Polycentric Water Governance in the Urban Global South

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1 Introduction

Our paper is focused on environmental governance in the urban context, particularly water resources, in a conjuncture of increasing demand for water use, and at the same time climate-change-related water scarcity and deterioration of water quality, a common condition of most urban metropolises in the Global South. Based on an empirical case study on urban water governance in the São Paulo Macrometropolis (SPMM), this chapter analyses emerging polycentric water governance practices from the conceptual perspective of Elinor and Vincent Ostrom, *inter alia*, emphasizing the need for interdisciplinarity, intersectorality, politicization and the integration of water resources and land use planning as fundamental elements of sustainable governance.

The SPMM comprises a widely urbanized region with intensively used agricultural landscapes, as well as environmentally protected areas and other ecologically valuable places, providing the several metropolitan regions of the SPMM with ecosystem services of fundamental importance for the people and their socio-economic activities, being water the major life-sustaining natural resource in the cities. Such urban agglomerations, economically integrated and ecologically interdependent, call for innovative approaches of integrative land use planning and governing across multiple scales (Sayre 2009) associated with high sensitivity regarding the political interests, conflicts and asymmetries involved (Eraydin and

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Frey 2019). This chapter aims to contribute with the identification of such obstacles to sustainable and resilient water governance, land use planning and public policy-making adjusted to the interdependencies and interconnectedness that characterize such territories.

Based on the conceptual underpinnings of rational choice theory, and sustained by their extensive empirical research, mainly related to "small-scale, self-regulatory systems" (Toonen 2010:193), the researchers of the Indiana School came to the common understanding that cooperation on the community level used to turn out a valuable alternative development strategy to hierarchic state intervention and pro-competitive market mechanisms. The question, therefore, arises to what extent these findings apply to the context of metropolises in the Global South, subject of our empirical study? In view of the evidently major complexity and diversity in biophysical, institutional, and cultural terms and the patent fact of longstanding exclusionary processes and extreme social and economic inequalities, what kinds of implications we have to expect concerning the applicability of Ostrom's perspective on "governing the commons" to the management of natural resources in the metropolises of the Global South?

Vincent Ostrom, with his studies on metropolitan regions, on American federalism, and on Natural Resources Management, adds an important perspective to this questions with the concept of polycentricity "as a normative ideal and practical form of governance" (McGinnis and Ostrom 2012:16), which has increasingly gained importance also in Elinor Ostrom's work in the fields of common-pool resource (CPR) management (Ostrom 1990), co-production of public services and infrastructure (Ostrom 1996), as well as in metropolitan governance (Toonen 2010), being "both scholars […] complementary and mutually reinforcing" (ibid.:194).

In this chapter, we put emphasis on water as the most fundamental natural resource for sustaining life in densely populated urban agglomerations. Therefore, in a context of increasing pressure for water privatization (Bakker 2010), running against the community-based natural resources management approach as idealized by the Indiana School, we wonder whether polycentric governance (PCG) based on cooperation and commonly decided rules could be a promising approach to adequately cope with water resources in an apparently adverse socio-political context. In the following section, we present the concept of PCG as the theoretical underpinning of our empirical research on water governance in the SPMM.

2 Theoretical Concept of Polycentric Governance: Potentialities and Limits

A first major contribution to the concept of PCG from the part of political science and public administration has been given by Vincent Ostrom and his collaborators in their article on "The Organization of Government in Metropolitan Areas", in which they stated that "polycentric' connotes many centers of decision-making

which are formally independent of each other" (Ostrom et al. 1961:831). Applied to metropolitan areas in the US, they identified, on the one hand, a lack of a clear central leadership function and an informal interplay of "many local public authorities, each pursuing its own aims in a seemingly uncoordinated manner" (Stephan et al. 2019:21).

On the other hand, the authors argued that the cooperation between organizations across different scales could in fact be the appropriate way to provide public services in metropolitan areas, forming a properly functional and effective "polycentric political system". At that time, this was a quite innovative and challenging diagnosis, in view of the predominant conceptions in political science as well as urban studies, which used to construe the complex political topography of metropolises as a synonym for pathological "organized chaos" (Ostrom et al. 1961:831; Ostrom 2005:13).

PCG, therefore, goes beyond the idea of a community-based governance practice as far as more complex governance arrangements are envisioned, involving numerous "autonomous authorities with overlapping jurisdictions and, thus, involving multiple, diverse and interdependent actors, at different scales and levels, interacting continuously and performing sometimes more competitive, sometimes more cooperative relations (Ostrom 2005, 2010)" (Frey et al. 2019:4). The relationships among the numerous governance actors involved in collaborative practices at different scales as well as the problems at stake determine how interactions occur and which results are finally obtained (Andersson and Ostrom 2008).

Thus, what is central for characterizing PCG is the absence of a central authority able to impose its will unilaterally upon other collaborating authorities and political actors, as well as cooperation across governmental levels and geographic scales. This means that polycentricity implies a continuous interplay across scales and sectors, between, on the one hand, authorities and actors entrusted with specific tasks, responsibilities, and assignments, and, on the other, general-purpose authorities with overarching coordinative functions. Correspondingly, water management as a specific public duty performed by specific administrative units, public agencies and, increasingly, private companies should necessarily be integrated in and accountable to the overarching land use planning.

According to Elinor Ostrom (2005, 2010; McGinnis and Ostrom 2012), effective PCG requires a regular exchange of ideas and information between these different actors from the public, private and voluntary sectors, an ongoing adjustment of positions and assessments, so that the various actors and institutions are in a real condition to effectively exercise their autonomy, which can always only be relative due to the necessity of these ongoing adjustments. And in the case that one level fails, the other one is expected to come into play, getting the things done. Therefore, the expectation that polycentricity enhances institutional resilience, adaptability, and robustness (Thiel et al. 2019). Thus, Heikkila et al. (2018:207) point out that "polycentricity offers a flexible enough conceptual framework to accommodate current environmental governance solutions, as well as inspire new ones".

For the Indiana School, a monocentric model of governance is thus not compatible with the complex challenges we are confronted with in dealing with the

commons. The PCG concept confronts the usual argument, highly appreciated by traditional urban planners, that action undertaken by centralized governments tends to be more effective. PCG involves multiple actors, opinions, scales and levels, and complexity is considered a fundamental, positive and necessary governance characteristic (Ostrom 2005, 2010). Related to metropolitan areas, Ostrom et al. (1961) already discussed the criteria of control, efficiency, political representation and self-determination as important for defining the appropriate boundaries within which public goods can be provided most effectively, thus calling for polycentric political arrangements.

Moreover, Vincent Ostrom, in his discussion on American federalism, already stated the necessity to look beyond governmental levels, considering the "various amounts of overlap" (1973:204) and the "rich structure of overlapping jurisdictions with substantial autonomy among jurisdictions". Substantial institutional mechanisms to ensure democratic control he considers fundamental for "a 'highly federalized' political system" (ibid.:205) able to adapt to existing biophysical conditions. Herewith Ostrom can be considered a forerunner of the currently prominent network governance approach (McGinnis and Ostrom 2012).

In fact, what current research, mostly conducted in the Global North, indicates for most governance contexts, is "a continuum of horizontal dispersion of authority from monocentric to polycentric solutions, with hybrid solutions lying somewhere in the middle" (Paavola 2016:145). Despite the quite common conflictive clashes between growth coalitions and environmentalists in the Global North, and the life-threatening resistance against "the process of development through destruction" (Gupta 2014:159) by the "environmentalism of the poor" (Martinez-Alier 2003) predominant in the Global South, the idea that consensus-oriented democratic participation and cooperation will bring about sustainable development has dominated global conferences and reports on environmental issues in the last decades, despite "uneven or fragile" accomplishments since the publication of the Brundtland Report on "Our Common Future" (Meadowcroft et al. 2019). On the contrary, whereas even the most developed countries turned out unable to address successfully basic issues of the sustainability agenda, new issues like "biodiversity loss, plastics, and other waste, pandemics, religious fundamentalism, and cyber security" emerged menacing a sustainable future for humanity (ibid.).

What seems to have been ignored is that environmental decision-making used to be highly conflictive, involving apparently unbridgeable gaps due to contradictory and incompatible values and interests, which definitely "cannot be satisfied simultaneously—a choice has to be made regarding which interests to affirm and which to block, and to what degree is their balancing possible" (Paavola 2016:144).

What therefore seems rather questionable, at least from a Global South perspective, is Ostrom's insistence upon the mere rule-enforcing nature of these interactive governance practices. What if the existing rules are simply the result of asymmetric power relations and exclusionary practices, incidentally, a very common feature, not only in countries of the south marked by extreme social and economic inequalities?

Water provision has definitely become a wicked policy problem, a "complex, and contested, social problem(s)" (Head 2019:180), particularly evident in the context of huge agglomerations. On the one hand, environmental and water governance have become more and more polycentric with multiple levels and scales involved, basically due to the increasing recognition of governments regarding their incapacity to handle such complex problems unilaterally. Then, there are mandatory interdisciplinary and intersectoral approaches in order to successfully face the multiple economic, social, territorial, and environmental interdependencies. Moreover, the plurality of prevailing values and interests, as well as the demand for long-term approaches to sustainability, have to be taken into consideration (Rydin 2008). On the other hand, it has also to be taken into account that all these emergent institutional structures change only gradually, due to institutional path dependence, and may therefore imply in situations of non-decisions, of strategic mutually blocking behavior, obstructing sustainable solutions (Benz 2007).

Moreover, frequently political decisions on environmental issues are highly conflictive, above all when "the abuse of natural environments and the loss of livelihoods" (Martinez-Alier 2003:ix) are at stake, and finally, problems of democratic legitimacy tend to emerge insofar as decisions are increasingly taken in governance arenas not democratically legitimized, making institutional design particularly challenging and fundamental to reach social acceptance and, thus, legitimacy of "sustainable and innovative policies in a multilevel context" (Schmitter 2002:51).

3 São Paulo Macrometropolis Water Governance in the Context of Climate Change and Water Crisis

Despite having at its disposal 12% of the planet's freshwater resources, Brazil faces immense challenges concerning resilient and sustainable water management, in order to reach universal access to clean water and adequate sanitation services for its population of over 209 million people. In several densely populated regions of the country infrastructure for water supply is still precarious. In the SPMM, the largest urban agglomeration in Brazil with 174 municipalities and a population of approximately 30 million people, the existing infrastructure for water supply is not sufficient to meet the increased demand for industrial and domestic use, and for irrigation of agricultural activities, according to the SPMM Water Resources Master Plan (Jacobi et al. 2020).

Territories like the SPMM concentrate large contingents of people, which depend on the provision of ecosystem services for their well-being. In the SPMM, as in many metropolises worldwide, pressure on natural assets has continuously increased in so far as urbanization and industrial development proliferated (Torres et al. 2019), often catalyzed by poor governance and increased climatic variability.

The current Brazilian model of water management was mainly inspired by the French model, where the participation of civil society in water management was structured in the 1960s. The Integrated Water Resources Management System was established in 1997 by the Federal Water Policy. The recognition of the hydrographic basin as the most appropriate scale for water management resulted in the delimitation of Water Resources Management Units, whose advisory and deliberative management bodies are called Hydrographic Basin Committees, responsible for the regional coordination and planning of water-related policies and measures (Jacobi et al. 2009). Hence, the water basin committees became the central institutional innovation to put into practice the three guiding principles—decentralization, integration, and participation.

Previously, the water resources policies favored the use of water for electric power generation and industrialization (Murtha et al. 2015). Use conflicts were solved centrally by governments without substantial policies and goals regarding environmental and sanitation access (Gomes and Barbieri 2004). For this reason, the model of integrated and decentralized water resources management has been considered by the literature as a privileged space for participation, articulation, and conflict resolution (Martins 2015).

In the period from 2014 to 2015, the southeastern region of the country was affected by a severe drought and the largest water supply system, the Cantareira, was badly affected by an intense decrease in water volume. The existing supply infrastructure, extremely dependent on rainwater and responsible at that time for the supply of almost half the population for the São Paulo Metropolis, has reached its limits (Côrtes et al. 2015). It is important to highlight that this water supply system is not controlled by a hydrographic basin committee. Instead, the Basic Sanitation Company of the State of Sao Paulo (SABESP), a mixed capital company created in 1973, is responsible for water and sanitation services in the majority of the municipalities in the SPMM. Although there is a formal structure of participatory and decentralized water management in basin committees in SPMM, the main conflicts in the decision-making process are not necessarily resolved at the meetings of the basin committees, even though SABESP has a seat guaranteed in the basins where it is operating water and sanitation services.

The severe water crisis not only revealed the fragility of the water supply system but also the shortcomings of urban and regional water governance in the Metropolitan Region, as well as a lack of compliance regarding the general land use planning, itself precarious at the macro-metropolitan scale. The water policy during the period of the water crisis was marked by great conflicts, with the São Paulo State Government becoming the final decision-making authority. With the mechanisms of social control suspended, it was the poor periphery of the cities which most suffered from the interruptions of water supply during the crisis. Powerful private economic interests were privileged to the detriment of the poorest and most vulnerable social groups (Fracalanza and Freire 2015; Torres et al. 2020).

According to the Ostroms, the existence of multiple autonomous decision-making centers, operating at multiple governmental levels and involving various administrative sectors in a relatively coordinated way, is, first and foremost,

a positive aspect for the political dispute process and for the governance of common-pool resources (Ostrom 2010). However, in the case of the SPMM, it is observed that irrespective of the fact that the urban water governance arrangements possess elements of polycentricity, the political arena, permeated by asymmetric power relations, is marked by intense conflicts due to the multiple and distinct interests at play, especially between the river basin committee, civil society, the São Paulo State Government, and the basic sanitation company.

The organizational chart of Fig. 1 presents the polycentric and multilevel governance structure that has been in force at the time of the 2014–2015 water crisis. It demonstrates how integrated water management in the SPMM is embedded in an institutional and regulatory framework at the level of the provincial state, which itself follows the regulatory determinations established at the national level. Apart from that, municipalities are responsible for providing services of basic sanitation to their citizens, for wastewater treatment, water management and drainage, and together with the provincial and the federal state, for the monitoring and supervision of the management of water resources in its territory (Whately and Neves 2017). But in order to fulfil adequately their task, municipalities are participating, together with representatives from the local and regional civil society, in regional water governance at the scale of the watersheds, mainly in the water basin committees, backed by the regulatory and operational agencies. Therefore, an effective cooperation between the different governmental and societal levels represented in Fig. 1 is crucial for successful polycentric water governance in the SPMM.

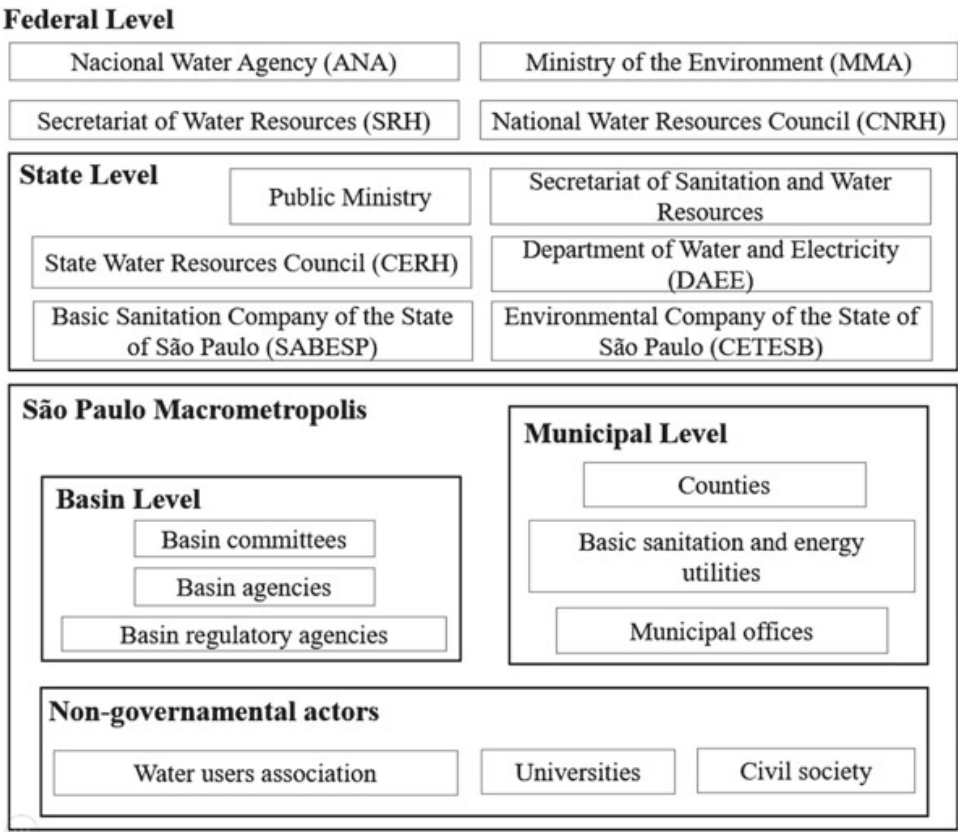

Fig. 1 Political and administrative actors involved in water governance at the time of the water crisis 2014–2015 (own elaboration; modified from Puga et al. 2020)

The chart reveals the high institutional complexity and significant interdependencies of the formal system of water governance in the SPMM. The multiple stakeholders and wide range of institutions involved call for a system of collaborative governance involving the municipalities, the provincial state, the private sector, and local social organizations as the central premise for effective decision-making processes in face of the multiple agendas, interests and contradictions that inevitably arise in the political arena. Nevertheless, it also demonstrates a potential lack of interaction with neighboring policy sectors and planning processes, particularly related to land use. From a PCG perspective, the main challenge is to supplant the predominant sectoral logic by an integrated cross-sectoral approach, taking into account the multiple scales involved.

It is appropriate to recall that part of the water used in the SPMM has its source in the neighboring state of Minas Gerais, thus increasing the need for articulations and intermediation of interests between the different stakeholders of the different water basins that compose the system in the SPMM. Besides, part of the water used comes from municipalities located in the state of Rio de Janeiro, which implies in articulation with an interstate committee that aggregates São Paulo, Rio de Janeiro and Minas Gerais thus taking the analysis to the federal scale, implying an even more complex scenario of competition for water.

During the water crisis, both institutional arrangements, the basin committees and the State Water Resources Council (CERH), the major deliberative forum of the state water policy, were—at least temporarily—disempowered, implying a lack of transparency and democratic legitimacy of the decision-making process (Jacobi et al. 2018). One of the main reasons for this shift, as they were mainly taken by a technical governmental crisis committee under the direct authority of the governor, is related to the interference of the electoral agenda at the State level. The government wanted to avoid taking unpopular rationing measures in view of the imminent elections (Jacobi et al. 2015). Thus, the state governor chose to nominate an executive body to handle the crisis on an exceptional basis, bypassing the competent State Water Council.

The constant denials by the São Paulo State Government regarding the seriousness of the crisis reduced possibilities and space for society to get involved and, moreover, several shortcomings have been identified regarding emergency planning, its implementation, and public relations (Jacobi et al. 2015). As a consequence of these shortcomings, peripheral neighborhoods were the most affected, as they were to a great extent hit by permanent interruptions of supply. The lack of transparency and accountability provoked reactions from part of the civil society organizations and the Public Prosecutors Office demanding comprehensive information. Nevertheless, the government blamed, first and foremost, the absence of rain for the calamity, trying at the same time to foster a less dramatic perception of the situation from part of the population. The drought problem was seen mainly as linked to a lack of infrastructure. Therefore, measures were taken to guarantee water security based on the traditional hydraulic paradigm, ignoring critical voices demanding the adoption of a more complex integrative approach to water governance.

The water crisis exposed both poor crisis management and insufficient long-term planning by the government of the richest state in the Brazilian federation. Two important aspects to understand the shortcomings in the governance process have to be stressed. First, the lack of transparency and information not only related to technical data about the conditions of the water supply system, but also referred to the political decisions taken by the state government (Empinotti et al. 2016). More detailed information about the water crisis was only released after the intervention of the Public Prosecutor's Office. The lack of transparency obstructs an informed and qualified participation and democratic control from part of civil society, a fundamental dimension of effective polycentric water governance (Ostrom 1973). This refers to the second flaw of the management of the water crisis. As stressed by Fracalanza (2017), the decisions were taken unilaterally and without the participation of civil society. Although integrated and decentralized management by river basins is recognized as a fundamental part of water governance, what happened in practice during the water crisis was a process of centralization of decision-making power and authority in favor of the state government and SABESP, contradicting the principles of both decentralized river basin management and PCG. The consequence was the subordination of water governance to technocratic and economistic reasons, in detriment to democratic participation, as well as social, environmental and territorial justice.

4 The Challenge of Water Governance in the SPMM—Between Crisis Management, Integrated Long-Term Planning, and Democratic Deliberation

From the conceptual perspective of Elinor and Vincent Ostrom, the existence of multiple autonomous decision centers, located at different scales and levels, and thus the complexity of the political decision-making process can be, or used to be, beneficial for sustainable and resilient governance of natural resources. And in fact, in our study we were able to verify that the structure and practice of water governance in the SPMM follow basically the principles of PCG as defined by the Ostroms. At least, the governance by water basins allows for civil society to participate in decision-making on water issues, contributes to a more integrative view of water and environmental policies, and brings the decision-making process closer to those who use the water and eventually suffer from poor water quality or from water scarcity, being therefore in line with the principles of the federal water policy.

However, the study also revealed that in times of crisis the real underlying asymmetric power-relations come to light, that is to say, the central authority of the executive power ends up in unilaterally imposing authoritarian rule. Justifying recentralization with the argument of technical and scientific requirements, the crisis management mode ultimately benefited economic and technocratic reason in

detriment to alternative holistic approaches committed to social, environmental and territorial justice.

Therefore, the institutional arrangements, based on the principles of integrated and participatory water governance, have proven less resilient as could have been expected by the theoretical framework of PCG. On the contrary, it showed that water governance in complex political, economic, and societal settings is first and foremost a question of power distribution and political dispute, embedded in a complex "web" of political actors, interests, and values. The shortcomings in terms of integrated long-term planning and democratic deliberation become particularly evident in times of crisis. This perspective reinforces why it is important to analyze the scope and limits of PCG in SPMM, being attentive to the ongoing political processes and conflicts.

Pahl-Wostl et al. (2012) point out that polycentric water governance experiences have shown that sharing responsibilities and coordination structures may promote good outcomes. Water governance implies the need to reduce unequal access to water. The analysis of the crisis in the SPMM revealed the importance of effective and consolidated participatory governance structures and decision-making processes, in order to increase resilience and therefore establish a sufficient capacity to deal with water scarcity in a region highly vulnerable to persistent periods of drought. The fact is that the authoritarian centralized decision-making of the crisis amplified the size of existing problems, which were not adequately addressed, as a consequence of the suspension of the fundamental principles of integrated water resources management, above all the principles of decentralization, participation and policy integration.

Moreover, the study demonstrated that possible solutions or mitigation of the problems that came up during the water crisis are linked to the need to strengthen the role of intersectoral cooperation in water governance, articulating municipalities with water management agencies and other relevant state agencies. We understand that the main problem in the SPMM is the lack of a comprehensive integrated governance system that considers the wider macro-metropolitan context as well as goes beyond the water management itself, in order to tackle the water resources in strongly interconnected territories. The different responsibilities are still too fragmented across the different state organizations, and often lack effective coordination (Araújo et al. 2020; Gonçalves et al. 2020).

Some progress has indeed been made. Among the instruments provided by the national and the state legislation, the river basin committees have to elaborate a long-term plan for each watershed, with the projection of scenarios and an agenda of goals to be achieved. Notwithstanding, considering the scale of the SPMM supply system, governance at the basin level is not enough, as the territory encompasses water transpositions between different basins. In 2012, the recently extinguished São Paulo Metropolitan Planning Company (EMPLASA) launched the São Paulo Macrometropolis Action Plan (PAM), as an attempt to better integrate different sectoral planning activities in an overall strategic plan to guide the development of the SPPM. Nevertheless, our studies revealed a by and large top-down practice of planning, as well as the predominance of economic concerns

in this plan in detriment to issues related to the environment and social justice (Jacobi et al. 2020). Yet, although PAM exists on paper, there is, at the time being, no evidence of its concrete application and effectiveness.

5 Conclusions

The concern to what extent PCG could be a more appropriate political and strategic approach to achieve transformational sustainable change in metropolises of the Global South—as opposed to the traditionally prevalent top-down and authoritarian management practices—was, from the outset, guiding our study on water governance in the São Paulo Macrometropolis.

Considering issues arisen from our research some general conclusions can be drawn. First of all, from *a technical, planning and scientific perspective*, there is a need to adopt a more complex "integrated approach to water management and land use planning, which has consideration for the sustainable management of water resources" (Carter et al. 2005:115). Whereas decisions about water, as said before, the most important resource to sustain urban life, have impact on land use, by the same token, land use changes in the urbanized areas tend to affect the natural environment, for instance through increased concentration of pollutants in water courses, as well as the social environment, in as much as open spaces or water courses are made available or not for leisure activities in favor of the local population (Campbell and Corley 2015). Without the adoption of such a holistic integrative view in planning and management, the unavoidable conflicts between land use planning and the protection of natural resources could hardly be resolved in the spirit of sustainability.

Consequently, as a second point, we have to bear in mind *the political dimension* of urban water governance. Land use conflicts, particularly if they involve water scarcity, or other types of natural resources shortages, are strongly political, that is to say, unequal access to power implies unequal access to water. Climate change and, hence, the multiplication of extreme events (lack and excess of rain) will still aggravate this situation of socioenvironmental injustice in the future. Failures in achieving sustainable integrative governance, and the continued insistence upon an one-sided policy of massive expenditures on storage reservoirs and inter-basin water transfers (Braga 2001), tend to favor overuse and degradation of water sources and the maintenance of already existing deficits in basic sanitation, threatening water security and public health (Carter et al. 2005), as tragically evidenced in the recent pandemic crisis in São Paulo and elsewhere, where the already disadvantaged poor living in the peripheries of the metropolises are those most affected due to lack of water availability and poor hygienic conditions (Acuto 2020). Resorting to the ideas of Jacques Rancière, we can say that only insofar as these societally disadvantaged and excluded, "the 'part which has no part', is enabled to assume an active political role, challenging the established asymmetrical political order in the name of equality" (Eraydin and Frey 2019:45), there is hope

that socioenvironmental justice becomes a central element of transformational change. Besides, more far-reaching changes depend on the politicization of planning and governance (Randolph and Frey 2019), the confrontation of the asymmetrical power relations and, thus, on the creation of a proper political arena at the scale of the Macrometropolis, where these political disputes can be effectively fought out and eventually resolved.

Thirdly, from an *administrative and managerial point of view*, multiple measures are urgently needed in order to enhance the adaptive capacity of water governance in the SPMM. Thus, it is vital to improve coordination between the state government, SABESP and the municipalities, to harmonize land use planning with water policy, to control land occupation, and to amplify the provision of sanitary services adapted to the expected climate change-related water shortage in the future. In addition, the shared use of ecosystem resources demands capacity building for the public agents involved in intersectoral activities in order to strengthen shared visions for sustainable water management, to enhance the response capacity of local institutions, and to create stronger commitment between local city managers and the public, inclusively favoring communitarian bottom-up initiatives.

In a wider *institutional governance perspective*, a general reevaluation of existing governance mechanisms and decision-making processes is indispensable. The water crisis showed that in order to reduce risks of water scarcity, there is a need for increased institutional resilience, particularly the strengthening of democratic instances of social participation. This requires the enforcement of environmental norms, a strengthening of the role of the State Council on Water Resources and the River Basin Committees in planning and political decision-making and, thus, better public control of Sabesp for the public benefit, in order to close the investment gap related to the poor peripheral areas (McLeod 2016; Jacobi et al. 2018).

The challenge of institutional design has been put by Vincent Ostrom and his collaborators quite accurately, already anticipating the deliberative turn in planning, public policies and democratic theory, when they pointed out:

> the most essential institutional arrangements are those that enable human beings to maintain an open public realm where people can freely communicate with one another, explore alternatives, engage in critical assessment, and consider contestable arguments in reaching an understanding about the shortcomings of existing institutions, and what might be done to alter the structure of human relationships and improve the conditions of life in the society (Ostrom et al. 1988:456–457).

Yet, in comparison with the perspective of the "Ostrom school" on CPR management, our approach on the metropolitan or macro-metropolitan territory emphasizes the complex institutional and social, economic and territorial inequalities that demand for a consistent and coordinated interplay between water security, water governance and land use planning as the basis for strengthening the emerging adaptive logic in the SPMM, as well as in other metropolises of the Global South.

Nevertheless, the existing mainstream logic of governance is still mainly developmentalist and growth-oriented in the developing world, and as we saw in our case study, this becomes particularly threatening in crisis situations when the lack of institutional resilience becomes explicit and the powerful economic interests, supported by governments, win through. Our research indicates that only in the case that citizens and local communities, civil society and social movements assume, step by step, a more relevant and proactive role as agents of change within broader multilevel and PCG arrangements, overcoming hence the institutional and cultural constraints identified in our case study on water governance in the SPMM, we can expect that natural resources management will evolve in a sustainable and fair manner. Much more research, however, is necessary in order to better understand if and how these kinds of interactions within polycentric governance arrangements could indeed converge towards effective transformational change.

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