



## Towards intersectoriality: the foundations for environmental territorial governance at the São Paulo Macrometropolis

### *No caminho da intersectorialidade: as bases para uma governança ambiental territorial na Macrometrópole Paulista*

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**ABSTRACT:** Based on the critical analysis of the issues of water security, risk, and ecosystem services, the article aims to present the foundations for territorial environmental governance through intersectoriality, relational character, and spatial integration, concepts that underpin territorial planning. Starting from the case of the São Paulo macrometropolis, the existing gaps in current management and planning practices were discussed in the face of the governance proposal presented in this article. Among the challenges and transformations to promote territorial environmental governance, it is necessary to recognize the relational interactions between actions, spaces, and dimensions, their impact on the territory, and consider local characteristics and their integration on a regional scale. Key to the transformation of governance practice is the recognition of territory as a produced space that results from socio-environmental relations and is mobilized by flows of power. Finally, territorial environmental governance is presented as a new point of departure and reflection that integrates policies, deconstructs the sectoral vision, and advances in producing a fairer, safer, and healthier territory for all, humans and non-humans.

**Keywords:** territorial environmental governance; multiscale; water security; risk; ecosystem services.

**RESUMO:** A partir da análise crítica dos temas de segurança hídrica, risco e serviços ecossistêmicos, o artigo se propõe a apresentar os fundamentos para uma governança ambiental territorial por meio da intersectorialidade, do caráter relacional e da integração espacial, conceitos estes que embasam o planejamento territorial. Tendo como caso empírico a macrometrópole paulista, foram discutidas as lacunas existentes nas práticas de

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gestão e planejamento atual diante da proposta de governança apresentada neste artigo. Entre os desafios e as transformações para promover a governança ambiental territorial, é necessário o reconhecimento das interações relacionais entre ações, espaços e dimensões, seus impactos sobre o território, assim como considerar as características locais e a sua integração em uma escala regional. Chave para a transformação da prática de governança é o reconhecimento do território como espaço construído a partir de relações socioambientais e mobilizados por fluxos de poder. Por fim, a governança ambiental territorial é apresentada como um novo ponto de partida e reflexão, que integre as políticas, desconstrua a visão setorial e avance na produção de um território mais justo, seguro e saudável para todos, humanos e não humanos.

*Palavras-chave:* governança ambiental territorial; multiescalaridade; segurança hídrica; risco; serviços ecossistêmicos.

## 1. Introduction

Environmental issues became part of the Brazilian planning practice through fragmented and sectoral institutional arrangements, both in regional and urban areas (Costa, 2008; Abers & Keck, 2013). Such characteristics are also present in the practices and structures of environmental governance that, despite the inclusion of participatory and decentralized decision-making processes, it prevailed a sectorial perspective (Castro & Futema, 2015; Frey *et al.*, 2019). The approach's limitations, which does not recognize the transversality of environmental problems, contribute to the challenges faced today, such as water scarcity in urban areas or the reduction of native vegetation remaining in Brazilian states, especially the Amazon (Empinotti *et al.*, 2019; Azevedo-Ramos *et al.*, 2020).

Thus, the current challenge is to reflect on and propose the foundations of environmental governance that breaks from the current sectorial perspective, challenges actions across the boundaries between urban, rural, and metropolitan areas, recognizes the flows of resources, and thus open the way for a proposal for territorial environmental governance.

In this sense, this article aims to present the guiding principles of the practice of territorial environmental governance that recognizes the impacts of actions at different levels and the need to consider local characteristics and their integration on a regional scale. This proposal is based on a bibliographic review of the most contemporary and critical literature on water security, risk management, and ecosystem services, chosen to deepen the fundamentals of territorial environmental governance practice. This reflection will be approached in the context of the São Paulo macrometropolis, which makes it possible to visualize the flows of natural resources and dependencies between municipalities and metropolitan regions, as well as the limits of a sectoral approach.

The article is organized so that its next section presents the fundamentals of territorial planning and how they are deepened in the critical perspective of water security, risk studies, and ecosystem services in constructing the bases for territorial environmental governance. Next, we present the case of the macrometropolis and how it reflects the inequalities and sectoriality of actions oriented to the environment. We end the article by presenting the challenges of promoting new territorial environmental governance practices and structures that

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break with sectoral perspective and are built from the recognition of the complexity and factors that make up the production of space and nature in this new regional planning unit, the macrometropolis.

## ***2. The foundations of territorial planning for territorial environmental governance: the contributions of water security, risk, and ecosystem services***

To promote environmental governance practices that breaks from sectoral institutional structures, territorial planning and its guiding principles of intersectoriality, its relational character, and its spatial integration (Favareto, 2007; Berdegú & Favareto, 2020) serve as the basis for our reflection. Thus, we understand the territory as a synthesis category of interdependencies between society and nature and the relations that mediate these interdependencies (Haesbaert, 2007). Such interdependencies are the result of the combination of several factors, such as history, economic structure, culture, biophysical conditions, infrastructure, investments, and institutions, among others, which constitute socio-constructed identities governed by some type of authority (Berdegú *et al.*, 2015; Favareto *et al.*, 2015). Thus, intersectoriality results from the formation of territories and their interdependencies. In this sense, the territory is produced by socio-natural and spatial relations. Such reflection dialogues with the environmental dynamics since, on the one hand, the environment is produced from interconnected chemical, physical and biological processes and, also, by the socio-natural relations that constitute it. In this way, environmental issues are transversal, and their governance must occur through the integration

of multiple efforts constituted at multiple scales, which break with the understanding of nature from its fragmentation in water resources, soil conservation, or preservation of biodiversity, for example (Empinotti *et al.*, 2019). So, intersectoriality is necessary because it recognizes the complexity of the environment organized in a non-fragmented reality. Thus, it transforms the management practices, and tools constituted from dichotomous epistemologies that led to their sectorialization.

At the same time, the relational character calls for the need to break with the understanding of oppositions and separation. Environmental issues are understood to be related not only to issues that refer to the characteristics of the physical environment but also to the human being, in which political and economic practices play a fundamental role in the construction of the environment and the recognition of environmental problems (Linton & Budds, 2014). For example, it is impossible to reflect on access to water without considering the infrastructure models in place and the political practices that influence its availability. It is impossible to think about risk only based on the natural characteristics of the landscape and disregard the social construction of vulnerabilities (Canil *et al.*, 2020). And finally, it is key to consider spatial integration in which the understanding of spaces is not sectoral and segmented as rural, urban, metropolitan, or regional, but are spatial, multidimensional, and multiscale categories in which the activities that occur in a space are related in a complementary and also competitive way with other spaces. At the same time, the forms of control and domination constitute a network of relationships that consolidates territories and different territorialities (Favareto *et al.*, 2015).

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In recent years, these principles have been deepened in water security, risks, and ecosystem services. The discussions on these three themes are presented below and how they support a territorial environmental governance proposal.

### *2.1. Water security and its multi-scalarities*

Currently, ensuring water security has become one of the drivers of water governance. Promoted by international development organizations, water security is defined as strategic interventions aimed at providing water in quantity and quality, for human supply, the balance of ecosystems, and the development of economic activities, as well as reducing the risks associated with critical hydrological events and increasing the resilience of supply systems (Grey & Sadoff, 2007).

In this context, the issue of water access is defined based on its availability and spatial distribution, its consumption by sectoral economic activities, and the intensification of the occurrence of extreme events that will have a greater impact on areas with a concentration of population and economic activities (Grey & Sadoff, 2007; Cook & Bakker, 2012; Grey *et al.*, 2013). By defining water security from the physical and spatial availability of water and by extreme events (Brown *et al.*, 2013), it is reinforced that State actions take place within a sectoral perspective, on a regional and national scale, and that disregards the local inequalities as well as the capacity of such agents to contribute with solutions that guarantee access to water in quantity and quality. Such an understanding assumes the problem of access to water as a merely technical issue, in which water resources are treated in a

sectoral, utilitarian way and as a source of input for various productive activities, for ecosystems and water supply.

However, the problem of unequal access to water within and between municipalities and populations, the characteristics of its availability, and the strategies mobilized to guarantee its access led us to redefine the concept of water security. It is necessary to consider water beyond its material characteristics, such as H<sub>2</sub>O, and recognize the social relations that configure its access and those that promote human beings' role as part of hydrosocial relations (Swyngedouw, 2013; Jepson *et al.*, 2017).

In search of a new way to guarantee access to water and that, at the same time, enable a new model of infrastructure and management, some authors proposed to consider other key points to define water security such as, the focus on the local scale, to consider the social production of water, its material characteristics and the presence of power asymmetries in the processes of accessing water (Jepson *et al.*, 2017). From this critical perspective, water security is understood as a process and is guaranteed mainly at the local and household scale since the strategies developed by communities and individuals to guarantee their water are understood and recognized. Such understanding contrasts with the unique role of the State and the private sector as water providers on a regional scale of infrastructure as the predominant approach (Lautze & Manthri-thilake, 2012).

Such reflection allows us to recognize environmental and social diversities and how they create opportunities for the development of multiple technological solutions on a local and more dispersed scale so that actions related to water management must be intersectoral. For example, to consider

not only surface water sources such as present in the Brazilian Water Law, but also to recognize groundwater and water in the soil when proposing management practices. Thus, actions aimed at land use, food marketing, energy production, and mineral exploration should be part of the list of actions in water management. The characteristic of water as an integrator of various sectors needs to be recognized. In addition, reflection on water management and planning must break with the premise of guaranteeing water supply and incorporate a reflection on consumption patterns that lead to resizing demand practices. From this understanding, it is necessary to develop relational planning practices which breaks with sectorial structures and links decision-making processes to a network that interconnects different scales, from local, metropolitan to regional and national, and that, at the same time, recognizes the complexity of hydrosocial relations as a consequence of interrelated and non-linear political, technical and biophysical processes (Jepson *et al.*, 2017). Even recognizing that Brazilian environmental policies offer opportunities for dialogue and intersectoral actions, the above reflection calls for new institutional arrangements. For example, due to scalar dynamics, the planning unit would not be delimited by watersheds but by the territory that is mobilized to guarantee and dispute for water, and which often encompasses more than its physical boundaries, different from the Brazilian Water Law – Law 9433 (Empinotti *et al.*, 2021). In addition, the role of the local scale would be more relevant than the regional scale in decision-making processes, different from what is constituted today in national and state watershed committees. Finally, in addition to defining the rules and regulations, the watershed committees would also be a space for the co-produc-

tion of solutions and actions, which firstly respect local specificities and dynamics. In this sense, the local scale is valued as a space for action and decision-making, as well as its relationship with other scales that go beyond the watershed (Zeitoun *et al.*, 2016). Still, it also presents a structure articulated to a multiscale system, based on decentralized decision-making, autonomy, and flexibility, and that does not privilege one space or certain interests over others.

## 2.2. Risk and relational interactions

Risk involves probability, perception, and decision-making processes. It is a social object, which implies the perception, by an individual or community, of danger or the possibility of a disaster. It only exists for those who perceive it, analyze it, understand its seriousness, and scope and adopt specific practices to face it (Veyret, 2003). Its definitions were derived, in the first instance, from the earth sciences, being related to the probability of the occurrence of a harmful physical event, focusing on the threat or physical event triggering the disaster, a physicalist approach (Hewitt, 1983). However, social, economic, political, territorial, institutional, and environmental dimensions have been considered, which focus on the probability of damages and losses associated with the occurrence of a harmful physical event or what could be considered a disaster risk (Narváez *et al.*, 2009).

The timeline has shown continuous reflection and review on the understanding of risks beyond the focus on disasters for decision-making processes that guarantee the safety and lives of people and, above all, offer better living conditions for

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vulnerable populations. In the 1990s, the focus was still predominantly technical and scientific for the diagnosis and control of disasters understood as natural. From the 2000s onwards, attention turned to adapting capacity and increasing the resilience of governments and local communities, giving more centrality and visibility to the underlying factors that cause vulnerabilities, both in analyzes and diagnoses and in practical measures (Sulaiman, 2018).

In the Anthropocene era, what seemed natural was increasingly understood as the product of human actions rooted in economic, cultural, and social models and the material relationships they express (Oliver-Smith *et al.*, 2017). To face the risks of disaster, it is necessary to rethink the compartmentalization of knowledge and agendas for a new paradigm, systemic, holistic, and integrative, that articulates the approach of natural sciences and applied sciences with the social sciences, integrating the threat of the physical environment and its effects, with social, economic, and political elements (Cardona, 2001).

The risk is a social construction, dynamic, differentiated in territorial and social terms, and the resulting disasters (Lavell, 2001). There is a defined territorial circumscription (which he calls the “impact territory”), in which risk and disaster reveal themselves and whose confrontation becomes the responsibility of communities and local authorities. However, there is also the “territory of causality”, which in most cases goes beyond municipal boundaries and extends to regional or macro-regional relations. This understanding allows for a process management approach (Narváez *et al.*, 2009) in the interrelation of risk management with environmental and territorial management.

This approach is expressed both in Colombia's National Disaster Risk Management Policy, recognizing that disaster risk management is related to the treatment of the environment, the protection of existing ecosystems in the country, and the use of rural and urban territories (Colômbia, 2012), as well as the National Civil Defense and Protection Policy (PNPDEC) in Brazil, which points to the integration between the PNPDEC and territorial planning policies, urban development, health, environment, climate change, water resources management, geology, infrastructure, education, science and technology, and other sectoral policies, intending to promote sustainable development.

Rethinking risk, therefore, brings together the various socio-natural dimensions involved, expanding the understanding and action on the problem, especially in urban spaces, marked by human intervention with constant change in natural dynamics and (re)production of vulnerabilities. Such understanding leads to a review of decision-making processes to face them through the expansion of action strategies: technical control of nature, centralized and hierarchical management, and the coordination of actions to respond to impacts, for diagnosis, planning, and intervention of socio-technical and participatory approach involving intersectoriality, spatial integration, relational interactions with decentralization, autonomy, flexibility, and diversity of actors in decision-making and governance.

### *2.3. Ecosystem services as a mobilizer of spatialized resources*

The concept of Ecosystem Service (ES) has been used for various applications, both in the sense



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of conservation, appropriation, management, and transformation resulting from the recognition of its importance for human activities. The concept is under debate in important forums associated with public policies (Díaz *et al.*, 2015) and can be incorporated into approaches such as resilience and vulnerability.

Ecosystem services, thought of as flows of energy, matter, and information from ecosystems, enable a better understanding of the relationship between the environment and human well-being, and allow an integrated analysis of the various public policies, for example, associated with water or risk. Such an approach makes it possible to expand knowledge of the nexus between ecosystem functions, services, and economic activities, including edge effects and feedback, in addition to risk-related incorporation. Another important aspect to be discussed within the scope of ES is the question of the temporal and variable quantitative and qualitative availability of ecosystem services (Burkhard *et al.*, 2012; Crosman *et al.*, 2013). That is, when planning a territory, we should recognize that the amount of water that flows in a river depends on the climatic seasonality, and because of that we should also consider the water flows most recent variations, and occupation of the territory.

There are two key elements that should be included when working with territorial management and ESs: the standards of ecosystem services and the concept of ecological security. Ecosystem service standards refer to the ecological processes of the landscape and important elements of that landscape that ensure the provision of these services. Thus, the concept of ecosystem service standards is associated with the guarantee of ecological security and a balanced relationship between economic development

and the environment since it seeks to identify which elements present that provides the minimum ecological security to guarantee the supply of a service, relating it to economic and environmental dynamics (Wang & Pan, 2019). In this sense, ecological security is based on the premise that ecosystems, in a stable way, provide SE for human well-being (Zhou *et al.*, 2014). This concept is not only associated with the resilience or integrity of the ecosystem but with the primary function of guaranteeing the supply, continuously, within the inherent variability of the service, for human well-being. For example, one can think about what would be the minimum area of riparian forest capable of guaranteeing the biodiversity of the ichthyofauna or even what coverage of natural vegetation would be capable of maintaining biodiversity and, consequently, the resilience of the system (Banks-Leite *et al.*, 2014).

This element is linked to the definition of limits, that is, how much we can change the characteristics of the environment while maintaining, at a minimum, the conditions for the provision of ecosystem services. Or rather, how much of the environment and its conditions should we keep to guarantee the supply necessary for human well-being, such as water supply and risk reduction? In this sense, there is the possibility of transforming this approach into ethical and scientific purposes, making it easier to be understood by the beneficiaries or service recipients (Costanza & Daly, 1992; Fisher *et al.*, 2009).

If, on one hand, the concept of ecosystem services promotes a better understanding of the dependence on resources and flows of ecosystems for human well-being, it must also be thought of in a distributive and equitable way, in the sense of justice associated with ES, or an Ecosystem Services Justi-

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ce. This proposal is in line with a fair distribution of ecosystem services within the perspective of socio-ecological processes, which includes water access, for example, or even risk reduction associated with the environment's resilience increase.

It should also be noted that other strategies, besides protecting green areas, should be considered as part of promoting ecosystem services, such as green and blue infrastructure. These structures of green areas and reservoirs (blue) can provide better distribution and equity in access to ES, that is, a strategic and planned approach to observing the relationships between natural areas, landscapes, and other open spaces for the conservation of ecosystem values and functions and its associated benefits to the human population (Benedict & McMahon, 2006).

Finally, thinking the ES approach, its standards, and justice can be debated based on some basic elements: such as its recognition, the processes associated with them, and their distribution (Lange-meyer & Connolly, 2020). In this sense, perceptions about the ESs combined with their contributions and associated values, the existing green and blue infrastructures and institutions can provide public policies, which necessarily involve a new perspective in which one considers the composition of the local socio-ecological interactions, their representation at different scales of uses, their distribution in the territory and the role of governance.

#### *2.4. Environmental territorial governance: a proposal*

The literature on water security, risk management, and ecosystem services presented above shows us that it is necessary not only to recognize

the dependencies between the various natural resources at stake but also how their transformation and management must incorporate the guiding principles of territorial planning. In this sense, we propose the bases of territorial environmental governance where intersectoriality, relational character, and spatial integration are key elements in understanding the processes that transform the environment, as shown in Figure 1.

The critical readings presented in this article incorporate the concepts of intersectoriality, relational character, and spatial integration. They offer us a complete way to understand the processes that lead to a more equal or unequal distribution of access to natural resources and their services. Recognizing that solutions to guarantee water security must consider the role of multiple actors and technologies that reflect the material context of water and its availability, as well as technologies that integrate and adjust to different political and social conditions. At the same time, the social construction of risk and the response to it must be integrated into actions triggered by various institutions that must be recognized as actors and developers of prevention solutions and practices. Finally, the temporal dynamics and the spatialization of ecosystem services further accentuate the understanding of instabilities and the need to adjust uses and access to natural resources as a function of their availability and the processes that influence them. Thus, a systemic and integrated approach involving ecosystem services, water, and risks, is necessary to deal with issues associated with multiple uses and interdependencies.

In this sense, new units of planning, such as the São Paulo macrometropolis, can offer the opportunity for thinking about territorial environmental governance since it constitutes an administratively



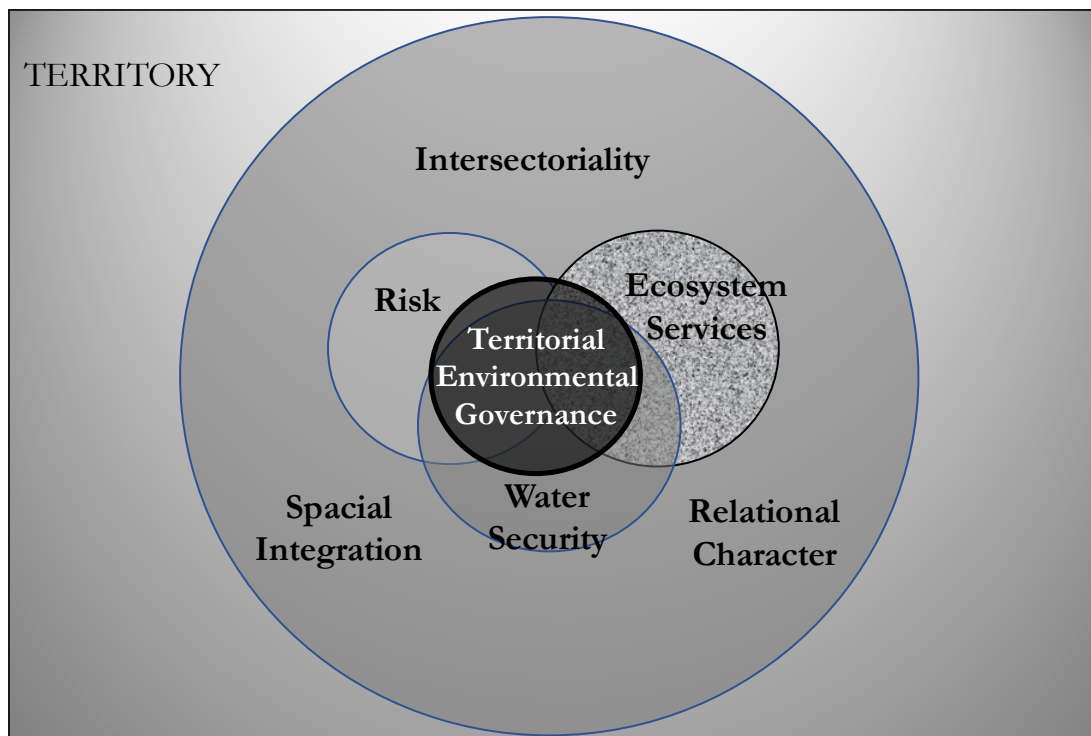


FIGURE 1 - Environmental Governance Territorial

defined region aimed at development and sustainability but still lacking a more integrated approach. Thus, below, we will present this new approach and how the environmental dynamics are constituted, intertwined, and challenge us to a new way of thinking.

### ***3. The challenges and opportunities of thinking about territorial environmental governance from the macrometropolis of São Paulo***

The São Paulo macrometropolis was initially proposed as a planning unit by São Paulo mana-

gement agencies to encompass the various flows of goods and people in a highly conurbated area (Tavares, 2018). With an area of approximately 52 thousand square kilometers, in which 174 municipalities are distributed in nine regions (Metropolitan region of São Paulo – RMSP, Baixada Santista – RMBS, Campinas – RMC, Vale do Paraíba and Litoral Norte – RMVPLN, de Sorocaba – RMS, in addition to the urban agglomerations of Jundiaí and Piracicaba and the Bragantina Regional Unit), it accounts for 83% of the GDP of the state of São Paulo (Emplasa, 2014) (Figure 2). Formed from a network of flows and multi-scale functional relationships, the macrometropolis is a complex and diversified productive structure, encompassing different types

of economic sectors, from the most traditional to the most modern, especially the high-tech sectors and innovative and specialized services (Tavares, 2018).

However, the macrometropolis also constitutes an institutional apparatus that enables the expansion of capital flows that guarantee access and availability of natural resources in response to the demands of the municipality of São Paulo (Tadeu, 2019; Zioni *et al.*, 2019). These issues became clear with the occurrence of the water crisis of 2013 and 2015, which evidenced the prioritization of water supply

to the city of São Paulo, as well as re-establishing the centralizing role of the state as a decision maker (Jacobi *et al.*, 2015; Empinotti *et al.*, 2019). In this sense, the macrometropolis responds to disputes and flows of power mobilized to guarantee access to natural resources and the conditions for producing wealth.

Such a planning unit is already characterized by economic, housing, and environmental inequalities, as well as distinct levels of risk vulnerability

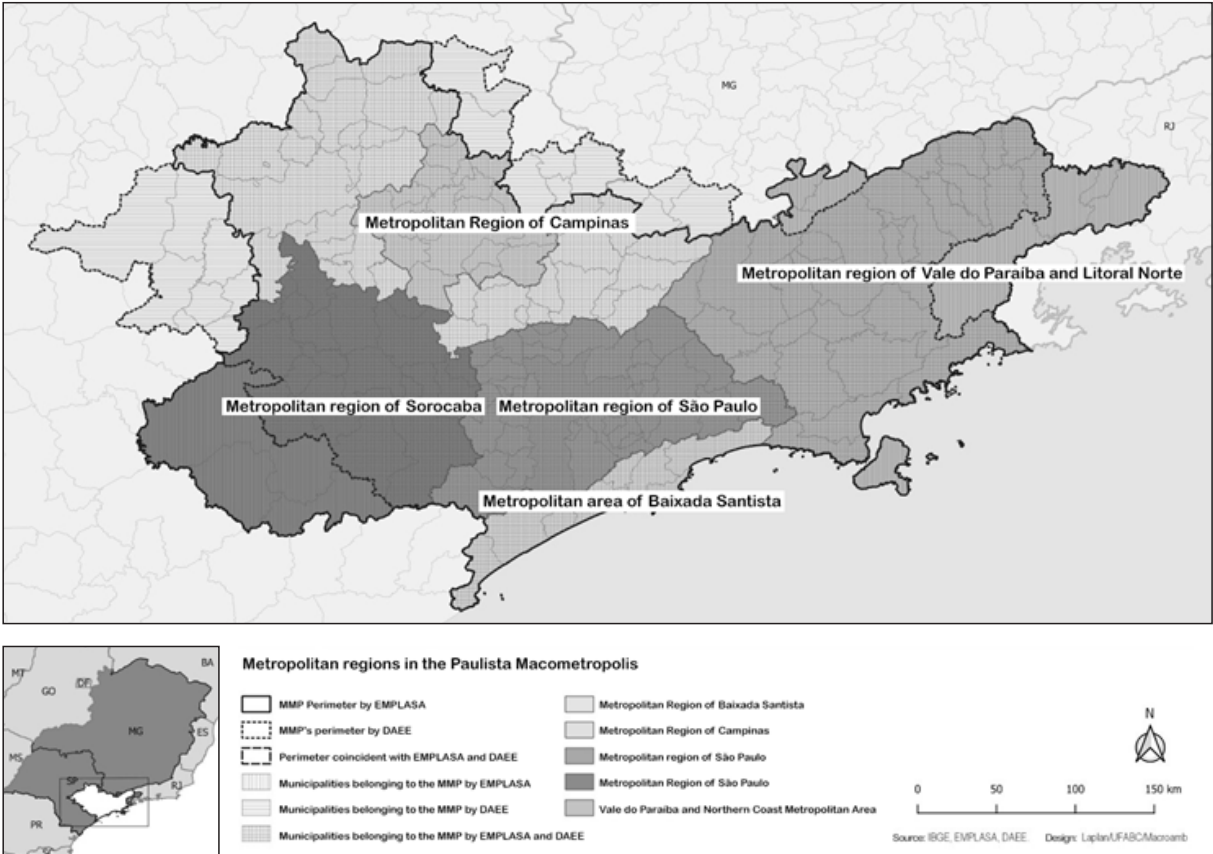


FIGURE 2 – Location and territorial boundaries of the Macrometropolis of São Paulo and its metropolitan regions.

SOURCE: IBGE, EMLASA, DAEE. Elaboration: Laplan/UFABC/Macroamb.

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(Marques, 2018; Travassos *et al.*, 2019; Gonçalves *et al.*, 2020). With 33 million inhabitants (Emplasa, 2019), 2.68 million live in precarious settlements, and approximately 1.5 million people are in areas at risk associated with landslides and flooding (Moura & Canil, 2019). At the same time, the sprawl of urban areas has followed a precarious pattern of urbanization (Maricato, 2011), with irregular land division and occupation of inappropriate and environmentally sensitive areas, in the process of “risk urbanization” (Rolnik, 1999) that intensifies into a ring or crown of precarious settlements around the expanded center of the city of São Paulo, putting pressure on areas of environmental protection to the south (Billings reservoir and Guarapiranga), to the north (Serra da Cantareira) and the east (Alto Tietê) (Royer, 2013).

Such characteristics result from a sectoral and non-integrated planning practice that dissociates social and economic issues from environmental ones, consequently producing a vulnerable territory with power asymmetries and concentration of natural resources.

An example of how urban and environmental planning does not dialogue occurs in the greater ABC region of São Paulo. In 1997, to preserve the water supply areas for the municipality of São Paulo, the State Law No. 9.866, on 11/28/1997, imposed restrictions on the water source areas' use and occupation in the state of São Paulo to stop water contamination from domestic sewage and solid waste disposal into water bodies, as well as siltation resulting from erosive processes made possible by the suppression of vegetation (Duarte *et al.*, 2010). Apart from a policy of housing provision of social interest, the law devalued the price of land in these areas and increased the expectations of

clandestine land developers and the installation of an informal land market, which had an inverse effect of increasing the pressure of occupation in strategic watershed areas for the supply of the RMSP and the proliferation of precarious settlements in areas susceptible to floods and landslides. As a result, in 2016, 30% of the ABC region (about 62,000 households) were placed in a water source recovery and protection area, 72% (about 190,000 households) were close to waterways (Denaldi, 2016) and had the characteristics of precarious settlements, which, in addition to problems with construction, infrastructure, public services, location, accessibility and legal insecurity, presented environmental insecurity, referring to the risk of floods, landslides and contaminated areas.

Understanding the socio-environmental dynamics that are produced and reproduced in the cities of the macrometropolis of São Paulo and assessing the negative impacts of sectoral policies and programs are necessary to contemplate integrated strategies from the territorial perspective that articulate risk management, environmental protection, water management, universalization of environmental sanitation and housing policy of social interest. Explaining this socio-historical-economic-hydrological-environmental context is necessary to overcome sectoral planning and actions, whose solutions have been increasingly questioned by their ineffectiveness in the face of a changing urban context, by the aggravation of the perverse relationship between poverty and socio-environmental risks, by the disarticulation of water management and the management of basic sanitation, by the separation between environmental protection and the provision of housing of social interest.

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When understanding the macrometropolis as a territory and its nature as a result of reflexive relationships between humans and non-humans, the point of analysis changes, and it is no longer possible to separate actions seen as environmental from actions of infrastructure, mobility, or housing. It is from the presence of human beings and their interaction with the materiality of the macro-metropolis space, mediated by institutions and their cultural and economic practices, that the territory of the macro-metropolis is defined. And it is from this understanding that we must think about environmental governance in a territorial way, which is relational and recognizes the multiple interrelationships at different levels and scales in this planning approach. Thus, in the challenge of proposing new governance practices in the macrometropolis, it is necessary to break with the sectorial nature of government actions and policies and also to relate the different institutional arrangements and planning units that exist today. Such reflection must be based on understanding the macrometropolis as a territory.

At the same time, when we look at the environmental theme, it is distributed in a transversal and segmented way among sanitation policies, water resources, land uses, and risk, among others. Each of these themes has its own legislation, planning, and management units, which brings us to the second point of this discussion. In the new outline of the macrometropolis, management and planning instruments that reflect the Brazilian federalist system that assigns responsibility to different governmental spheres such as the Union, states and municipalities are superimposed. For example, while the National Water Policy and the State Water Policy use the federal and state watershed basins as their planning unit, the National Sanitation Law guides the elabo-

ration of sanitation plans at the municipal scale. The Master Plans (Planos Diretores) are responsible for defining areas of use and occupation, and zoning at the municipal scale that strongly influences strategies for preserving green areas and water bodies.

Within the state of São Paulo, the themes “Safeguarding Biodiversity” and “Resilience to Climate Change” are guidelines of the state's Ecological-Economic Zoning, which uses as one of the aspects of the assessment of the flows of ecosystem services to guide public policies. These changes can enhance the sense of reducing socio-environmental vulnerabilities and preparing society for risk situations.

Thus, one of the main challenges is to break with such structures and create a path for decision-making processes and institutional arrangements that recognize institutional and spatial interrelationships and lead to a proposal for territorial governance.

This article presents a clear integration between water security, risk management, and ecosystem services, and these elements must be considered within a new management proposal. In other words, there is a need to propose actions beyond the current economic growth model, focusing on expanding gray infrastructure as the main way to guarantee human demands in this area.

Thus, as water security is more than a goal but a process of co-production of solutions that guarantee access to water through a combination of multiple technical solutions contextualized in local conditions, it dialogues directly with ecosystem functions and the various benefits of enabling its existence. Preserved areas and green infrastructure must result from our relationships and uses of macrometropolis spaces, and not as an imposition on the housing pressure of an unequal society.

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Infrastructure, housing, and mobility planning and interventions must be aligned and recognize ecosystem services that, in turn, contribute to ensuring water availability, which can be accessed and distributed according to local needs and activities. In this context, the risk is strongly impacted since people's living conditions related to infrastructure, access to sanitation, population concentration, and distribution, combined with the geological, relief, and precipitation characteristics that make up such landscapes, directly interfere with the levels of its occurrence.

In this sense, territorial environmental governance provides us with a new starting point and reflection, which integrates policies, deconstructs the sectorial vision, and advances in producing a more just, safe, and healthy territory for all, humans, and non-humans.

#### **4. Conclusion**

In this article, we propose to present the foundations of territorial environmental governance, based on the principles of territorial planning, from the critical reflection of water security, risk, and ecosystem services. Our challenge already begins with the integration of environmental issues, which, in the practice of environmental governance, are treated in a sectorial and disjointed manner. In the Brazilian environmental policy, water resources and risk management are guided by separate legal frameworks that interact when they have objects/situations in common, such as droughts and floods, but, in practice, they are not articulated. At the same time, ecosystem services are treated laterally and incipiently in the Brazilian legislation.

Recognizing the need to understand and structure environmental governance practices based on intersectoriality, relational character, and spatial integration is fundamental to considering the environmental problem's solution, availability, and access. These must not be limited to technical solutions, but the social and political component that produces the environment and its interactions must be present. In other words, guaranteeing water security does not only involve increasing the water storage network, and its efficiency in distribution but also the understanding that land uses must be articulated since they have direct impacts on the availability and quality of water. In this sense, it is important to consolidate a dialogue with ecosystem services that identify the provision of water as such, as well as the issue of risk that is constituted as a result of the location and human presence in the physical environment.

At the same time, it is necessary to recognize local characteristics, not only physical and material but also political and social, together with the power asymmetries that constitute them and contribute to the unequal distribution of access to the environment and its risks. This means that solutions designed for one condition do not necessarily work for others. Thus, a new model must have space for local specificities and regional integration. In this sense, there is a search for more multiple and flexible systems of environmental governance that promote, on the one hand, justice and equality in access to natural resources and, on the other hand, the valorization of interrelationships and their reflexive character in the constitution of the territories. In this sense, the articulation between water security, risk, and ecosystem services is a proposal that mainly

enhances management, and action that materializes territorial environmental governance.

This article presents the principles to support the territorial environmental governance practice, based on the adjustment or creation of new institutional arrangements. It recognizes territorial relations as the foundation for environmental planning and integrated-territorial management to overcome the sectorial perspective that prevails to this day in our practices.

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## References

- Abers, R; Keck, M. *Practical Authority: Agency and Institutional Change in Brazilian Water Politics*. Oxford: Oxford University Press, 21 ed., 2013.
- Azevedo-Ramos, C.; Moutinho, P; Arruda, V. L. da S.; Stabile, M. C.C.; Alencar, A. C.; Castro, I; Ribeiro, J. P. Lawless land in no man's land: the undesignated public forests in the Brazilian Amazon. *Land Use Policy*, 99, 104863, 2020. doi: 10.1016/j.landusepol.2020.104863
- Banks-Leite, C. *et al.* Using ecological thresholds to evaluate the costs and benefits of set-asides in a biodiversity hotspot. *Science*, 29, 1040–1045, 2014. DOI: 10.1126/science.1255768
- Benedict, M. A.; McMahon, E. D. *Green infrastructure: linking landscapes and communities*. Washington: Island Press, 2006.
- Berdegúe, J. A.; Bebbington, A.; Escobal, J. Conceptualizing spatial diversity in Latin American rural development: structures, institutions, and coalitions. *World Development*, 73, 1-10, 2015. doi: 10.1016/j.worlddev.2014.10.015
- Berdegúe, J.; Favareto, A. Balance de la experiencia latino-americana de desarrollo territorial rural y propuestas para mejorarla. *In: Quinceaños de desarrollo territorial rural em América Latina: ¿qué nos muestra la experiencia?* Buenos Aires: Teseo, 11-58, 2020.
- Brown, C.; Meeks, R.; Ghile, Y.; Hunu, K. Is water security necessary? An empirical analysis of the effects of climate hazards on national-level economic growth. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 371, 2013. doi: 10.1098/rsta.2012.0416
- Burkhard, B; Kroll, F; Nedkov, S; Müller, F. Mapping supply, demand and budgets of ecosystem services. *Ecological Indicators*, 21, 17-29, 2012.
- Canil, K.; Lampis, A.; Dos Santos, K. Vulnerabilidade e a construção social do risco: uma contribuição para o planejamento na macrometrópole paulista. *Caderno da Metrópole*, 22, 397-416, 2020.
- Cardona, O. D. La necesidad de repensar de manera holística los conceptos de vulnerabilidad y riesgo: Una crítica y una revisión necesaria para la gestión. *In: Annals International Work-conference on Vulnerability in Disaster Theory and Practice 2001*, Wagening: 29-30 jun., 2001.
- Castro, F.; Futema, C. *Governança ambiental no Brasil – entre o socioambientalismo e a economia verde*. Jundiaí: Paco Editorial, 2015.
- Colômbia. *Ley 1523, de 2012*. Por la cual se adopta la política nacional de gestión del riesgo de desastres y se establece el Sistema Nacional de Gestión del Riesgo de Desastres y se dictan otras disposiciones. Disponível em: <<http://www.suin-juriscol.gov.co/viewDocument.asp?ruta=Leyes/1682614>>. Acesso em: ago. 2022.
- Cook, C; Bakker, K. Water security: debating an emerging



- paradigm. *Global Environmental Change*, 22, 94-102, 2012. doi: 10.1016/j.gloenvcha.2011.10.011
- Costa, H. S. de M. A trajetória da temática ambiental no planejamento urbano no Brasil: o encontro de racionalidades distintas. In: Costa, G. M.; De Mendonça, J. G.; Ribeiro, A. C. T. (Orgs.). *Planejamento urbano no Brasil: trajetória, avanços e perspectivas*. Belo Horizonte: Editora C/Arte, p. 80–93, 2008.
- Costanza, R.; Daly, H. Natural capital and sustainable development. *Conservation Biology*, 6, 37-46, 1992.
- Crosman, N. D. *et al.* A blueprint for mapping and modelling ecosystem services. *Ecosystem Services*, 4, 4-14, 2013.
- Denaldi, R. Diagnóstico habitacional regional do Grande ABC - relatório Final. São Bernardo do Campo. Disponível em: [http://consorcioabc.sp.gov.br/imagens/noticia/DiagnosticoHabitacionalRegionaldoGrandeABC\\_versaofinal.pdf](http://consorcioabc.sp.gov.br/imagens/noticia/DiagnosticoHabitacionalRegionaldoGrandeABC_versaofinal.pdf).
- Díaz, S. *et al.* The IPBES conceptual framework - connecting nature and people. *Current Opinion in Environmental Sustainability*, 14, 1–16, 2015. DOI: 10.1016/j.cosust.2014.11.002
- Duarte, C. G.; Malheiros, T. F.; Grisotto, L. E. G.; Ávila, R. D. Legislação e gestão de recursos hídricos nas áreas de mananciais da Região Metropolitana de São Paulo, Brasil. *Revista Ambiente e Água*, 5, 245-257, 2010.
- Empinotti, V.; Giatti, L.; Sinisgalli, P.; Bermann, C. O nexos água - energia - alimento e os desafios da governança ambiental da macrometrópole paulista. In: Torres, P.; Jacobi, P. R.; Barbi, F.; Gonçalves, L. R. (Orgs.). *Governança e planejamento ambiental: adaptação e políticas públicas na macrometrópole paulista*. Rio de Janeiro: Letra Capital, 2019. p. 171-177.
- Empinotti, V. L.; Budds, J.; Aversa, M. Governance and water security: The role of the water institutional framework in the 2013–15 water crisis in São Paulo, Brazil. *Geoforum*, 98, 2019. doi: 10.1016/j.geoforum.2018.09.022
- Empinotti, V. L.; Dias, N. T.; Fragkou, M. C.; Sinisgalli, P. A. Desafios de governança da água: conceito de territórios hidrossociais e arranjos institucionais. *Estudos Avançados*, 35, 177-192, 2021.
- EMPLASA – Empresa Paulista de Planejamento Metropolitano S/A. *Plano de ação da macrometrópole paulista 2013-2040: uma visão da macro-metrópole*. São Paulo, 2013.
- EMPLASA – Empresa Paulista de Planejamento Metropolitano S/A. *Plano de Desenvolvimento Urbano Integrado da Região Metropolitana de São Paulo – PDUI-RMSP*. São Paulo, Emplasa, 2019.
- Favareto, A. *Paradigmas do desenvolvimento rural em questão*. São Paulo: FAPESP, 2007.
- Favareto, A.; Kleeb, S.; Galvanese, C. Territórios importam – bases para uma abordagem relacional do desenvolvimento das regiões rurais ou interioranas no Brasil. *ReGIS*, 1, 14-47, 2015.
- Fisher, B.; Turner, R.; Morling, P. Defining and classifying ecosystem services for decision making. *Ecological Economics*, 68, 643-653, 2009.
- Frey, K.; Ramos, R. C. F.; Moraes, A.; Sá, G. G. J. de. Desafios contemporâneos para a governança democrática da água. O caso da macrometrópole paulista. In: *Anais ENANPUR*. Natal, 31 de mai., 2019.
- Gonçalves, L. R.; Xavier, L. Y.; Torres, P. H.; Zioni, S.; Jacobi, P. R.; Turra, A. The coast of the Macro metropolis: so far from God and so close to the devil. *Desenvolvimento e Meio Ambiente*, 54, 40-65, 2020. doi: 10.5380/dma.v54i0.69275
- Grey, D.; Sadoff, C.W. Sink or swim? Water security for growth and development. *Water Policy*, 9, 545-571, 2007. doi: 10.2166/wp.2007.021
- Grey, D.; Garrick, D.; Blackmore, D.; Kelman, J.; Muller, M.; Sadoff, C. Water security in one blue planet: twenty-first century policy challenges for science. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 371, 2013. doi: 10.1098/rsta.2012.0406
- Haesbaert, R. Território e Multiterritorialidade: um debate. *GEOgrafia*, IX, 19-45, 2007.
- Hewitt, K. *Interpretations of calamity*. Boston: Allen & Unwin, 1983.
- Jacobi, P. J.; Cibim, J.; Leão, R. de S. Crise hídrica na macrometrópole paulista e a resposta da sociedade civil.

*Estudos Avançados*, 29, 27-42, 2015.

Jepson, W. *et al.* Advancing human capabilities for water security: a relational approach. *Water Security*, 1, 46-52, 2017.

Langemeyer, J.; Connolly, J. J. Weaving notions of justice into urban ecosystem services research and practice. *Environmental Science and Policy*, 109, 1-14, 2020.

Lautze, J.; Manthrilake, H. Water security: old concepts, new package, what value? *Natural Resources Forum*, 36, 76-87, 2012. doi: 10.1111/j.1477-8947.2012.01448.x

Lavell, A. Sobre la gestión del riesgo: apuntes hacia una definición. Lima: PREDECAN/Comunidad Andina, 2001. Disponível em: <http://cidbimena.desastres.hn/docum/crid/Mayo2004/pdf/spa/doc15036/doc15036-contenido.pdf>.

Linton, J.; Budds, J. The hydrosocial cycle: defining and mobilizing a relational-dialectical approach to water. *Geoforum*, 57, 170-180, 2014. doi: 10.1016/j.geoforum.2013.10.008

Maricato, E. *Brasil, Cidades: alternativas para a crise urbana*. São Paulo: Vozes, 2011.

Marques, E. *As políticas do urbano em São Paulo*. São Paulo: Editora UNESP, 2018.

Moura, R. B.; Canil, K. Vulnerabilidade social e suscetibilidade a deslizamentos na região metropolitana de São Paulo. In: *Anais Fórum de Governança Ambiental da Macrometrópole Paulista*, São Paulo, 25 de abr., 2019.

Narváez, L.; Lavell, A.; Ortega, G. *La gestión del riesgo de desastres: un enfoque basado en procesos*. San Isidro: Secretaría General de la Comunidad Andina, 2009.

Oliver-Smith, A.; Alcantara-Ayala, I.; Burton, A.; Lavell, A. The social construction of disaster risk: seeking root causes. *International Journal of Disaster Risk Reduction*, 22, 469-474, 2017.

Rolnik, R. Para além da lei: legislação urbanística e cidadania (São Paulo 1886-1936). In: Souza, M. A.; Lins, S.; Santos, M. do P. C.; Santos, M. da C. (Orgs.). *Metrópole e globalização - conhecendo a cidade de São Paulo*. São Paulo: Editora CEDESP, 1999. p. 1-22.

Royer, L. O. Municípios “autárquicos” e região metropolitana: a questão habitacional e os limites administrativos.

In: Furtado, B.; Krause, C.; França, K. (Orgs.). *Território metropolitano, políticas municipais: por soluções conjuntas de problemas urbanos no âmbito metropolitano*. Brasília: IPEA, p. 157-194, 2013.

Sulaiman, S. Ação e reflexão: educar para uma cultura preventiva. In: Sulaiman, S.; Jacobi, P. R. (Orgs.). *Melhor prevenir: olhares e saberes para a redução de risco de desastre*. São Paulo: IEE-USP, p. 49-56, 2018.

Swyngedouw, E. UN water report 2012: depoliticizing water. *Development and Change*, 44, 823-835, 2013.

Tadeu, N. Dias. *O poder da água: a disputa política pelo acesso à água em Ilhabela, SP/Brasil*. São Paulo, Tese (Doutorado em Ciência Ambiental) – USP, 2019.

Tavares, J. Formação da macrometrópole no Brasil: construção teórica e conceitual de uma região de planejamento. *Revista Latinoamericana de Estudios Urbano Regionales - EURE*, 44, 1-11, 2018.

Travassos, L.; Momm, S.; Torres, P. Apontamentos sobre urbanização, adaptação e vulnerabilidades na MMP. In: Torres, P. H.; Jacobi, P. R.; Barbi, F.; Gonçalves, L. R. (Orgs.). *Governança e planejamento ambiental: adaptação e políticas públicas na macrometrópole paulista*. Rio de Janeiro: Letra Capital, p. 120-126, 2019.

Veyret, Y. *Os riscos: o homem como agressor e vítima do meio ambiente*. São Paulo: Contexto, 2003.

Wang, Y.; Pan, J. Building ecological security patterns based on ecosystem services value reconstruction in an arid inland basin: A case study in Ganzhou District, NW China. *Journal of Cleaner Production*, 241, 118337, 2019.

Zeitoun, M. *et al.* Reductionist and integrative research approaches to complex water security policy challenges. *Global Environmental Change*, 39, 143-154, 2016.

Zioni, S.; Travassos, L.; Momm, S.; Leonel, A. L. A macrometrópole paulista e os desafios para o planejamento e gestão territorial. In: Torres, P. H.; Jacobi, P. R.; Barbi, F.; Gonçalves, L. R. (Orgs.). *Governança e planejamento ambiental: adaptação e políticas públicas na macrometrópole paulista*. Rio de Janeiro: Letra Capital, p. 90-99, 2019.

Zhou, K. H.; Liu, Y. L.; Tan, R. H.; Song, Y. Urban dynamics, landscape ecological security, and policy implications:

---

a case study from the Wuhan area of central China. *Cities*,  
41, 141-153, 2014. doi: 10.1016/j.cities.2014.06.010