others, they all acknowledge that only one or a few issues at a time can be the focus of an actor.

However, this core assumption about actors’ resources being too limited to engage in multiple issues at a time is challenged by the changing nature of policy problems and policy making. Already Gromley (1986) points to the fact that the regulatory reality is shaped by different issue arenas and so-called issue networks: Actors gravitate to issues for diverse reasons, such as salience of the issue or the role actors play following their organizational affiliation. Different studies argue that actors actually deal with different issues at the same time, as suggested by the literature on sector intersection (Hoberg and Morawski 2008), trans-subsystem dynamics (Jones and Jenkins-

Smith 2009), or the ecology of games (Lubell 2013). There are important spillover effects that go from one issue or subsystem to another (Ostrom 2005; Jones and Jenkins-Smith 2009; Lubell et al. 2017). These studies thus tend to contradict the argument that actors do not have enough resources to engage in parallel processes related to diverse issues. Following the arguments in this literature, we can only understand how actors behave and try to shape policies if we acknowledge a broader set of issues belonging to the same or different policy subsystems.

3. Actors' Multi-Issue Motivation: Theory-Guided Expectations

We know that actors engage in games only if the benefits compensate for their invested resources (Coase 1960; Ostrom 1998). Furthermore, research on linked or nested action arenas suggests that the behavior within any particular situation may depend upon expected outcomes (Ostrom 2005). Following this logic, actors engage in several issues at a time if the benefits of this multi-issue activity outweigh the transaction costs related to it.

Presumably, transaction costs might be low if the issues an actor engages in belong to the same subsystem. Within a subsystem, actors formulate policies to solve a previously identified problem that falls into the scope of the broader political topic (such as sustainable crop irrigation or energy transitions implementing the nuclear phasing out). Actors within a subsystem tend to build so-called advocacy coalitions based on shared beliefs and world views, and coalitions within a subsystem tend to remain stable over time (Sabatier and Jenkins-Smith, 1993). This leads us to the first expectation that actors that identify with a given subsystem will tend to deal with several issues belonging to this subsystem (see Table 4 for a graphical illustration).

Beyond this basic assumption on actors engaged within one subsystem, we elaborate on three more reasons why actors engage in issues, more specifically in issues not belonging to the

same subsystem. First, Gormley (1986) has shown evidence that policy making varies depending on the salience and complexity of issues and that issue salience influences actors' engagement. Actors' perception on the urgency and salience of an issue affects the timing of policy making and the attention an individual or organization dedicates to an issue (Wlezien 2005). This phenomenon can be described as "issue popularity". Popular issues—issues that many other actors and the broader public talk about—offer broader public interest, and strategic actors may insert themselves into the discussion of a popular issue to gain publicity and strategic advantages in the political discussion (Hecl 1978). Given that actors might get higher pay-offs from engaging in popular issues, we expect actors to participate in issues if those issues are popular.

Second, the policy network literature claims that policy outcomes are influenced by individual actor attributes as well as by actor interactions (see Lubell et al. 2012; Fischer 2017). Network closure – an important structural pattern in actor networks – describes the phenomenon that the interconnectedness of political actors tends to increase over time (Coleman 1990; Ingold 2014). Given that this interconnectedness lowers transaction costs of actors, we expect actors to engage in issues with actors they already know because they engage in other issues together. Whenever actors engage in issues that lie outside their core interest or expertise (i.e., issues outside their core policy subsystem), they need to rely on information from actors they know and trust. Trust and reputation are two key concepts of collective action, primarily in situations where actors have the chance to meet each other repeatedly (Ostrom 2005; 2010).

Finally, the fourth expectation about multi-issue activity relates to so-called actor type homophily. It refers to the fact that actors of the same type have a tendency to engage in the same issues. One explanation for the emergence of clusters of similar actors is that actors may try to imitate or mimic their peers. Similarly, actors of the same type might relate to the same issues because these actors play the same role in the policy design or implementation process or because

they are affected by the problem and issue at stake to a similar degree or have similar areas of expertise (Calanni et al. 2015; Maag and Fischer 2018; Malang et al. 2019; Weible 2008). Furthermore, actors of the same type tend to be active in the same institutional venues, in the same stages of a policy process, and have access to the same pieces of information and therefore tend to cluster together.

4. Case and Research Design

The water sector is one of the most prominently studied sectors of public policy in general, and in the collaborative governance and socio-ecological systems literatures in particular (Berardo and Lubell 2016; Schlager and Heikkila 2009; Weible and Sabatier 2005). Existing studies highlight the variety of issues, actors, and decisional levels that are involved in policy making aiming at water resource regulation (see also Gooch and Stalnacke 2010; Bressers et al. 1995; Vogel et al. 2015; Gooch et al. 2010). Given that water policy spans diverse issues and subsystems simultaneously, we take this as an ideal case to examine our question. More concretely, we approach the complexity of issues and actors by systematically linking actors to issues they are involved in. This is similar to the ecology of games framework (Lubell 2013; Lubell et al. 2014), which aims to understand complex governance systems by relying on a two-mode network between actors and forums. Instead of forums, we identify actors relating to issues. We thereby keep the larger institutional setting and the overall topic constant by concentrating on national policy making related to the resource water in Switzerland.

Swiss water policy making is an ideal case for several reasons. Switzerland is the “water castle” of Europe, as several main watercourses, such as the Rhone or Rhine rivers, have their origin in the Swiss Alps. Through its integrative and consensus-oriented direct-democratic system

and federalist structure, the country has the institutional pre-conditions to account for the multi-level and boundary spanning nature of water (Kriesi and Trechsel 2008; Sciarini et al. 2015). Finally, Switzerland is a small country where water scarcity or floods also have an immediate impact on issues such as water pollution or protection. This setting thus helps us to distinguish between issues belonging to the same subsystems (such as hydropower and nuclear phasing out belonging to “water and energy”) and to different subsystems (such as hydropower and micropollutants belonging to “water and energy” and “water contamination”, respectively).

While being inspired by the policy network literature, we do not follow most aspects of traditional actor identification in that literature (see Knoke et al. 1996). Instead, we proceed in an inductive and exploratory manner: We identify issues first and then identify actors dealing with these issues. We define actors as collective, public, or private organizations that are responsible for, interested in, or concerned by policy making related to the identified issues.

5. Data and Methods

5.1 Data Gathering: Coding Actor–Issue Relations

We rely on documents from two distinct, broad venues: the media, largely covering issues related to public opinion and attention regarding an overall topic, and parliament, where only issues that get onto the political agenda are covered. Both are important venues for policy making (Kingdon 1984, 1995; Baumgartner and Jones 1991) and have a broad focus. A combination of both media and parliament thus allows us to cover a maximum of actors and issues.¹

We chose the Swiss-German quality newspaper *Neue Zürcher Zeitung*² for the media analysis and the Swiss online database of parliamentary proceedings *Curia Vista*³ for covering the parliament. We inductively defined three key words we expected would catch all water-related

documents from both sources. We used the three basic terms *water* (“Wasser” in German), *water body* (“Gewässer” in German), and *lake* (“See” in German) to identify articles dealing with water-related issues in the media and in parliamentary proceedings.⁴ For comparability, we limited the period to 2013, that is, the last full calendar year at the time of the start of the data collection procedure (summer 2014).⁵ 3,983 media articles and 207 parliamentary proceedings⁶ containing water-related issues were identified. These articles were then manually screened, and 451 and 125 documents, respectively, were retained for coding as they clearly addressed water-related issues on the national political agenda⁷. All the other articles were classified as non-relevant as they did not address water-related issues (for example, only using the water-related words in other contexts) or did not relate to water politics at all. The three keywords used in the first step provide a precision value for relevant and potentially relevant articles and proceedings of 11 and 60 percent, respectively.⁸

The second step in the data gathering process aimed at increasing our confidence in the selection procedure based on the three keywords *water*, *water body*, and *lake*. We tested the keywords against an extended list of other terms related to water topics, such as rivers (“Flüsse”), glaciers (“Gletscher”), or pumped-storage hydropower plant (“Pumpspeicherkraftwerk”). We calculated the recall percentage for each of the terms on the extended list. Recall refers to the number of relevant documents retrieved from the total number of relevant documents in the database (Powers, 2007). All 46 additional terms yielded a recall of above 98%, justifying our three broad key words (for the list of 46 additional terms and further information on the second step in our coding procedure, please refer to section 1 in the Supplementary Information (SI) Online).

In the third step of our data gathering process, we coded actors and issues in the identified documents using the software *Discourse Network Analyzer* (Leifeld 2016). For each article, all relevant issues (e.g., micro pollution in water bodies, building a new hydropower production plant,

or improving flood protection measures) were identified, and then actors linking to those issues were coded. We decided not to use a pre-defined list of issues, and rather coded the issues as they were mentioned in the documents. Our goal was to collect actors and issues free from standard top-down coding rules and instead use an inductive and exploratory approach.

The coding proceeded as follows: For each issue, all previously coded issues were examined for suitability. If no previous issue suited the current issue, a new issue was created. Over the course of the entire coding process, previously coded documents were revisited and recoded if a new issue offered a better fit. For instance, the issue “promoting hydropower production” was first chosen but later split into two issues, “promoting hydropower production” and “construction of new hydropower plant”, and all previous articles were recoded to fit the two categories. This coding procedure resulted in 94 unique issues relating to Swiss water policy. For each issue, the actors dealing with the issues were coded as well.⁹ This results in a two-mode network of actors linking to issues.

5.2 Coded Subsystems and Actor Types

Each of the 94 identified issues was subsequently assigned to one out of eleven subsystems. Issues were assigned to subsystems based on context knowledge and information gained from the coded documents. We presented the coded subsystems to four experts in the field of Swiss water politics to ensure no relevant subsystem was missing. All four experts approved our list of subsystems.

Table 1 details the subsystems with actor and issue counts. The “water energy subsystem” and the “protection of water and water contamination subsystem” are the two largest subsystems, with 24 and 20 coded issues, respectively, and 75 and 69 active actors involved, respectively. Table 2 lists the 10 most popular issues and indicates their respective subsystem. The issue with most

actor involvement (25 in total) concerns the expansion of Swiss hydropower in the water energy subsystem.

Apart from subsystems, we also coded actor types for each of the 195 identified actors involved in Swiss water policy (Table 3). Party actors and interest groups are the largest two groups (with 46 and 39 unique actors, respectively). However, state actors show the broadest involvement in issues (with 30 state actors involved in 57 issues).

--- Table 1 about here ---

--- Table 2 about here ---

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5.3 The Two-Mode Network of Actor–Issue Relations

To capture actor–issue relations, we cast our coded actors and issues as a two-mode network. Two-mode networks are a specific type of network where the sender nodes and the target nodes are distinct types of nodes, also referred to as the first and second mode. These networks allow ties between the modes, not among them (Borgatti and Everett 1997; Agneessens and Everett 2013; Jasny and Lubell 2015). Existing research in policy studies has mostly analyzed two-mode networks between actors and decision venues, but not between actors and issues (Jasny and Lubell 2015; McGinnis 2015; Lubell 2013).

In our case, a network tie between an actor and an issue means that the actor dealt with that particular issue, as identified through the document analysis. For example, a media article on the

construction of a new hydropower plant in Puschlav, Switzerland, first names the firm in charge of the project. The article then goes on to name a member of the government council of the Canton Grisons and the president of the municipality of Puschlav, who both avidly support the project in their roles as representatives of the canton and the municipality, respectively. All three actors share a link to the issue “construction of new hydropower plant”. Thus, we analyze a two-mode network with the first mode representing the actors and the second mode representing the issues that are being debated in Swiss water politics.

In total, the network contains 489 actor–issue relations and is depicted in Figure 1. Figure 1 also illustrates the complexity involved in studying the relationship between actors and issues. Out of 195 identified actors, 183 are part of the large component. Similarly, 89 out of 94 issues are connected to each other, forming a large central component with only very few isolate actor–issue relations.

5.4 Methods

We first conduct a descriptive analysis of the two-mode network of actor–issue relations in Swiss water politics. We then continue to examine actor–issue relations in closer detail and assess them using exponential random graph modeling (ERGM; for applications in policy studies, see Lubell et al. 2012; Leifeld and Schneider 2012; Park and Rethemeyer 2012; Fischer and Sciarini 2016; Ingold and Leifeld 2016). We chose not to transform the two-mode network into a one-mode network of actor–actor relations in order to prevent modeling problems that arise with projection.¹⁰ Instead, we model the network as-is and employ a two-mode ERGM (Jasny 2012), identifying the potential factors behind a tie between an actor and an issue. ERGMs simulate the interplay of the model terms and compare the simulation results with the empirically observed network in order to

fit the model iteratively (Cranmer et al. 2017). Estimation is carried out using Markov Chain Monte Carlo Maximum Likelihood Estimation (MCMC MLE) as the number of possible permutations in the normalizing constant of the likelihood function is too large for exhaustive enumeration (Robins et al. 2007). Finally, this allows us to conclude whether an element of the structure of the observed network—our dependent variable—is due to pure chance or if there exists a systematic driver causing the specific network structure to appear.

Because the probability of any network tie depends on the structure of the entire network, the modeling process for network data in ERGMs is somewhat different from conventional regression analyses, where the outcome variable is only expected to be influenced by exogenous covariates, not endogenously (Cranmer and Desmarais 2011; Cranmer et al. 2017). ERGMs can consider both endogenous and exogenous explanatory factors. Endogenous factors refer to the presence of patterns in the network that are unlikely to be the result of a random process, such as reciprocity or the formation of triangular structures. Exogenous factors include so-called node covariates (does a characteristic of a node affect the probability of that node to have ties?) and tie covariates (does the existence of parallel, exogenous ties affect the probability of a tie in the network?).

We use four two-mode network statistics: In accordance with our first expectation, we control for the fact that multi-issue involvement is driven by subsystem homophily, that is, that actors are involved in different issues belonging to the same subsystem. We operationalize this first pattern as a clustering term related to our subsystem variable and add it to the model through an exogenous dyadic covariate, which tests whether an actor is more likely to connect to an issue if the actor is also connected to a large share of other issues from the same subsystem. The term calculates the number of issues k an actor i is engaged in within the same subsystem as focal issue j , divided by the total number of issues that actor i is engaged in, and then tests whether this share

significantly explains actor i 's tie or non-tie to issue j .

The three additional model terms relate to lower transaction costs and/or higher benefits for actors getting involved in issues across different subsystems. The second term captures issue popularity. The term measures the tendency of actors to get involved in issues that are also densely populated by other actors. We operationalize this by counting the number of actors that are involved in a specific issue j . A positive coefficient for this model term would indicate that actors tend to become engaged in issues if larger numbers of other actors populate this issue. The third statistic captures clustering tendencies (four-cycle closure) across subsystems by counting the number of actors that are co-involved in two issues from different subsystems (see Table 4). By spotting familiar actors (due to shared issues), actor i may choose to engage in issue j simply because a large number of actors whom i deals with in other issues k are involved. The shared actor in the issue j allows actor i to reduce its transaction costs, as this actor already knows i and its preferences. Furthermore, actor i may be able to leverage a deal on issue j that benefits this actor's involvement in other issues k as well. We operationalized this third endogenous term as a geometrically weighted non-edgewise shared partner statistic (Hunter 2007) for the second mode and with issue heterophily – a custom endogenous ERGM user term. We expect to find a positive coefficient for the term, which would indicate that network closure takes place *across* subsystems. The fourth model term captures actor type homophily. We use a simple test of homophily, by checking whether actors of the same types cluster together. We operationalize this by counting the share of actors k involved in issue j that share actor i 's type and use it in a dyadic covariate to explain actor i 's involvement in issue j . A positive coefficient indicates that actors tend to cluster together based on their type. It should be noted that the causal link cannot be tested in this cross-sectional design. It is possible that some actors actively recruit other actors of the same type to an issue or that actors of the same type tend to select the same issues. In this cross-sectional design, we cannot distinguish

between the two mechanisms and can only identify whether actor-type clustering takes place at a higher rate in the observed network compared to the random networks. Table 4 offers a mathematical and graphical representation of the main terms included in our model. We include an actor activity term to control for underlying tendencies of actors to engage in multiple issues as well as different activity levels of different actor types. Both terms are explained in full detail in the SI Online. The actor activity term as well as the third term described above are fully endogenous while the two hypotheses for two-mode homophily (first and fourth model term), issue popularity (second model term) and the actor type activity term are tested locally using exogenous dyadic covariates.

We use the *ergm* package (Hunter et al. 2008) in *R* (R Core Team 2020) to estimate the two-mode ERGMs. We used the *ergm.userterms* package (Hunter et al. 2013) to build the appropriate change statistic for the new cross-subsystem clustering term and generated covariate matrices for the two homophily terms. We performed goodness-of-fit analyses on all the models using the *btergm* package (Leifeld et al. 2018) by comparing network statistics to 200 simulated networks based on the estimation of the model. The full model reports an appropriate fit, which means the estimated coefficients can be substantively interpreted (Cranmer et al. 2017; see Appendix).

--- *Figure 1 about here* ---

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6. Descriptive Analysis: Mapping Actor–Issue Relations

6.1 Actors' Relations to One or Several Issues

As seen in Figure 1, the network of actors and issues presents a complex cluster of nodes clearly stratified neither by subsystem involvement nor by actor types. Under the assumption that actors deal with only one single issue, the network would present itself as a loose set of components, each with one issue at the center and several actors connected to it. If actors only dealt with different issues belonging to the same subsystem, we would see different, unconnected components with issue nodes of the same color. However, we see a complex network with varied actor–issue relations, with colors indicating different subsystems not clearly clustering together. Figure 2 shows that whilst 119 out of 195 actors (approx. 60%) are involved in one issue alone, 76 actors (approx. 40%) deal with multiple issues in parallel. The simple fact that actors deal with various issues is not as informative in and of itself, as actors could deal with issues all belonging to the same subsystem. Therefore, the colored bars in Figure 2 show the number of subsystems that the issues actors are dealing with belong to. For example, among the 42 actors dealing with exactly two issues (second bar from the left), 15 actors (36%) deal with two issues belonging to the same subsystem (dark blue), and 27 actors (64%) deal with two issues belonging to different subsystems (clear blue). Overall, almost 70% of all actors involved in two or more issues deal with issues that cross subsystem boundaries.

A closer look at the actor involvement in issues and subsystems shows that state actors, party actors and science actors show higher rates of multi-issue involvement across subsystems than other actors (see Figure 3). A majority of municipal or cantonal actors, private firms, and interest groups deals with a single issue, although a small group of interest groups is also involved in multiple issues across several subsystems.

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--- Figure 6 about here ---

--- Figure 7 about here ---

The 60% of actors¹¹ involved in a single issue mostly represent actors that are clearly active in other broad topics than water and intersect with the water topic on very specific issues only (see Table 4 in the SI Online for a full list of all 195 actors and the number of issues and subsystems they are involved in). For instance, the Federal Office of Public Health (ID 122) is involved in the issue of water pollution caused by radioactive substances (ID 35). Clearly, water pollution is not this Federal Office's focus. Similarly, the Swiss Catholic Lenten Fund (in German: Fastenopfer, ID 58) got involved in the issue of water scarcity due to land grabbing (ID 33) and is not expected to be involved in other Swiss water policy issues as it mainly deals with development cooperation and humanitarian aid. Another example is the tax administration of the Canton of Valais (ID 92), which in 2013 dealt with the issue of taxation of hydropower plants (ID 31). These examples indicate that the bottom-up approach to gathering actor involvement captures a broad range of actors that may have been neglected by alternative data collection procedures.

6.2 Actor–Issue Relations Within and Beyond Subsystems

Different types of actors are involved in multiple issues across several subsystems, with the largest share stemming from party and state actors (as can be seen in Figure 3). This is not surprising, given that state actors may carry out a mandate that demands cross-issue and cross-subsystem involvement, and party actors need to be involved in multiple issues to fulfill their role as representatives of the public's interest.

A focus on subsystems instead of actors is more interesting in this regard: Some subsystems attract more actors that deal with many other issues themselves and are thus more strongly connected to other subsystems. An example is the biodiversity subsystem, which takes a rather central position in the respective network due to the involved actors spanning most other subsystems. Figure 4 shows the simplified two-mode network of actors and their subsystem involvement and the central role of the biodiversity subsystem. Biodiversity issues include the conservation of aquatic habitats, protection of said habitats, and more specific issues related to fish mortality or mobility. As such, involved actors span energy issues, protection of water, or spatial planning, to name a few. Indeed, most subsystems share at least one actor with another subsystem. Figure 5 indicates the number of actors that are involved in any two subsystems. The upper triangle encompasses all actors while the lower triangle depicts only state actors. This illustrates that subsystems are related not simply by state actors that are mandated to be involved in a broad range of issues. Even though state actors account for a large fraction of cross-subsystem involvement, they do not account for all of it, indicating that other actors hold important cross-subsystem positions as well. How subsystems are related can be seen in the larger number of actors involved in biodiversity issues and protection of water issues or in the involvement in energy issues and protection of water issues. However, some clusters are less obvious: Almost half of all actors involved in biodiversity issues are also involved in energy issues, reflecting a strong relation between these two subsystems. We illustrate this relation with qualitative evidence in the form of

two examples. The first example relates to the involvement of environmental interest groups in water energy issues, and the second example examines the involvement of hydropower production actors in water contamination issues.

Looking closely at Figure 6, the first example shows that the cluster of energy issues (light purple triangles) is interspersed by an issue belonging to the biodiversity subsystem (issue ID 22, blue triangle). Issue 22 deals with the provision of protected aquatic habitats, such as wetlands. The protection of these habitats often clashes with hydropower production projects, as in the case of the Grimsel hydropower station. Here, involved energy firms petitioned to increase the dam and were boycotted by NGOs and local interest groups because the increased flooded area would span into the nationally protected wetland area. What is interesting is that many of the interest groups got involved in a new hydropower production project in the Trift area. As there were no protected habitats threatened in the Trift area, NGOs and interest groups had no direct claim to get involved in this issue. However, they heavily mobilized in favor of the Trift hydropower plant, in order to negotiate a deal with the involved hydropower production firms to abandon their plans to increase the dam in the Grimsel area. As such, these issues cluster together, forming a complex network of issues and actor involvements. The example illustrates that actors actively negotiate and bargain over multiple issues, and that the outcome in one negotiation may affect the outcome or actor involvement in another.

A second example of a strong relation between two subsystems can be examined surrounding issue 35 (see Figure 6). The issue deals with radioactive substances in water bodies. The issue gained popularity after the 2011 Fukushima incident. Spurred by the Green party, federal offices¹² were asked to investigate potential sources of contaminations and prepare action plans in case of a leak of radioactive substances from one of the Swiss nuclear power plants. These issues have relations to several other issues on nuclear safety and water-related dangers, such as impacts

of radioactive substances on the environment (biodiversity issue), micro-pollution issues (water contamination issue) or flood preventions (protection from water issue). Interestingly, the issue also ties to hydropower production issues via three shared actors, one of which is the power station Bern (in German: Berner Kraftwerke BKW, ID 47). The Fukushima incident generated a broad discussion on renewable energy sources and the role of hydropower in Switzerland's transition towards sustainable energy production. The BKW used the media attention to postulate a promotion of clean hydropower production by engaging in the discussion on the threat of radioactive water contaminations via damaged nuclear power plants. Therefore, even though not directly involved in the issue of radioactive substances in water bodies or the subsystem of protection of water and water contamination, the BKW nevertheless chose to become involved to promote their own interests in the water energy subsystem.

These two qualitative illustrations show that issue involvement can go beyond subsystem homophily and play to some actors' strategic involvement in popular issues or issues that give them a strategic advantage. In conclusion, this extensive cross-subsystem involvement of actors shows that within-subsystem involvement does not represent the full activity of actors involved in Swiss water policy.

7. Modeling Actor–Issue Interactions

Figure 8 reports the results of the ERGM.¹³ Actors have a strong tendency to be involved in multiple issues as shown by the highly significant and positive effect of the actors' activity term (GWdegree, mode 1) that is included as a control variable.

The positive (and significant, as indicated by the confidence intervals not passing zero) effect of subsystem homophily indicates that multi-issue involvement is dominated by actors'

engagement in issues that belong to the same subsystem. However, whereas this result is in line with descriptive findings, we also observed actors with different issue profiles. As the graphical representation of the two-mode network in Figure 1 shows, subsystem homophily is not the only factor driving multi-issue involvement. Indeed, the subsystem homophily effect alone cannot capture the full data-generating process of the two-mode network. Accordingly, the model's predictive power improves substantially if we include the three additional explanations that model cross-subsystem involvement (see Section 4 in the SI Online).

--- Figure 8 about here ---

A first complementary explanation for actors' multi-issue involvement is issue popularity. This effect is significant and positive: Actors tend to link to other popular issues. The cross-subsystem clustering term also shows a positive and significant effect. This indicates that actors tend to span subsystems through issues with a high number of shared actors. We further examined whether actors tend to group together with their peers. Our results can only weakly confirm this fourth expectation. The actor type homophily term is positive, yet shows large confidence intervals and was rather unstable in other configurations of the ERGM (e.g., it was the only term that fluctuated from significant to non-significant by adjusting the decay parameters in the two geometrically weighted terms). There is some tendency in the two-mode network for actors of the same type to cluster together on issues; however, the results are not robust and should therefore be interpreted with caution.

As for activity of actors from different actor types, both municipal and cantonal actors as well as private firms show a lower tendency to get involved in issues than state actors. No effect is present for the other actor types, however, indicating similar levels of activity among state, science,

party actors, and interest groups.

8. Discussion

We investigate the basic assumption if actors are only capable to deal with one or few issues in parallel or if and why political actors deal with several issues simultaneously (Hoberg and Morawski 2008; Jones and Jenkins-Smith 2009; Lubell 2013). Our results show that a considerable part of actors (39%) indeed deal with more than one water-related issue. Given that many of these actors are probably involved in other issues not related to water, which are not included in our analysis, it is more appropriate to assume that half or more of the actors engaged in policy making deal with at least two issues at the same time. However, this finding does not apply equally to all types of actors: Most municipal and cantonal actors, private firms, and interest groups have a narrow issue profile and focus mostly on single issues. State actors and science actors deal more often with two or more issues at the same time. The majority of party actors deals with at least two issues.

Topical connections between issues, that is, issues belonging to the same subsystem, are an important factor guiding the multi-issue involvement of actors engaged in a complex policy making system. Again, this finding can be further qualified based on results from the descriptive analysis. As mentioned above, especially interest groups and private firms have rather narrow issue profiles, in the sense that most of them deal with only one issue. Furthermore, those who deal with several issues have a narrow subsystem profile, as the issues they deal with often belong to the same subsystem. This corresponds to the more punctual involvement of these actors in politics mostly related to very specific issues. Subsystem homophily applies less strongly to science, state and party actors. State actors and party actors typically deal with a broad range of issues, and have an

interest in brokerage, compromise finding, and logrolling across issues. Overall, subsystem homophily is an important factor that structures the complex network of actors and issues. Actors tend to relate to multiple issues when they belong to the same subsystem. We find empirical support for this first expectation, however with differences with respect to actor types.

Our results provide further evidence for other factors motivating actors to engage in multiple issues at one time. Following the descriptive analysis, actors tend to engage in already popular issues that other actors engage in: The power station Bern (Berner Kraftwerke, ID 47) provides an example through its involvement in the issue of water contamination through radioactive substances. Although not directly affected by the issue, this electricity supplier chose to use the media attention to propose the promotion of clean and sustainable energy production as the solution to the problem. Research on policy debates has shown that issue popularity is an important aspect of actor–issue links (Leifeld 2014; see also Baumgartner and Leech 2001) and corresponds to a form of preferential attachment (Barabási and Albert 1999). The ERGM confirms this important mechanism in the network structure. Highly popular issues do seem to create local hubs in the actor–issue network and, as such, make the network more densely connected. This implies that empirical studies focusing on single policy subsystems or even issues need to pay close attention in their actor selection process to also capture actors that are not topically-related to the issue but rather engage in the issue because of its popularity.

We further tested whether actors tend to relate to issues that familiar actors are also dealing with. The presence of such an effect is an indicator that actors choose issues not simply because they belong to the same subsystem, but also because the involvement in these issues gives these actors advantages in the policy process. Leifeld and Schneider (2012) have shown that actors use their network ties to improve their position and to leverage resources. Similarly, we observe that actors build trust and bond with actors with whom they engage in other issues from different

subsystems. This is a crucial finding as it highlights the importance of issue sharing in policy making processes as an explanatory factor for collaboration ties among actors.

Finally, we do not have clear results for actor type homophily: On average, issues attract a mix of different types of actors. Consequently, the broad topic of water policy seems to correspond to a collaborative governance setting (Ansell and Gash, 2008). However, our results also suggest that different actor types behave differently in this multi-issue setting, which we further discuss below in the conclusion.

9. Conclusion

In the broad sense, in this article we asked why actors engage in multiple issues. To investigate this multi-issue activity of actors, we analyzed the actor–issue network in Swiss water policy and used descriptive and inferential social network analysis. The most important findings and their implications for policy studies are the following: First, a large part of actors does indeed deal with several issues at the same time, but there exist important differences between actor types. Second, policy subsystems as defined in a top-down way, based on topically similar issues, are an important factor that structures actors' issue involvement. Again, differences exist across actor types, and party and state actors tend to be involved in more cross-subsystem activities than other actors are. Third, issue popularity is another important factor influencing actors' issue involvement, which also accounts for actors' cross-subsystem issue involvement. Knowing more about issue popularity can have some practical implications: When drafting their own agenda and setting legislative priorities, decision-makers and state authorities can rely on this information. Issues that receive high public or media attention might also be those where policy making seems urgent and thus most justified. One downside, however, might be that the more popular an issue is, and therefore the more actors pay attention to it, the more complicated, costly, and complex policy making

becomes (as opposed to “quiet politics”, see Culpepper 2010; Angst 2018). This holds especially true for popular issues that are crowded by actors with no straightforward interest in the issue, i.e., actors who want to use the issue attention to foster their own agenda. Transaction costs in relation to participation and policy coordination might increase as a result, and, finally, issue popularity decreases again. Fourth, we can confirm that actors engage in issues because these issues link them to actors they already know from other issues. The positive closure effect gives some indication about the presence of a collaborative governance setting: Actors who frequently engage in similar issues have the chance to meet more easily and to start engaging in collaboration. These effects related to issue interdependencies warrant future research. We posit that shared issue engagement can increase the bond between actors, foster trust, and improve coalition formation processes and enhance policy learning; all of which can provoke policy change (see Moyson et al. 2017; Nohrstedt 2010). Negative side-effects, such as adherence to status quo solutions due to locked-in coalitions, however, may also persist due to increased issue sharing among actors. Finally, how actors engage in multiple issues is also a relevant question related to literatures of policy integration. How actors are able to engage in multiple issues simultaneously can affect their capacity to produce policies that span multiple sectors, such as e.g., environmental aspects in financial policies. All three aspects need to be addressed in future research.

Our results stem from a first attempt to systematically analyze the complexity of actor–issue relations across different policy subsystems. We have tried to identify important mechanisms on the theoretical level and related network substructures on the empirical level, but it is important to realize that these structures often overlap in reality. Our findings should be further tested and refined in future studies. For example, while we relied on our best case and context knowledge to categorize issues into topically related issue sets, corresponding to subsystems, this procedure could be refined by relying on ongoing policy processes, policy documents, or other sources

normally used for identifying and delimiting policy subsystems (see also Angst 2018). Also, while we claim that it is important to look beyond policy subsystems, our analysis is obviously also limited to a small part of the overall network of actors and issues dealing with all potentially relevant policy problems in a governance system. Our focus on water-related issues allowed the identification of many issues and subsystems, but we still had to draw borders at some point, which has implications for the analysis. For example, an actor dealing with the issue of micro-pollutants might appear in our network as an actor dealing with one single issue as they are not involved in any other water-related issue. However, this actor might deal with other, non-water-related (and thus not included in our sample) issues, such as the control of chemical substances, industry, or health. Furthermore, as discussed in Footnote 1, while we relied on two different data sources, we still cannot exclude that given actor types or issues are over- or under-represented in our sample, which again might affect our findings. Finally, our data represent Swiss water policy making only. Given that most results correspond to broader theoretical assumptions, we are confident that results have a broader validity, and are applicable to other topical areas and institutional contexts.

Overall, many actors are involved in multiple issues, and both actor and issue characteristics appear to influence these actor–issue interactions. These findings have important implications and speak to Lowi’s (1972) groundbreaking work about issue characteristics (such as salience or complexity) that impact actors’ inclusion and exclusion in policy making. Within-subsystem dynamics (collaborative or adversarial, see Weible 2008) then shape the activities (such as coordination) of different actor types: Future research should thus not only focus on actor and issue characteristics and relations, but should take subsystem dynamics into account to explain actor–issue interactions and investigate consequences of these patterns for the negotiation of policy outcomes.

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Subsystem	# Issues	# Actors
Water energy issues	24	75
Protection of water and water contamination	20	69
Biodiversity	12	19
Water supply	7	23
Development	6	7
Water use and tourism	5	27
Transport	5	9
Agriculture	4	25
Spatial planning	4	13
Climate change	4	11
Protection from water	3	9
Total	94	195

Table 1. Subsystem summary table. 11 subsystems were coded. The second column contains the number of issues pertaining to a particular subsystem, and the third column contains the number of unique actors that are engaged in each subsystem.

Issue	ID	Subsystem	#Actors	# Actor types
Expansion of hydropower production	7	water energy issues	25	6
Profitability of hydropower production plants	6	water energy issues	19	5
Water pollution caused by radioactive substances	35	protection of water and water contamination	16	4
Construction of new hydropower plants	17	water energy issues	15	5
Energy strategy 2050	38	water energy issues	11	4
Hydropower accident	16	water energy issues	10	5
Easing of water protection law	40	protection of water and water contamination	10	4
Micropollutants	21	protection of water and water contamination	9	4
Loss of cultivated land due to water protection laws	24	agriculture	9	4
Compensatory feed-in remuneration	42	water energy issues	9	4

Table 2. List of 10 issues with largest number of actors involved (i.e., degree of centrality on the second mode)

Actor types	# Actors	# Issues	# Subsystems
Municipal and cantonal actor	32	26	7
Interest group	39	41	9
Party actor	46	57	11
Private firm	37	25	8
Scientific actor	11	20	8
State actor	30	57	11

Table 3. Actor type summary table. Six different actor types were coded. The second column indicates the number of unique actors for a given actor type. The third column indicates in how many unique issues (or subsystems in the last column) all members of one actor type are involved in.

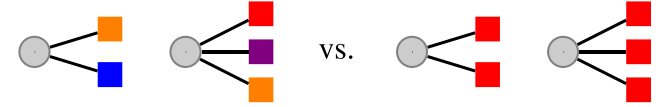
Model term Operationalization

Interpretation

Multi-issue involvement in similar issues:

Subsystem homophily

$$h_{\text{subsystem_homophily}}(N, a) = \sum_{i,j} \frac{\sum_{k|k \neq j} N_{ij} N_{ik} a_j a_k}{\sum_{k|k \neq j} N_{ij} N_{ik}}$$



Other explanations for multi-issue involvement:

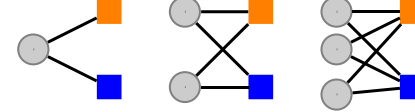
Popularity

$$h_{\text{popularity}}(N, a) = \sum_{i,k|k \neq i,j} N_{ij} N_{kj}$$



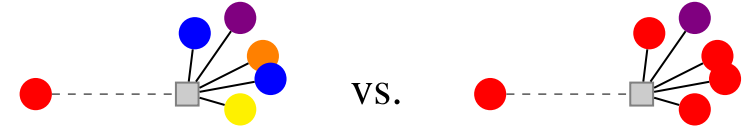
Cross-subsystem clustering (closure)

$$h_{\text{gwb2nsp}}(N, a, \theta_s) = e^{\theta_s} \sum_{i=1}^{n_k-2} \{1 - (1 - e^{-\theta_s})^i\} NSP_{ik} a_j a_l$$



Actor type homophily

$$h_{\text{actortype_homophily}}(N, a) = \sum_{i,j} \frac{\sum_{k|k \neq i} N_{ij} N_{kj} a_i a_k}{\sum_{k|k \neq i} N_{ij} N_{kj}}$$



Control variables include: Actor activity (gwb1 degree) and activity levels of different actor types (node factor, state actors are baseline).

Annotations for $h_{\text{subsystem_homophily}}$: k refers to the issues that tie to the same actor i as focal issue j .

Annotations for $h_{\text{popularity}}$: k refers to the number of actors that connect to the same issue j as the focal node i .

Annotations for h_{gwb2nsp} : NSP_{ik} refers to the number of shared actors two issues j and l have in common. We chose a decay parameter of $\theta_s = 1.2$ for the down-weighting of large counts. a_j and a_l refer to the subsystem each issue belongs to.

Annotations for $h_{\text{actortype_homophily}}$: N_{ij} refers to a tie between actor i and issue j . The term measures the fraction of other actors k that connect to the same issue j and have the same actor type a as focal node i , over the total number of other actors k that are connected to j .

Table 4. Model term specifications testing factors that affect multi-issue involvement using ERGM. Circles represent actors, squares represent issues.

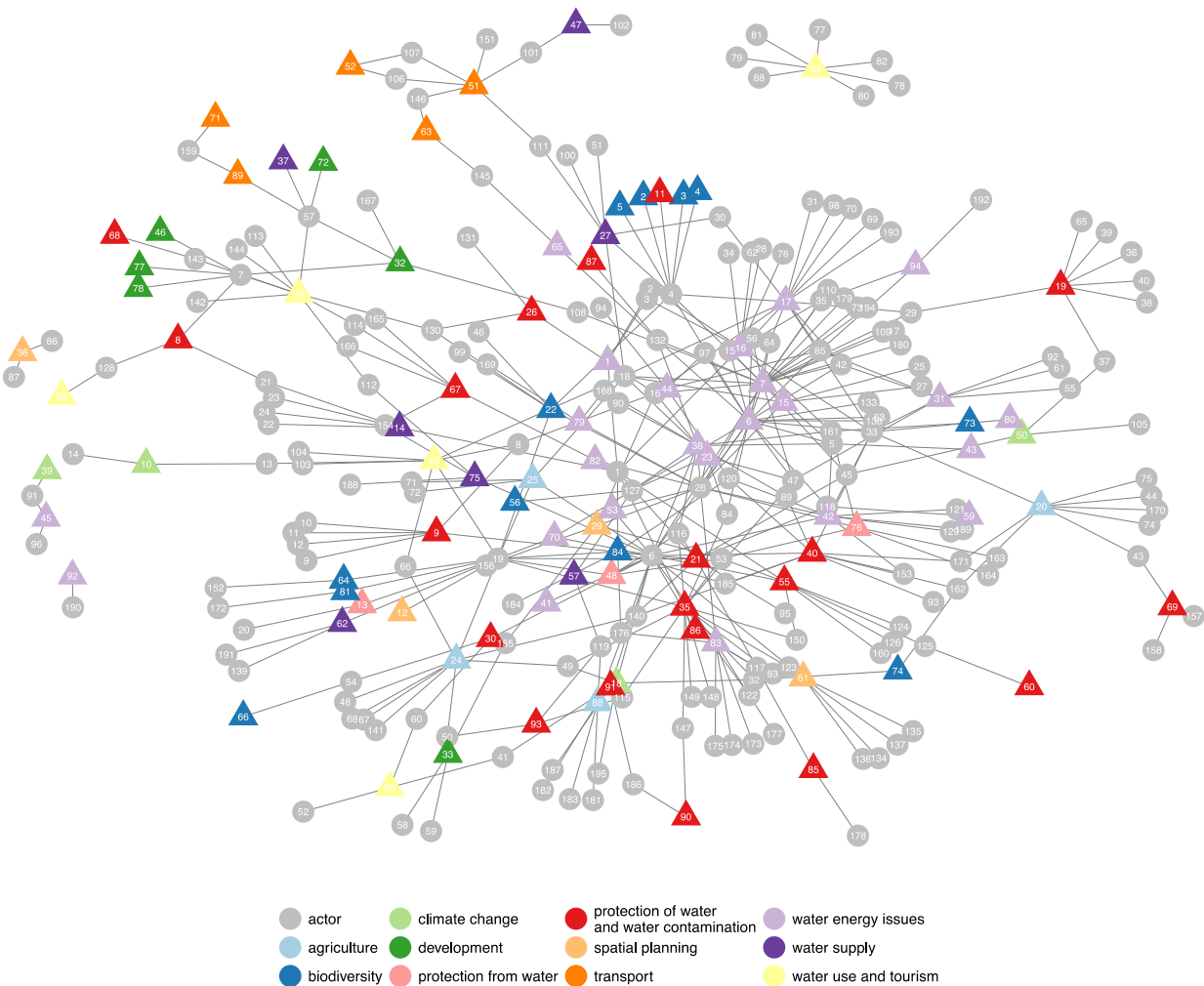


Figure 1. Actor–issue two-mode network. Circles represent actors, triangles represent issues. Issues are colored according to the subsystem they belong to. A total of 195 actors and 94 issues form a large component. Lists of actors and issues corresponding to the labels can be found in the SI Online.

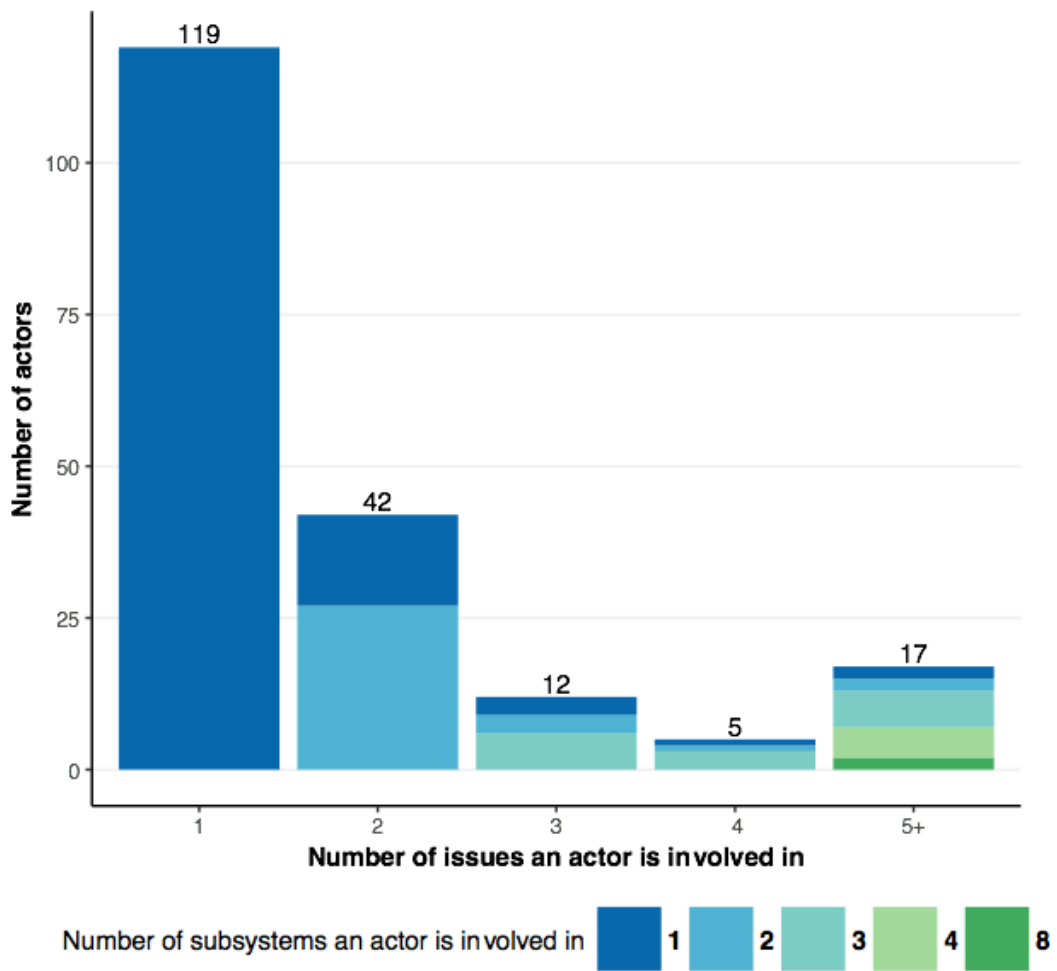


Figure 2. Number of actors involved in one or multiple issues. Colors represent multiple subsystem involvement

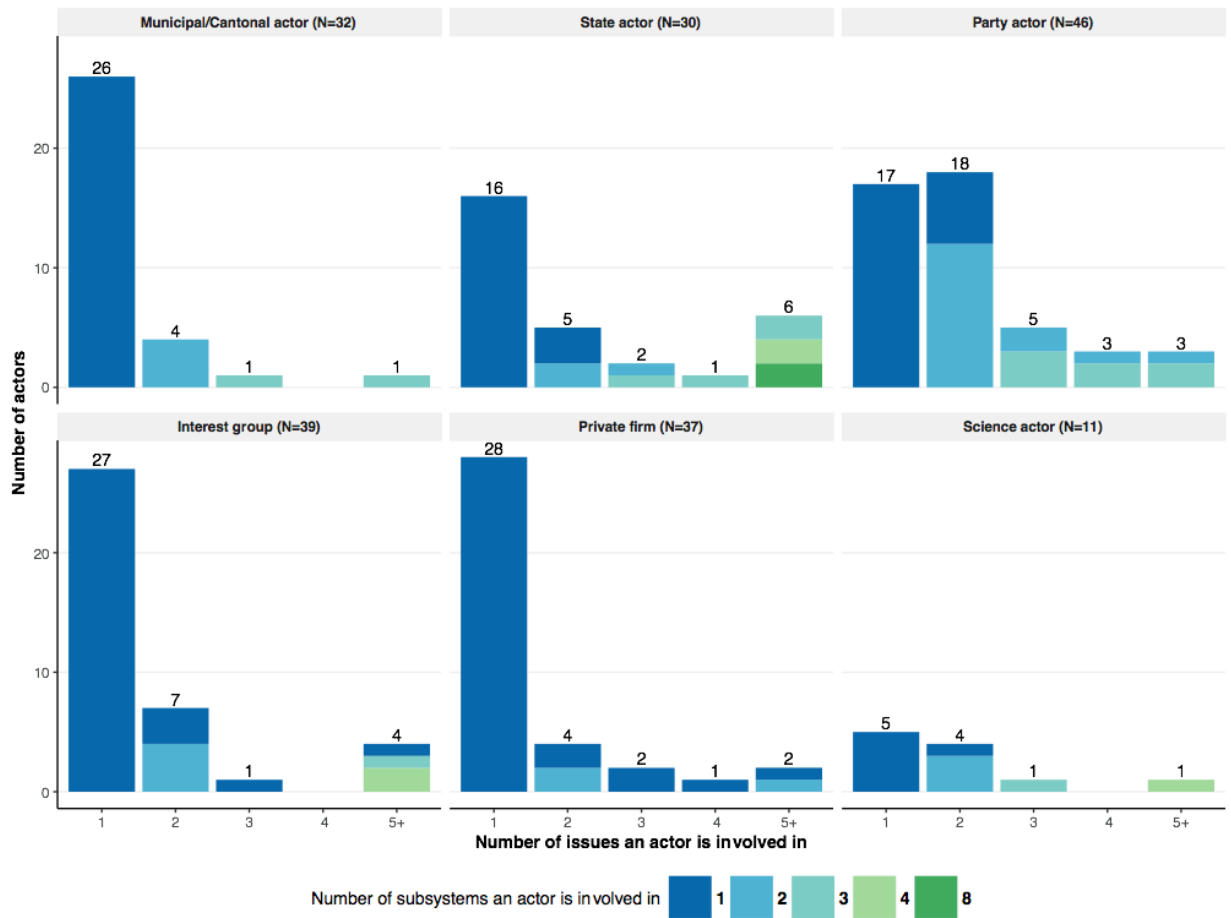


Figure 3. Number of actors involved in one or multiple issues grouped by actor type. Colors represent multiple subsystem involvement

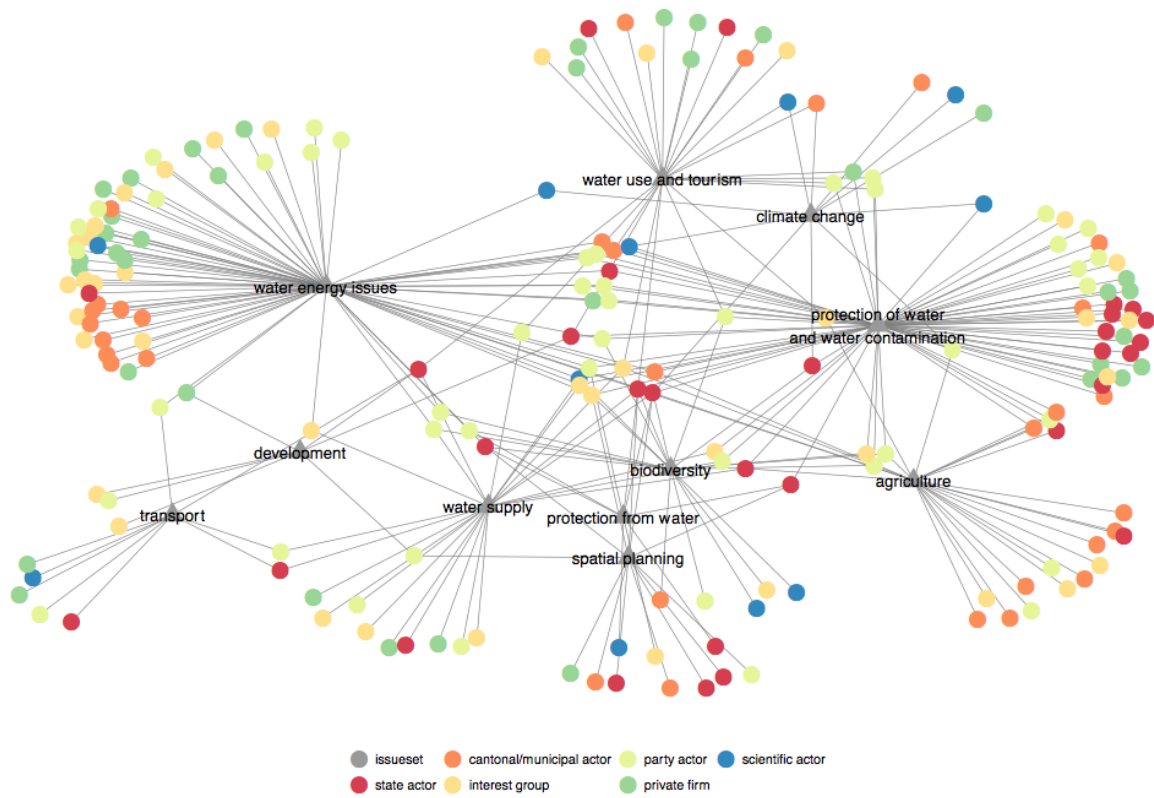


Figure 4. Two-mode network of actor–subsystem involvement. Colored nodes refer to actors of a given actor type, and triangles represent coded subsystems.

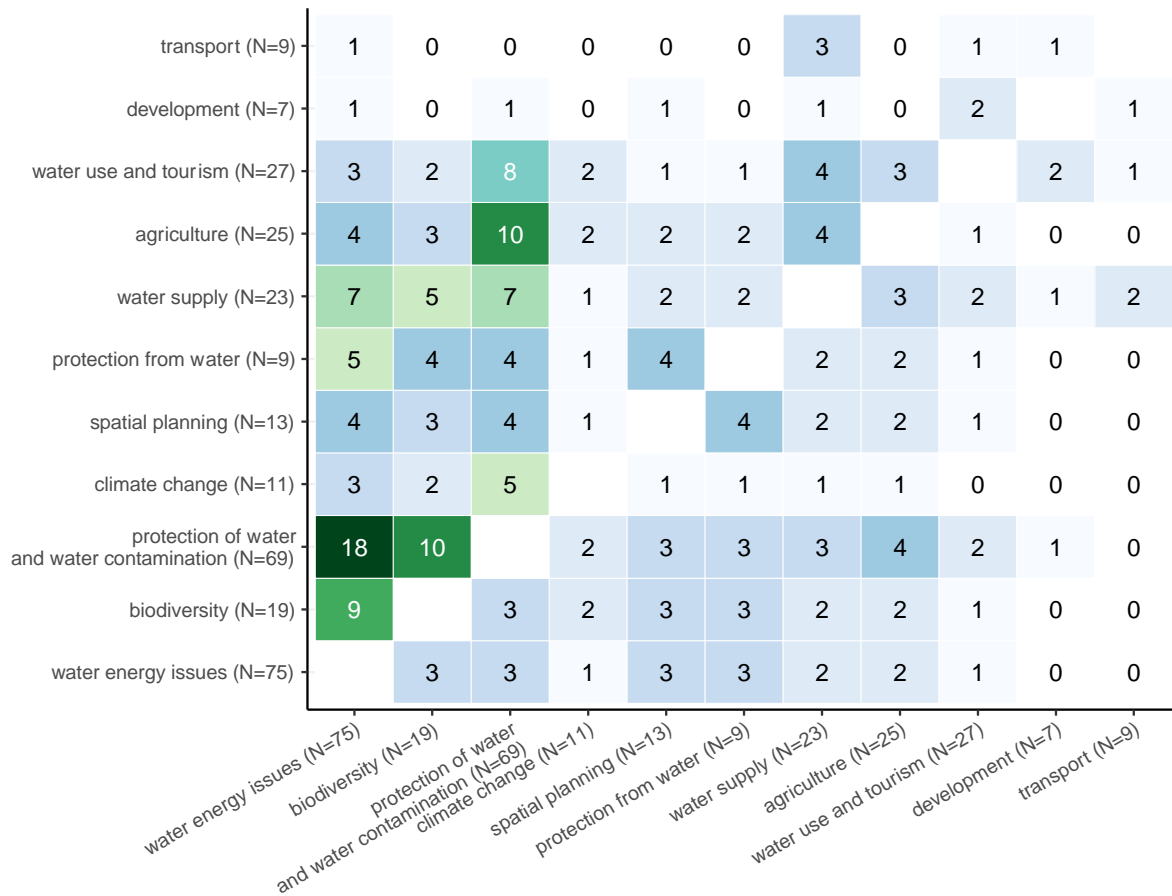


Figure 5. Heat map showing number of shared actors between any two subsystems. Upper triangle includes all actors; lower triangle includes only state actors. Number of actors involved in a subsystem are listed after the name of each subsystem.

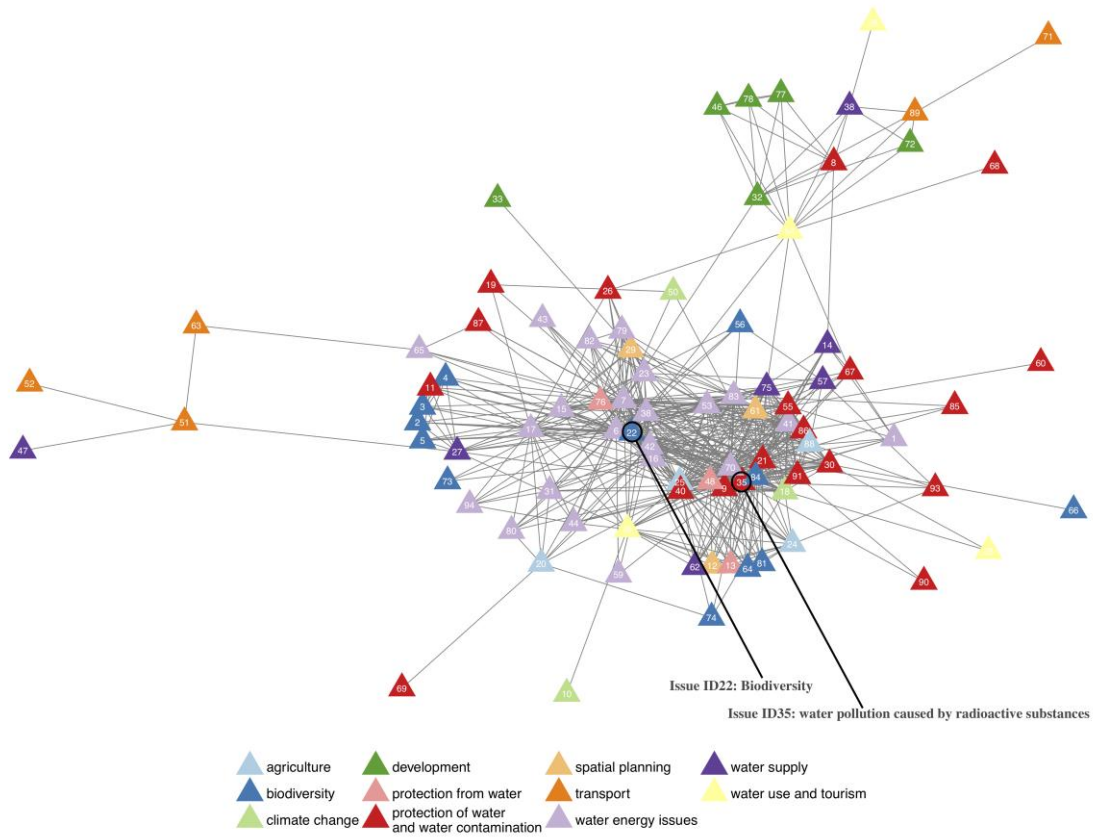


Figure 6. One-mode projection of the actor–issue network. Two issues are connected if they share at least one common actor.

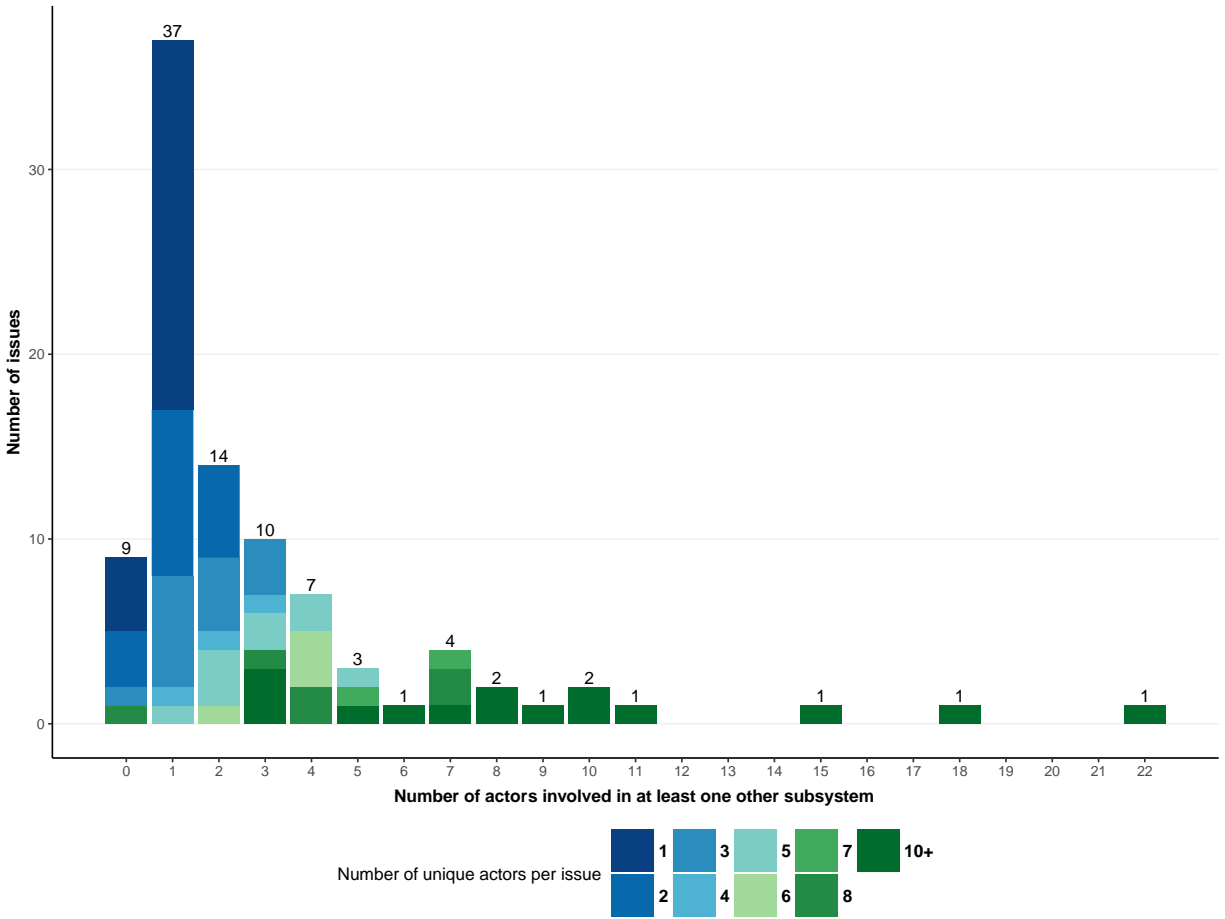


Figure 7. Bar plot showing the number of issues with zero, one, two, etc. number of subsystem-/boundary-spanning actors involved. Only nine issues show no involvement of actors that deal with other issues in different subsystems. Colours indicate the size of the involved actor group for each issue.

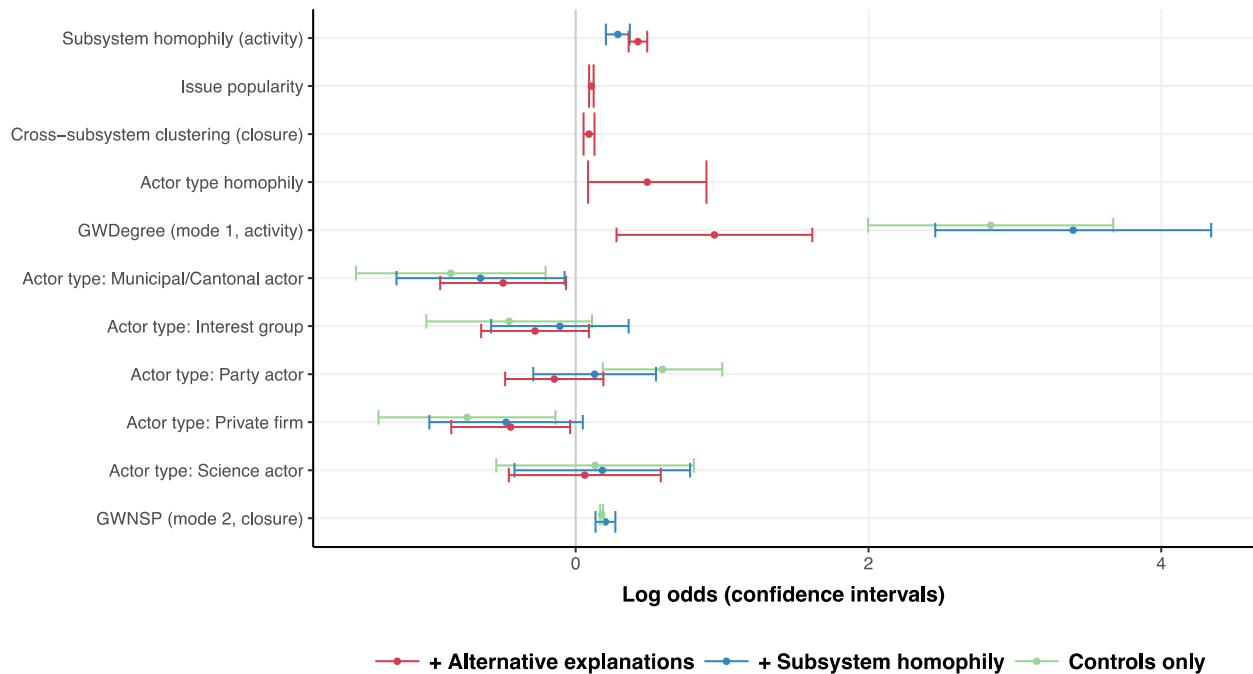


Figure 8. Results of the two-mode ERGM on actor–issue involvements. Coefficients and standard errors are reported for three models. The green model includes control variables only (BIC = 3958.15). The blue model includes controls and the subsystem homophily term (BIC = 4274.19). The red model is the full model that contains controls, the subsystem homophily term, as well as three additional network terms that explain actor–issue involvement (BIC = 3543.78). For the sake of visibility, the edges term is not reported in the figure, but it was part of the estimated models (coefficients and SE for the edges terms are: for the green model edges = -4.56 (SE=0.199), for the blue model edges = -4.87 (SE = 0.22), for the green model edges = -5.15 (SE = .24)). See SI Online for the full results table.

Appendix

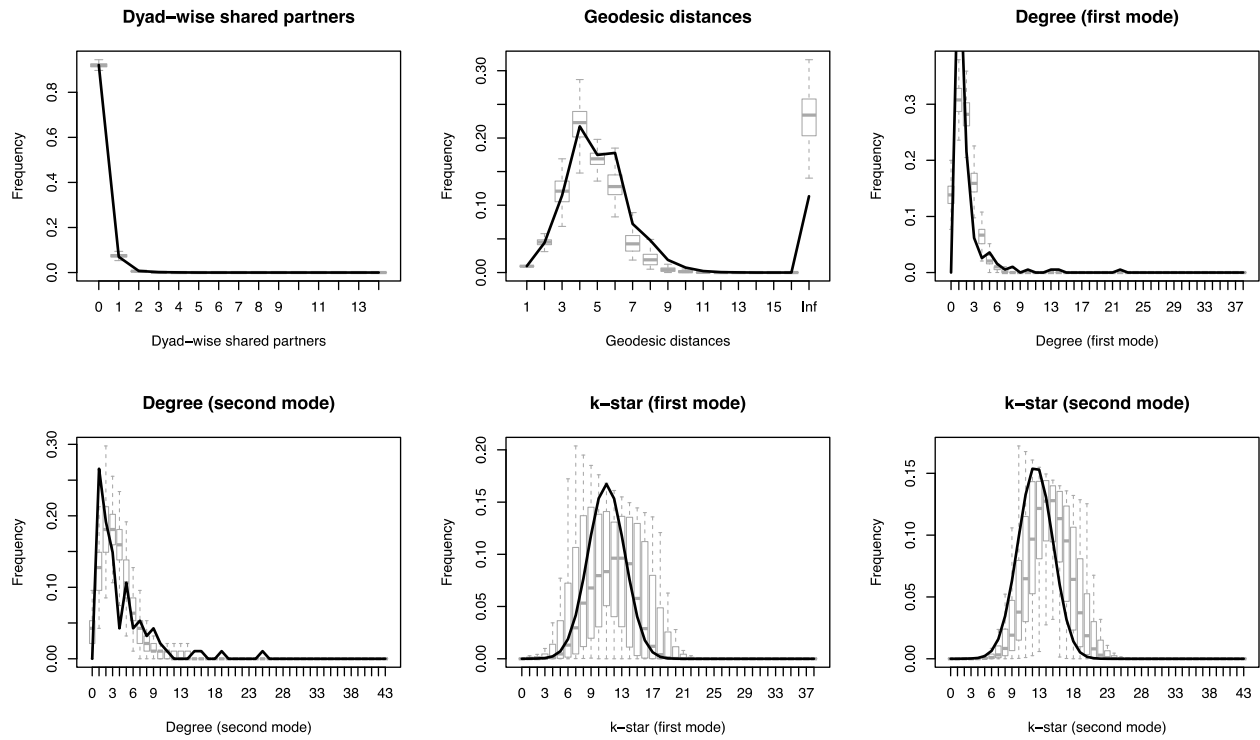


Figure A1. Goodness of fit assessment for the full model (red model in Figure 8).

¹ We cannot exclude the possibility that a given actors type is over- or under-represented in our dataset (state actors are known to be more strongly present than other actors in media documents, and party actors are by definition more present than other actors in parliamentary documents). However, such a bias in actor identification would not automatically lead to a bias in results; that is, the fact that state actors may be overly present in media articles, for example, does not automatically mean that they are more active with respect to different issue sectors. Furthermore, a related study (Angst 2018) that surveyed actors involved in Swiss water politics based on the actor list in this paper revealed that two rounds of snowballing only increased the sample by 29 actors. This small number of additionally named actors is an indication that our sample is relatively robust and not particularly sensitive with regard to a specific source. With respect to issues, it should be noted that media tend to report on popular issues, which might lead to an overestimation of the popularity effect in our analysis.

² *Die Neue Zürcher Zeitung* (NZZ) is a quality newspaper with a nationwide and supra-regional focus. Studies on media and politics usually rely on quality newspapers (Tresch, Sciarini and Varone 2013), and differences between different newspapers are usually negligible (Tresch 2008). The weakly polarized and partisan media are quite accessible to any type of actors.

³ <http://www.parlament.ch/e/dokumentation/curia-vista/Pages/default.aspx> (last access: April 7, 2020).

⁴ For an effective screening, the three keywords were separated by an OR operator. Furthermore, to catch all complex word combinations that might include the keywords in several variations, a star (*) was added at the beginning and at the end of the three words. The final search combination was: *wasser OR wasser* OR *gewässer OR gewässer* OR *see OR see*.

⁵ Of course, the limitation to one specific year involves a focus on issues mainly relevant in that given year (Downs, 1972; Wolfsfeld and Sheaffer, 2006). In the case of Switzerland, energy policy was an important issue in that year, due to the discussion of the new Energy Strategy 2050, elaborated as a reaction to the 2011 Fukushima nuclear accidents. Thus, while hydropower issues might be especially prominent in that year, other issues might be underrepresented, compared to other years. However, given that we are interested in the general structure of actor and issue relations, the specific type of issues should not bias our analysis.

⁶ Types of documents: “Botschaft oder Bericht des Bundesrates” (Report of the Federal Council); “parlamentarische Initiative” (Parliamentary Initiative); “Standesinitiative” (Cantonal Initiative); “Motion” (Motion); “Postulat”

(Postulate); “Interpellation” (Interpellation); “Anfrage” (Question) or “einfache Anfrage” (simple Question); “Empfehlung” (Recommendation); “Fragestunde” (Question hours). Documents that have been included in the data base for coding contain “Eingereichter Text” (Submitted content), “Antwort des Bundesrates” (reply of the Council), “Wortprotokolle des Parlaments” (minutes of the Federal Assembly).

⁷ Eighty-two documents are non-relevant as they contain German idioms or are handed in by Member of Parliament Christian Wasserfallen, whose name contains the German word for “water”. The number of submitted or treated documents peaks in March ($n = 33$), June ($n = 54$), September ($n = 44$) and December ($n = 48$), and thus follows the course of the parliamentary sessions held in these months.

⁸ Precision indicates the ratio of the number of relevant documents retrieved to the total number of irrelevant and relevant documents retrieved, expressed as a percentage (Powers 2007).

⁹ We did not distinguish the extent to which actors are engaged in these issues, nor did we code the stage in which they got involved in the issue (i.e., agenda-setting or implementation). Future research on multi-issue engagement in policy-making processes should address this simplification as it allows for interesting insights into the time an actor becomes active on a respective issue and which actors engage at the same time.

¹⁰ Examples are the overestimation of triadic closure effects and a loss of information on the target mode; see, for instance, Borgatti and Everett 1997; Latapy et al. 2008; Opsahl 2013; Everett and Borgatti 2013).

¹¹ No actors were excluded from the sample, however low their level of involvement in a water-related issue was judged.

¹² Namely the Swiss Federal Nuclear Safety Inspectorate (ENSI, ID 53), Federal Department of the Environment, Transport, Energy and Communications (DETEC, ID 6), as well as Federal Office for Civil Protection (FOCP, ID 150).

¹³ Figure A1 shows that the model captures the endogenous properties of the actor–issue network fairly well. The solid lines, which represent the observed network, and the median lines of the boxplots, which represent the results of 200 simulated networks based on the model, are aligned closely with each other across various auxiliary network statistics. This indicates that the model terms employed here capture the data-generating process adequately.