Title: Actors' strategies in an ecology of games: the case of water management in Brazil

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Abstract

Environmental governance is characterized by its fragmented character, a multiplicity of venues compete to capture institutional spaces and actors' commitments across administrative boundaries. The Ecology of Games framework has called attention to the intertwined character of different venues. Departing from this framework, this paper seeks to explore how actors struggle to advance their interests through strategically investing their engagement across different decision-making venues for water management and use. It focuses on the case of the Paraíba do Sul river in Brazil. The paper uses a network modelling approach to empirically investigate actors' engagements across venues and if and how those engagements relate to their position in their collaborative (social) networks. Actors skillful in maneuvering this Ecology of Games have indeed been able to exert influence in decision-making processes that seemingly go above and beyond what could be expected given their capacities in terms of available funding and formal authority.

Introduction

Recent work on environmental governance has called attention to the institutional complexity brought about by its fragmented character. Work on the Ecology of Games departs from the existence of a multiplicity of venues that overlap and compete to capture decision-making spaces and actors' commitments across administrative boundaries (Berardo and Lubell 2016). For the purposes of this paper, we understand venues as institutionalized forums in which participants discuss and make decisions on the management of a resource. The case of integrated water management is paradigmatic of complex institutional systems since the implementation of basin-based governance arenas inevitably crosses pre-existing administrative divisions (Pahl-Wostl et al. 2008).

So far, the literature on the Ecology of Games has mainly discussed whether institutional complexity increases or hinders general cooperation; it has focused on cases in the global north (Lubell 2013). In this paper we seek to understand whether the multiple entries to the management system offered in an Ecology of Games, give actors the opportunity to develop strategies that challenge traditional power assymetries. Said otherwise, this paper explores whether an institutional structure that provides many participatory opportunities challenges previous power distributions. We apporach this issue by investigating who are perceived as influential (leaders), how other actors relate to these leaders, and what factors might explain why certain actors are influencial.

We investigate this issue by focusing on a case from the global south, Brazil. Indeed, Brazil water management system presents a particularly interesting case since the decentralization experience constituted a transformation respective of the kind of centralized rule that existed before: it implemented participatory venues for water management at the basin, state and national levels from 1992 on[1], and gave those venues decision-making power (see Table 2).

This paper focuses on the case of the Water Basin Committee of the river Paraíba do Sul, CEIVAP, which flows through the states of São Paulo, Rio de Janeiro and Minas Gerais. It is

[1] The first participatory institution for water management was created in the state of São Paulo in 1992. The federal law organizing the water management system dates from 1997.

the oldest of the federal committees, funded in 1996.[2] We used a mixed methods approach. We undertook a network analysis to investigate with whom actors exchange information and align positions (here refereeing to any two actors that choose to agree/align on a common standpoint in regards to a management issue) as well as how their influence is perceived by others; we performed a regression analysis to test several elements that might allow to explain actors' influence in the committee; and we drew on extensive semi-structured interviews to explore actors' intentions and rationales behind their strategic choices in terms of with whom they engaged. The paper focuses on the two following questions:

1. Who are the 'leaders' in the sense of being identified by many others as highly influencial. Further, are there any specific actor/leader characteristics that explain actors' choices to align their position with, and/or exchange information with?
2. What factors coincide with an actor being a leader? In particular, is being a leader associated with participation in many different venues, and/or associated with having many social ties to other actors? Further, are these potential explanatory factors entangled, e.g. is multi-venue participation associated with having many social ties?

The paper proceeds as follows: it first puts the literature on the Ecology of Games into dialogue with the literature investigating power dynamics within participatory instances; it then presents the case, follows with a methodology section, presents the results and the discussion of those.

Theoretical framework

Recent work on environmental governance conducted by Lubell and others has led to the development of a framework departing from the Ecology of Games (hereafter EoG) (Lubell, Henry, and McCoy 2010). The EoG appeared originally as a perspective put forward by political scientist Norton Long which called attention to the interconnection between apparently disconneceted areas of social activity (Long 1958). Others (Cornwell, Curry, and Schwirian 2003; Dutton 1992) adopted this perspective after Long, but it was only recently that attempts to fully operationalize an analytical framework emerged.

[2] Federal committees are those that cross administrative divisions of the state level.

Besides from Long's work, Lubell and colleagues draw inspiration from literatures revelant to the analysis of social-ecological systems, such as the literature on complex adaptive systems. Crucially, they associate the EoG perspective with Ostrom's Institutional Analysis and Development framework (E. Ostrom 1990) to orient the exploration of multiple and interrelated collective action problems. Indeed, the EoG framework shares with IAD the idea that "most of social reality is composed of multiple arenas linked sequentially or simultaneously" (E. Ostrom, Gardner, and Walker 1994, 45). In other words, the EoG framework provides concrete ground to guide empirical investigation of polycentric institutional systems that deal with collective action problems, such as environmental governance (V. Ostrom, Tiebout, and Warren 1961). It further develops the concept of adjacent action situtations put forward by McGinnis: "an action situation X_i is adjacent to Y if the outcome of X_i directly influences the value of one or more of the working components of Y" (McGinnis 2011, 53).

The EoG framework suggests categories to tackle the issues at stake in collective action problems: "policy games, policy issues, policy actors, policy institutions, policy systems, and time" (Lubell 2013). Policy actors are the involved stakeholders in a given issue – a collective problem for the management of the resource. Policy institutions are formal rules that structure decision-making processes. A policy game occurs when a set of policy actors participate in policy institutions. Policy systems are geographically defined territories that encompass multiple issues, institutions and actors, and that change over time. These are the conceptual bases that lead to the main hypotheses of the EoG framework: the institutional complexity of a system affects actors' interactions and their strategies to advance their agendas.

Most of EoG papers focus on whether or not cooperation in one game leads to an increased general level of cooperation (Scott 2016; Smaldino and Lubell 2014; Smaldino and Lubell 2011; McAllister, McCrea, and Lubell 2013; Lubell, Robins, and Wang 2014). Only recently some scholars have turned their attention to actors' strategies and relative power positions within an Ecology of Games (Scott and Thomas 2017). We consider this is essential to understand what kind of institutional system benefits which actors, and thus pursue that line. Conversely, the literature on power dynamics within participatory or cooperative institutions has remained oblivious of the potential effects of an Ecology of Games on power

distribution. One of the purposes of this article is to put these two bodies of literature into dialogue since a full account of power dynamics in environmental management needs to be informed by the interplay between different venues. Similarly, the strategies actors develop in an Ecology of Games cannot be fully accounted for if power dynamics and actors' attempts to reverse or consolidate those are not taken into account.

After the enchantment of the early 1990s, a critical literature on participatory institutions emerged to call attention to the failures of participatory approaches in terms of obtaining effective inclusion of all stakeholders.[3] This literature argues that participatory institutions need to be understood in the context in which they are implemented, and not in isolation. This strongly resonates with the perspective of the EoG framework, although the critical literature on participatory institutions especially insists on the power assymetries embedded in such institutional contexts (Daré and Barreteau 2003; Becu et al. 2008; Barnaud and Paassen 2013).

We follow Akbulut and Soylu (2012) in defining power as "the ability of individuals or groups to influence the agenda and final policy choice" (1146). Exploring this in the case of participatory institutions leads to acknowledging that different stakeholders do not join participatory institutions from the same power position. Concretely, this means that some actors are better placed to influence the outcome of the participatory process, which questions the idea of equal participation on which these institutions are based (Muñoz, Paredes, and Thorp 2007; Sikor and Nguyen 2007; Barnaud and Paassen 2013).

However, this literature has not explored the particular effects in terms of power distribution of institutional systems in which there exists multiple participatory forums, as is the case in the Brazilian water management system. Even though the existence of multiple venues might reinforce existing or emerging power asymmetries (Scott and Thomas 2017), they might still provide new opportunities for less influential actors to increase their impact. This paper explores in which ways an institutional system with multiple participation

[3] A full list of references would be too long to include here and would take us well beyond the purposes of this paper. See for example Cooke and Kothari (2001) and Hickey and Mohan (2004); and for environmental governance specific cases, see for example Newig and Fritsch (2009) or Cook and Spray (2013).

instances affects power dynamics through a specific focus on the leaders, who they are, and why others might choose to align their positions with them.

This section has argued that associating the EoG with the literature that investigates power dynamics in participatory instances helps us adopt a framework that leads to an understanding of how complex institutional systems work closer to the reality of everyday interactions than what the literature has highlighted so far. Investigating the case of Brazil through a social network analysis is appropriate as we explain in the following sections.

Case Study

The categories of the EoG framework allow us to disentangle the institutional complexity of the water management system in Brazil (See Table 1).

Table 1: The EoG framework in the Paraíba do Sul

Policy system	Policy games	Policy issues	Policy actors	Policy institutions	Time
Management system of the Paraíba do Sul River	CEIVAP meetings	All relative to CEIVAP (amount of money collected; use of the money collected; transposition to São Paulo)	Participants in the council and actors with key knowledge or experience about it	CEIVAP, adjacent Water Basin Committees, state-based forum for water resources	Snapshot 2014 (SP water crisis)-2016 (fieldwork)

The policy system in which we focused is the management system of the basin of the Paraíba do Sul river which flows through the states of Rio de Janeiro, Minas Gerais and São Paulo (see Figure 1).

Figure 1: Water Basin of River Paraíba do Sul

In order to determine our sample, we decided to depart from one policy institution, the basin committee of the Paraíba do Sul river which has overarching responsibility over the management of the system (see Tables 2 and 3 below). The CEIVAP, which is an acronym for "Committee for the Integration of the Paraíba do Sul River" was created in 1996. Its statutes define that 40% of participants represent the users (industries, hydroelectric companies, agriculture, provision companies, etc.); 35% represent the public power (federal, state, municipal); 25% civil organizations (associations, NGOs, universities).

Table 2: Venues and responsibilities at the federal level

National level	National Council of Water Resources
	National Agency of Water
Basin level	CEIVAP • Define the quality of waters of the basin rivers • Define rights of use and the procedures to obtain those • Approve the Water Resources Plan for the Basin and follow-up its execution • Guide the actions of Agevap, the executive agency for the implementation of CEIVAP decisions • Define the values for the payment of water use

The actors included in the sample were the participants in the water basin council of the Paraíba do Sul (CEIVAP). The network analysis focused on these actors. Additionally, we conducted interviews with those actors who had an otherwise important knowledge of the system, be it because they were involved in its management for a number of years or because they currently occupied a key position in other policy institutions included in the study. Besides the CEIVAP, were aslo included as part of the studied policy system: the adjacent committees, the state-based forums for water resources, as well as the national forum for water resources, which provides overarching guidance for the system. Participants in CEIVAP take part and extend their networks in these different institutions.

The water resources management legislation currently in force in Brazil was approved in 1997, through law 9433. This law, inspired in IWRM, introduces five management tools through the National Water Resource Policy (NWRP) and the National Water Resource Management System (NWRMS). These tools are: the basin plan, the authorization of use, the payment for water, the classification of desired water quality for each water body and the Water Resources Information System (Elabras Veiga and Magrini 2013). They lay on the 1988 Brazilian Constitution, which established two fundamental principles: water as a public

asset and the shared jurisdiction between states and the federal level.[4] Besides the Water Basin Committees, the law creates Water Resources Councils at the State and National levels as well as State Water Resources Management Entities, which are the executive branch of the Water Resources Committees.

It is only in the year 2000 that the National Water Agency (ANA) is created with the responsibility of implementing the policy instruments. The creation of a centralized institution for water management came to challenge the logic that had driven the original reform: decentralization. In 2004, law 10881 is approved to repair this to some extent as it establishes that the money obtained from the payment of water needs to be reinvested in the basin.

[4] WBC are collegiate organisms that follow a tripartite design, in which there are representatives from the public sector – which includes the state and municipal governments for those basins with limits within a single state, and additional representatives from the federal government for those basins that cross several states –, the user sector and civil society. In the case of committees that touch upon territories where indigenous communities live, these communities need to be represented too, as well as an officer from the Institute of the Indigenous Peoples. In the case of transboundary basins, a representative of the Foreign Affairs Ministry needs to be among the representatives from the federal state. The exact composition of the committee participants is determined by each of the committees, the only condition the law establishes is that public power representation (which includes the federal state, the state level and municipalities) does not surpass half of the total participants.

Table 3: Brazilian Water Management System

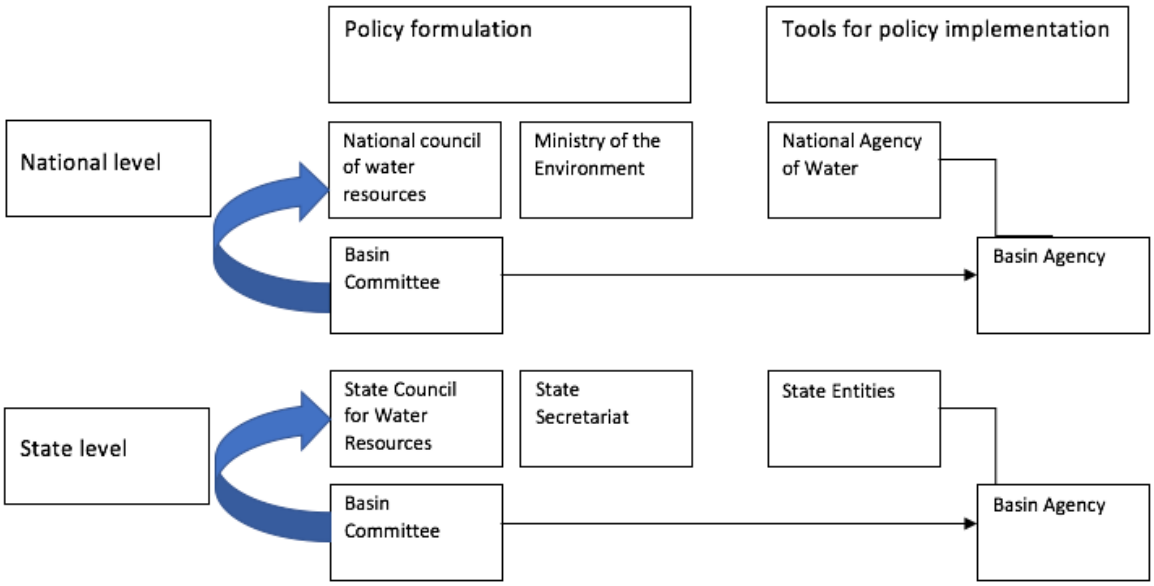

Table 4: Competencies at the state level

State level (common)	State council of water resources of Rio de Janeiro	State council of water resources of Sao Paulo	State council of water resources of Minas Gerais
Guidance on the creation of Water Basin Committees and its regulations, and approve their institution Draft, approve and ensure implementation of the state plan for water resources Establish criteria for the establishment of rights of use Deliberate on questions and proposals relative to legislation or state policy on water resources Promote the articulation of planning across administrative levels Promote and coordinate studies and projects	Establish general criteria to be followed in the creation of Water Agencies, as well as in the drafting of the Internal Regulations Mediate, as the last administrative stage, possible conflicts existing among CBHs.	Create, extinguish and reorganize the Water Basin Committees and Sub-committees, respecting regional particularities, observing what is indicated in the article 24 of the law 7663 of the 30th of December 1991. Arbitrate in conflicts among CBH Competencies relative to budget management: - Discuss and approve the budget directives and the annual budget of the state for water management. - Establish norms and criteria relative to the distribution, among beneficiaries, of the costs of multiple use works on water resources or of common or collective interest - Establish directives for the formulation of annual and pluri-annual programs for the use of the resources of the State Fund on Water Resources – FEHIDRO - Authenticate the committees' proposals for four-year programs of investment and the values of payment for water Constitute Chambers, Teams or Technical Groups, as part of the deliberative mechanisms, composed with members of the CRH, which could invite technical or specialist staff to advise them in their work	Approve the norms for the use, preservation and recuperation of state water resources

Table 5 Within state committees' competencies

State Committee level (common)	Water Basin Committees in Sao Paulo	Water Basin Committees in Minas Gerais	Water Basin Committees in Rio de Janeiro
Draft the basin plan and follow up on its execution	Propose the constitution of regional or specialized units as well as sub-committees	Approve the rights of use for businesses with a potentially polluting impact	Propose to the State Council the authorization for the constitution of Water Agencies and approve its annual budget
Draft the annual report on the situation of water resources in the basin and promote relevant studies			Propose the uses exempted of authorization
Establish norms and criteria relative to the distribution, among beneficiaries, of the costs of multiple use works on water resources or of common or collective interest			Implement joint actions with the Executive in order to define the criteria for the preservation and use of the marginal zones of rivers, lakes and lagoons
Propose the water quality categorization of different water bodies and submit it to the competent organism.			
Propose the values for water payment, to be approved by state councils			
Approve the annual and pluri-annual programs of investment, in services and works of interest for water resources, with base in the basin plan			
Nullify, as the first instance, possible conflicts over water use			
Promote agreements with other organizations			

The policy issues included are all of the issues relative to the management of the river. Issues of particular relevance in terms of what was discussed in the committee during our time in the field are: the amount of money received for the payment of water – in terms of who pays how much; the use of such money – i.e. how to invest the money collected; and the distribution of water – including sub-issues such as a possible transposition of water to the state of São Paulo. As far as time is concerned, we took a snap-shot perspective, taking the system from 2014 (water scarcity crisis in São Paulo) to 2016 (present time – fieldwork time). This, however, as indicated, did not lead us to focus exclusively on the issue of water scarcity.

Methods

The sample included in our quantitative analysis consists of the participants in the water basin council CEIVAP, provided that they fulfilled one condition: having attended at least twice of the last six meetings. This led us to a sample of 45 people of which three refused to participate in the study, which gives us a response rate of 93%.

We presented respondents with the list of participants in the committee and asked them to evaluate each participant following three criteria: whether they shared information with them, whether they aligned positions with them – in terms of voting behavior and support in the discussions –,and whether they saw them as influent. The first two questions were rated on a 4 point scale where: 1 means rarely or never, 2 means sometimes, 3 means often and 4 means constantly. The last question was evaluated on a five point scale where 1 was not at all and 5 completely. We combined the list-based method with the recall method. Indeed, respondents were asked to indicate if there were other important actors – besides the participants in the plenary – for the management of the Paraíba do Sul river. Other indicated actors included representatives of the National Agency of Water and of the Agevap – this is the agency in charge of executing the committee's decisions.

While evaluating each of the participants, the respondents explained why they gave them such evaluations. Additionally, we asked actors a series of descriptive questions about their participation in the water management system, such as the number of years they had spent participating in the committee, the number of venues in which they participated and the degree to which they were involved in the committee (on a 1 to 4 scale where 1 is "not at

all" and 4 is "it is a fundamental aspect of my work"), which allowed us to develop a set of attributes and variables to further explain actors' behavior and strategies in the committee.

To complete this data, we ran semi-structured interviews with participants in the council during which they could speak about their general views on the system of management. We also conducted interviews with actors who had been part of the system for a number of years or who were in a priviledged position to know the system.

We started the analysis by exploring the correlations between the three different networks and we drew inspiration from the qualitative data to explore attribute-based patterns – state and sector – in explaining the alignment of positions.

We then hypothesized that five factors (independent variables) could be significant in terms of explaining influence (dependent variable). In determining these factors, we were inspired by previous studies and by insights from the qualitative data. Selected variables are:

V1: The more years an actor spends in the committee, the greater their influence.

As explained in the background section, the committee here studied fits within a complex web of institutions. Becoming familiar with such a complex web requires time, which is why the number of years spent in the committee seems like a good predictor for obtaining a better knowledge of the system. The committee brings together a list of 60 representatives – of which 75% attend regularly. An actor who has spent significant time in the committee could be seen by others as better placed to navigate the system and thus have a greater influence.

V2: The more involved an actor is in the committee, the greater their influence.

During qualitative interviews, participants pinpointed that several actors were in a powerful position because they had exclusive dedication to the committee matters. For example, in the case of industries' federations or hydroelectricity, an appointed actor had for only job to represent the federation in the committees, and the same happened with government officials at the state level, or with activists who entirely devoted themselves to the committee work. A very different case was that of agricultural producers or activists who undertook their activities on the side of their daily work, as well as municipal representatives who frequently had much more to do than just participate in the

committees. Through this hypothesis we intended to explore whether this qualitative insight had a broad impact on the whole network.

V3: The more venues an actor attends, the greater their influence.

The CEIVAP is a committee that brings together three states and which basin is divided in seven sub-basins. Thus, actors participating in CEIVAP have a number of opportunities to take part in other relevant venues for the management of the basin such as smaller basin committees or state councils for water resources. We formulated this hypothesis inspired by the EoG literature, which debates whether actors, considering their limited amount of available time and resources, should concentrate their efforts in one or several venues.

V4 and 5: The type of venue attended determines the influence.

The fourth and fifth variables aimed at investigating whether the specific kind of venues attended had an impact in terms of the influence obtained. We divided venues into two types. Firstly, we created a binary variable to specify whether the given participant attended other basin committees (V4). Secondly, we created another binary variable to investigate whether participants took part in other administrative venues for water management at the state or national level – i.e. venues for water management that followed traditional administrative divisions (V5).[5]

After the regression analysis, we examined through a path analysis whether the most significant variable had a direct or indirect effect on influence. We further explain this in the results section.

Results

We initially explored the correlation between the three different networks and we observed that they were highly correlated, and especially so the networks on information sharing and alignment of positions. Although influence is also correlated to the other two networks, it is less so. In all three networks we observed that two actors were ranked consistently as the top two across networks. The actors in the third and fourth position in terms of influence

[5] There were no such venues at the municipal level. We occasionally found at the municipal level environmental commissions were water related issues might be discussed. Participation in these venues, however, was neglectable in our sample so they were not taken into account.

appear as the fourth and seventh respectively in terms of alignment. These four actors are representatives from the user sector, the public sector and civil society.[6]

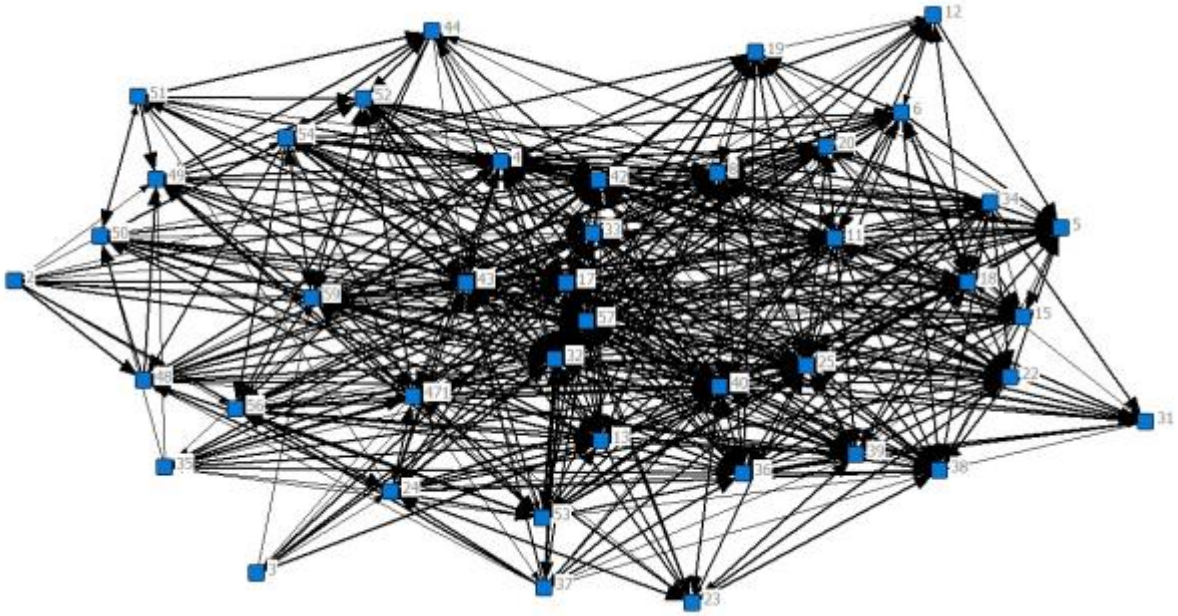

Figure 1 Influence network

We decided to further explore the characteristics of the alignment-based network, which informs on people's voting behavior and likelihood to support others in defending specific positions.

During the interviews, participants shared that in order to understand alignment, it was necessary/sufficient to identify the leader for each state. Our interviewees considered that people tended to align with what they understood as their state's interest. In order to explore this insight, we identified the five[7] actors who ranked the highest in the alignment network and gave them a state leader attribute. To each other participant we attributed a state variable and tested whether people tended to follow their state-based leaders. We explored the relations between groups and leaders both for all incoming links and only for the strongest links. Then we repeated the same exercise with a sector-based attribute.

[6] We cannot further specify their identity for confidentiality reasons.

[7] In this way, all states and sectors were included. We cannot further specify which actor belonged to which state or sector, or how exactly they ranked for confidentiality reasons.

Density Table all links state

	B	A	D	E	C
1	2.727	2.500	2.000	2.909	2.318
2	1.462	3.000	3.038	3.038	1.808
3	2.455	2.182	1.909	3.000	2.091

Density Table strong links state

	B	A	D	E	C
1	0.455	0.364	0.182	0.455	0.182
2	0.000	0.538	0.538	0.615	0.154
3	0.364	0.455	0.273	0.636	0.273

Density Table Strong links sector

	C	A	B	E	D
1	0.250	0.333	0.250	0.333	0.333
2	0.118	0.471	0.235	0.529	0.176
3	0.250	0.500	0.250	0.875	0.625

Density Table all links sector

	C	A	B	E	D
1	2.208	2.333	2.333	2.542	1.958
2	1.265	2.441	2.118	3.000	2.176
3	3.000	2.875	1.875	3.625	2.750

Table 6: Leaders and attributes

Actor	State	Sector
A	1	y
B	2	y
C	3	x
D	1	z
E	3	z

Our results show that when all incoming links are taking into account, there is a slight bias towards certain leaders, but it is well distributed among the groups, which suggests that leaders build support from all states. When only strong links are taken into account, there is a stronger tendency to follow state-based leaders but the distribution is still significant. The procedure based on sector leaders showed similar results: some leaders manage to draw support from their own sector, but this is not consistent across leaders or sectors.

We then turned to explore the parameters that explain influence, in trying to understand how people become leaders. The results of the regression analysis show that the only significant variable is the number of venues attended. We found surprising that no other variable helps to explain influence and particularly that the dedication that participants pinpointed as key during the interviews, was not significant in terms of explaining influence. A caveat however must be raised: dedication was self-reported and while actors might have indicated that they devoted themselves to the committee this might not actually be the case. It is also worth noting that the time spent in the committee does not explain influence, which suggests that the system offers newcomers opportunities to become influent.

Table 7: Regression results

	inf_in~g	timein~s	number~s	degree~t	otherc~s	higher~s
inf_indeg	1.0000					
timeincomm~s	0.2990 0.0544	1.0000				
numberofve~s	0.6088* 0.0000	0.3716 0.0154	1.0000			
degreeofin~t	0.3340 0.0306	0.1512 0.3393	0.2183 0.1649	1.0000		
othercommi~s	0.2556 0.1023	0.2817 0.0707	0.4447 0.0032	0.1998 0.2047	1.0000	
higherupad~s	0.5577* 0.0001	0.1061 0.5037	0.6964* 0.0000	0.2156 0.1704	0.1915 0.2245	1.0000

In light of these results, we decided to further explore the nature of the effect of attending multiple venues. Indeed, we engaged in a path analysis in which we tested whether attending different venues produced a significant direct effect in terms of augmenting influence or whether that effect was mediated by other factors. We hypothesized that participating in many venues gave participants the opportunity to exchange information with many others, since they are to take part in different networks of information exchange. Therefore we tested whether the indirect effect of attending many venues was related to the opportunity they gave participants to exchange more information. We did not include info degree centrality in the earlier regression since it was highly correlated with both influence and number of venues, and thus could have conflated the results (or put another way, it could have over-shadowed other effects). These caveats were however less pronounced for this simpler path analysis only involving three variables, and where we explicitly focused on the strength of their entanglements.

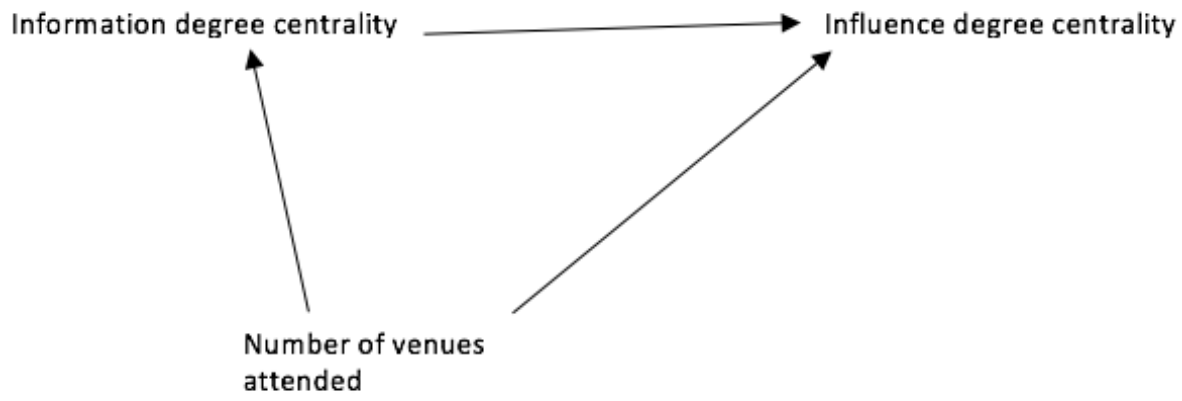

Figure 2 Rationale for path analysis

The path analysis showed (see appendix 1) that the indirect effect of the number of venues attended through the effect of information exchange is nine times higher than the direct effect of venues attended. The direct effect was not even statistically significant. These results however present some limitations as they are based on one-directionality.

Discussion

By associating the literature on power dynamics in participatory instances and the literature on the Ecology of Games we have built an interesting framework to explore the structures

that determine power dynamics among participants in water committees and to understand possible strategies that actors follow to establish their leadership.

Our results also show that leaders might be from any of the sectors, which goes against the idea that differences in pre-existent resources are always impossible to overcome. They are also from different states, which challenges the idea that people would follow their state interest.

Our results also show that in order to become influent, actors should try and invest in attending multiple venues. These findings are important since they speak both to the critical literature on participatory instances and the Ecology of Games.

The literature on participatory institutions has called attention to the "elite capture" phenomenon in which a few well-connected participants with considerable resources in economic and political terms make use of those resources to determine the outcomes of participatory processes (Wong 2017; Fritzen 2007; Labonte 2012; Saito-Jensen, Nathan, and Treue 2010). Our results show that, by contrast, any participant, regardless of their positioning in terms of resources, can increase their influence if they use the opportunity to attend a high number of venues as a means to exchange more information. We however acknowledge that the ability to attend multiple venues, and to build many social ties, takes time and resources that not everyone has access to. Hence, not everyone will be able to build influence. Yet, our results show that the ability to build influence is not restricted to actors of a certain type. Indeed, results hold true across participants' attributes, independently of whether they are part of the "civil society", "users" or "public organizations" categories.[8]

The fact that the time spent in the committee is not a significant variable to explain influence also seems to go against the idea of elite capture. It suggests that the system has succeeded in institutionalizing itself and that it doesn't rely on specific participants. This needs to be read in light of the time the committee has existed: 20 years, i.e. a significant amount of time to consolidate the system.

In terms of explaining the factors that lead participants to become leaders, we saw that only participation in many venues is significant. Participation in many venues gives the

[8] Details of this cannot be revealed for confidentiality reasons.

opportunity to build ties, since venues provide a space for networking and exchanging information. This result shows the importance to understand participatory instances in their institutional context. Indeed, the strategy of participating in many venues to increase one's influence is only possible in institutional contexts where there are many venues in which to participate. Thus, these results raise the question of what would happen in cases in which participatory basin based councils are isolated, the only formal venue in which it is possible to have a say on water management. Further research needs to be conducted in such cases to determine whether informal institutions, and participation in them, fulfills a similar role.

The EoG literature "emphasizes organizational constraints, namely that organizations have finite capacity for networking and interaction with other organizations" (Scott 2016, 219). and that thus, strategies should be put forward taking this into account. Our results suggest that it might be better to invest resources in attending many venues and not just one. This, however, might be context dependent. Future research could investigate whether the types of links between different venues (if they are more or less interdependent) affect actors' strategies to invest in one or several venues.

Conclusion

This paper has shown that leadership in the Water Basin Committee in charge of managing the Paraíba do Sul river in Brazil is distributed across states and sectors, suggesting that there is no elite capture phenomenon at play. Additionally, the paper has shown that in order to become influent actors should put forward strategies that allow them to increase the number of networks of information exchange in which they participate, which, in this case, translates into participating in many venues. These findings seem to suggest that pre-existing power allocations do not entirely determine the dynamics at play in the committee and that the Brazilian water management system, with its multiplicity of participatory instances, offers newcomers possibilities to become influent. These results confirm some of the recent findings on the Ecology of Games and contribute to the literature on participatory instances by putting participatory instances in the context of the institutional web in which they are inserted.

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Appendix 1

```
sem (inf_indeg_norm <- numberofvenues info_indeg)(info_indeg <- numberofvenues )
Endogenous variables
Observed:  inf_indeg_norm info_indeg
Exogenous variables
Observed:  numberofvenues

Fitting target model:
Iteration 0:   log likelihood = -305.64915
Iteration 1:   log likelihood = -305.64915

Structural equation model                  Number of obs     =         42
Estimation method  = ml
Log likelihood     = -305.64915

------------------------------------------------------------------------------
             |                 OIM
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Structural   |
 inf_indeg_norm <-  |
        info_indeg |   .0230074   .003618     6.36   0.000     .0159163    .0300985
    numberofvenues |   .0270249   .0554456     0.49   0.626    -.0816464    .1356963
             _cons |    1.49014   .1833256     8.13   0.000     1.130828    1.849451
 -------------------+----------------------------------------------------------
 info_indeg <-      |
    numberofvenues |   9.061559   1.90704     4.75   0.000      5.32383    12.79929
             _cons |   28.47741   6.467086     4.40   0.000     15.80216    41.15267
-------------------+----------------------------------------------------------
var(e.inf_indeg_norm)|   .2687279   .0586412                 .1752126    .4121547
  var(e.info_indeg)|   488.8032   106.6656                 318.7034    749.6895
------------------------------------------------------------------------------
LR test of model vs. saturated: chi2(0)   =      0.00, Prob > chi2 =
```