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What can Urban Waters teach us? Prospects of action in the metropolitan region of Rio de Janeiro

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SUMMARY

The work presented here is based on a continuous research process and aims to work on the environment from the understanding of the relationship of cities in the metropolitan region of Rio de Janeiro, with its main urban rivers and to reflect on alternative solutions to the problems found. The challenge presented, in the ongoing research, from the experience of the Ubatiba River, in the city of Maricá, seeks to identify distortions and seek to make the reflections, within the principles of sustainability, produce effects on planning, design and management practices of the city, its urban waters. For this purpose, this investigation also intends to rely on the understanding and understanding of the existing legal provisions that guide the development of the target cities, committing, by bringing to the debate some reflections, based on theoretical-practical investigations, not to exhaust the theme, but rather to situate it as relevant in the face of the reality of the problems that surround cities, especially Brazilian cities, in contemporary times.

KEYWORDS: Planning and Management of Urban Waters. Urban Rivers. Metropolitan Region of Rio de Janeiro.

1 INTRODUCTION

Today, more than ever, we understand that the issue of water availability and population supply is only part of the reach of water in the urban environment, because it can be analyzed in other aspects. In view of the production of recent urban forms, leveraged by the practices of reproduction of capital, some factors are considered conditioning in the development of cities, in urban growth, in the treatment given to environmental issues and in the management practices of the territory, which focuses on the ways of managing urban waters.

This aspect was fundamental to instruct this work from Milton Santos' reflections on ecology and nature, in an interview published in 2000. Especially when he points out that "the value of nature is related to the scale of values established by society for those goods that were previously called natural" (SANTOS, 2000, p. 18). For the author, the disorder and fragmentation of the territory is associated with how society treats its natural resources. The model that applies in the treatment given to urban waters by Brazilian municipalities reflects how the theme has been neglected by governments. Not to mention that the globalizing process, which we have seen, accelerates the adoption of a culture that continues not to recognize the territory, its resources, as the author emphasizes, as part of the social link of the country. According to the author, the man-nature relationship goes through the "search to understand the world and places and in the search for solutions to the problems of the majority" (SANTOS, 2000, p. 27). We need to welcome the arrival of a new era with actions that value knowledge about the territory, its relationship with society, both in its entirety and in its detail. For Santos (2000, p. 28), "the world made known is in itself a revolutionary moment." And the techniques that are at our disposal are not devoid of intentionalities, as they can be considered as a driving force for the strategies and achievements adopted by social actors. It is up to us to identify the particularities in the essence of the relationship nature-society-territorial and solve its meaning. And this criticism will go through the work we propose here to describe.

For Perini (2004), the concern with the theme of urban waters, especially its management, has as a reflective basis the demand for greater awareness and the structural changes that stand before the relationship between nature and society-land.

> Universally, the theme water has been drawing the attention of people and providing greater global awareness and awakening approaches on

> the most varied issues that correlate, treated distinctly in the most diverse regions of the planet. It can be about degradation, scarcity, pollution, abundance, quality or quantity of water. However, the rhetoric that, due to the increase in population, technological diversities and the misuse of this resource, is unanimous, leading to the depletion of drinking water. (PERINI, 2004, p. 25)

The study region, initially the municipalities of Maricá and Niterói, in a context of the metropolitan east of Rio de Janeiro, experiences a process of progressive peripheralization with its own dynamics, structure and urban forms that show the inadequate and unequal access to urban services, Where the most disqualified part of the territory ends up contributing to the promotion of threats to the areas of Environmental Preservation. The traditional territorial planning then begins to privilege the establishment of ideal or adequate patterns of urbanization, without connection with the local reality, providing the legitimation of existing inequalities and the separation between planning and management, which no longer fits in the face of current demands. In this work it will be opportune to approach only the experience of the river Ubatiba, in the city of Maricá.

The challenge presented in the research here aims to identify distortions and aims to ensure that the reflections contribute for, within the principles of sustainability, produce effects on the practices of planning, project and city management, of its urban waters. With this purpose this research also intends to rely on the understanding of existing legal provisions, such as Municipal Executive Plans, Sector Plans and Legislation, in different spheres.

2 OBJECTIVES

The research sought to understand and work the environment, understand the relationship of the cities of Niterói and Maricá with their main urban rivers and reflect on alternatives to the problems found in the analysis, are mainly directed to the treatment of urban waters.

The specific objectives allowed us to rethink the urban space in the face of physical characteristics and local needs, as well as to know the specificities of the study region, its water network and the role played by urban waters, in addition to investigating the theme of urban environmental requalification, its characteristics in order to identify under what conditions this concept could be adopted in the planning and management of urban waters in the target cities. Each experience was treated independently, as it is the case presented here of the river Ubatiba, in the municipality of Maricá.

3 METHODOLOGIES

In the applied methodology, we dedicate ourselves first to rescue the data from the previous research, which translated into a literature review on the subject and how the theme rebounds in cities, in order to better understand the dynamics of the study area, bringing the scales closer and synthesizing information. In the present stage, when we privilege the characterization of these areas and their specificities, in accordance with the watersheds of the

rivers João Mendes[1] (Niterói) and Ubatiba[2] (Maricá), we emphasize the approximation of the relationship nature-society-legislation as a motto for the investigation.

The reading and understanding of texts about the environment, its relationship with individuals and with the urban space, knowledge of the concept and forms of revitalization was fundamental for the creation of the theoretical basis that guided this research. The characterization and analysis of the collected information, the studies through maps and images, field visits and photographic records were also support for the purpose of the research in understanding the relationship of the river with the urban space in which it is inserted and suggesting a transformative intervention approach.

It should be noted that during the most critical period of the Covid-19 pandemic the field survey was replaced by drifts from satellite images in the study area.

Initially, when revisiting the theme of urban environmental requalification, we faced a concept of mobilizing and strategic character, which, when appropriate, tends to promote improvements in the geographical space and in the lifestyles of the population, in line with the control of the impact of urbanization, according to the contributions of Araujo, Ribeiro, Holzer (2016) and Costa (2008). According to the work of Morsch and Mascaró (2016), Restoration of urban rivers as a strategy for a more sustainable city, which carries out an approach to sustainability in cities and urban rivers, this initiative presupposes a planned action and that in an integrated way will enhance the structuring natural elements of the city. For the authors, fluvial regularization, based on hydraulic constraints, is the first step in the recognition of rivers as structuring elements of urban water in cities.

Other looks, such as Tucci (1997) and Ribeiro (2017), allowed reflections during the research within a range of possibilities. The first author, based on a theoretical basis, supported by a technical bias that investigates the environmental impact of urban waters on urban development of cities, focuses on the runoff of urban waters the recommendation that the control measures, in the set of a watershed, they must be guided in the light of structural and non-structural measures, which are hardly disassociated. For the author, any interference initiative should be based on the knowledge of environmental aspects, the impacts of urbanization, the trends of ongoing expansion, the knowledge base on the subject in the study area, the degree of training of the human resources involved to intervene in the region, among

[1] The river João Mendes crosses the entire eastern and oceanic region of the municipality of Niterói, currently is in a deteriorated state, with several modifications in its path such as plumbing, launch of fresh sewage and invasions in the riparian forest. The importance of the preservation and recovery of the river is mainly based on its insertion in these regions, subject to real estate speculation.

[2] The Mumbuca River in Maricá despite being responsible for the part of the municipal water supply is degraded in its most urbanized stretch, but also underwent changes in the areas closest to the springs. There were processes of channeling, invasion of the margins, deviation of the water courses for the formation of dikes and decharacterization of the riparian forest. Mumbuca is the name given to the stretch of the river Ubatiba after the limit of the RJ106. Except for the districts of Inoã and Itaipuaçu, supplied by the Imunana-Laranjal System, the river Ubatiba, according to the Atlas of Water Supply of the National Agency of Water and Basic Sanitation - ANA (2021), and the wells of Maricá configure the supply springs of the municipality.

other factors. The second author, in her master's dissertation[3] on the Piraquê-Cabuçu river basin, west of the city of Rio de Janeiro, uses the concept of landscape units[4]. She defines as unity each distinct homogeneous stretch by similarity in the organization and dimension of the composers' elements of the landscape, which may be physical support, vegetation cover or urban spot. By proposing the division of the perimeter into sections, the previously regional scale becomes local, from the pedestrian point of view, which helps to identify problems in the main course and on the banks of the rivers. The landscape visualization was worked on different scales, in the division of landscape units of the watershed (in sections) and in the analysis of the excerpts by field visits, applied interviews and by the perception of the landscape on a local scale (RIBEIRO, 2017, p. 80).

The reflections extracted from the deepening of the research on the subject, from the mentioned case, with capillarity on vulnerable territories regarding degradation, scarcity, pollution, abundance, quality or quantity of water, highlighted by Perini (2004), corroborate that diverse experiences may, within the Brazilian context, in the metropolis of Rio de Janeiro, highlight the role that belongs to man in this journey as part of nature. It is up to him to act from a conception of the world that favors the integrated vision of environmental problems.

The cases studied, until then, reinforce that the waters should be our justification to enable the recommended interventions and that the gaze should be integrated. The lessons learned in the investigated repertoire or in the empirical experiences consulted present nature as a guide to the process of "making" cities. It is worth noting that Brazilian cities show that having legislation is not enough. It is necessary to create an enabling environment for more innovative initiatives to thrive, while at the same time we can guide ourselves through the field of behavioral change and operational solutions. Thus, two major challenges are presented: population growth and increased use of natural resources, which require measures that work from the perspective of awareness.

When considering the scope of the theme and the methodological path described, other perspectives and experiences were added from Final Papers (TCC), guided in the context of the ongoing research[5], by an exploratory, descriptive, and analytical bias. One of the works in question, entitled The Visible and the Invisible in the Landscape: Environmental urban requalification of the Ubatiba/Mumbuca River Case – Maricá/RJ, by Carolina Moura[6] , the objective was to propose an action plan based on the urban environmental requalification for the river Ubatiba/Mumbuca in Maricá, considering the studied hydrographic region relevant to the understanding of the relationship between the expanding city, its major projects, and the

[3] Urban rivers and the relations of/in the free space (case study of the Piraquê-Cabuçu river basin – west zone of Rio de Janeiro), March 2017.

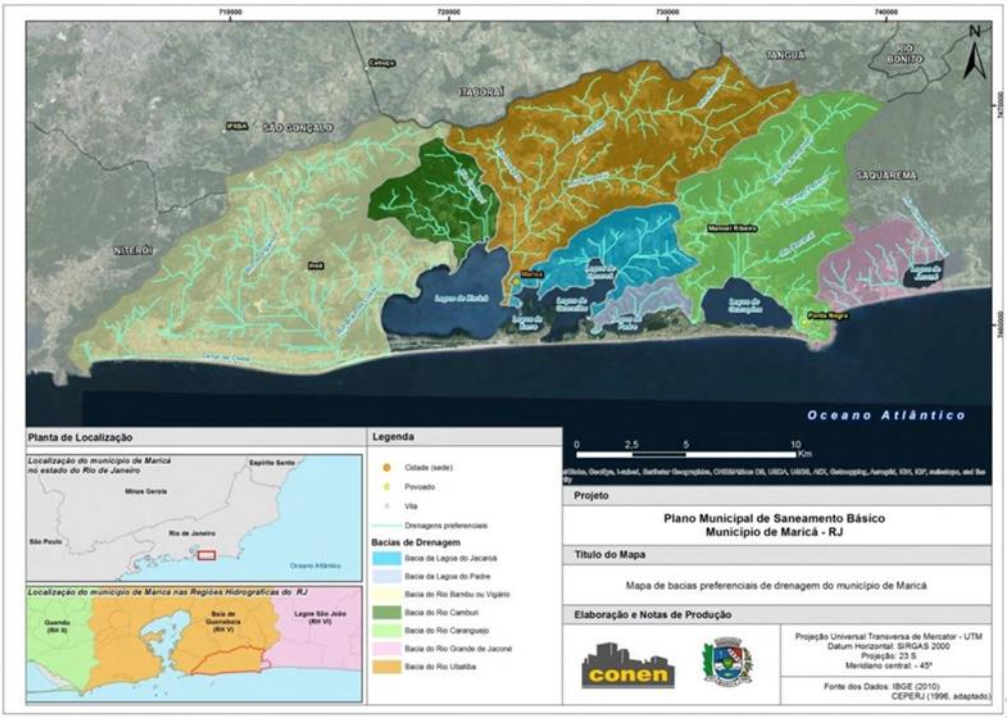
[4] Studies on the subject, such as de Queiroz et al. (2016) and Amorim and Oliveira (2008), for example, reaffirm that, by associating attributes of the natural system to the anthropic system, the landscape dynamics can be analyzed with the vigor and the necessary specificity to identify weaknesses and potentialities to be treated in the management of the territory.

[5] This is a study set in the Research Group City, Urbanization Processes and Environment, registered in the National Council for Scientific and Technological Development (CNPq).

[6] Final Paper defended in 2021.2 in the Architecture and Urbanism course of the Fluminense Federal University.

elements of the natural landscape, such as its waters, which, for now, they are still seen as barriers to urban development. The work in reference presents a "polluted river, with negative interferences in the bed, banks and surroundings, affecting the fauna, flora and the quality of life of the population", evidencing changes in its ecological function, in a progressive way, as well as degradation and invisibility characteristics (MOURA, 2021, p. 16). This does not differ if from trends found in other Brazilian cities where the city/river conflict is perceived so intensely that the life of the water body is completely lost, thus enacting the end of that ecosystem. The investigation of this case of study, developed within the scope of a FINAL PAPER, reinforces the interest that this theme has been reaching in the academic field, providing concerns and possibility of acting along with the intertwining of teaching, research, and extension activities, especially in the field of research and extension, regarding the need to combine efforts that propose to understand the problem of urban waters in Brazilian cities. In this paper, it is evidenced the need to associate studies of the recent normative framework, focused on the segment of urban development and urban infrastructure, especially water resources policies, with local specificities and demands of the population. In the approach adopted by the author, either by the investigative or propositive bias, it is suggested that Urban Environmental Requalification actions be presented as a perspective to rescue the urban rivers and awaken a collective consciousness for preservation not only of the water body, but of the entire surrounding region, considering the river as part of the urban water system of a city.

Figure 1: Delimitation of the main drainage basins of Maricá



Source: Municipal Plan of Basic Sanitation of Maricá – PMSB, 2015.

Figure 1 highlights the need to know the distribution of the city's water network, to associate it with environmental legislation related to water use priorities, as well as other tools

for water and environmental resource management in the municipal, state, and federal levels. In addition to this technical and legal-urban reading, it is important to compare what corroborates the degradation of water bodies. Whereas during the field activities of this work, it was observed the effects of the lack of planning regarding the management of urban waters, often verified when traveling through the river, walking along its banks, contemplating it as a enjoyment of a city landscape. The specificities of the route of the river Ubatiba river hydrographic region could, in part, be observed in Figure 2, in which the river is not fully inserted in consolidated urban soil and part of its waters are used to supply the population.

It is worth mentioning that the international debate surrounding the theme and its repercussion in the case of Brazilian cities has highlighted the issue of health emergency, water and the guidelines directed to the climate crisis, especially regarding the folding in water management. The treatment given to rivers as beings devoid of rights is still supported in water structures of channeling and capping, contributing to the decharacterization of them, not to mention the occupation of their margins, increasingly intense. This portrait is experienced by the case of the Mumbuca/Ubatiba River.

The study presented by Moura (2021) shows that water bodies need to be worked under the awareness bias. The relationship described and established between the territory and the river is conflicting. The urban water management reveals the continuous conflict, especially water and sewage management, as the main questioning and concern of the population and public authorities.

Figure 2: Graphical representation of the Ubatiba River Basin

Source: Preparation of researchers from the Google Earth Platform, 2019.

The understanding of the case required the investigation of authors such as Lima, Oliveira and Guimarães (2014) and Silva (2011), who in their works on the theme of urban environmental requalification point out that the recovery of urban rivers has the potential to highlight its beauties and potentialities. The authors point out that such actions, which have repercussions on rivers, tend to revive their history, produce an ecologically sustainable city mitigating risks and adversities caused by urban expansion and, above all, value their role as elements of the urban landscape, highlighting the treatment of the city's water network as responsible for planning and management of urban waters. What, in a way, grounded the research presented, in addition to the analysis and proposition resulting.

4 RESULTS

It is important to note that current studies on urban waters are looking for its importance also in the search for a healthy city. The health of watersheds, considering that rivers and adequate sanitation corroborate to aim for the well-being of the population. As Tucci points out (2008, p. 3), "today's problems are reflected in the health of the population, frequent flooding, loss of rich and diverse environment in many regions." According to the author, it is necessary to break with the cycle that has been perpetuating in our cities – to recognize the passive and do nothing to transgress this order. The author's contributions help in the conclusion that in order for the country to achieve sustainability goals, observing, for example, the Sustainable Development Goals (SDGs) of the United Nations Agenda 2030, the expansion of access to supply and the provision of sewage collection and treatment, it is necessary that investments be made in the sector from the vision of an integrated management, which is based, above all, on the interface between the various systems involved.

The arrangement suggested by the author is presented as a possibility for water systems in urban areas, due to an efficient and integrated management, to act in a preventive way in urban development, contributing to the reduction of costs to solve problems related to urban water planning and management. But it should also be considered the articulation of the relevant legislation, the planning and management systems of the cities, such as Peixoto, Studart and Campos (2016) consecrate.

> However, the main difficulty for urban water management is the lack of articulation. The policies of environment, land use and occupation and water resources are not well articulated. Above all, in the institutional sphere, as to the agents responsible for the effectiveness of these. (PEIXOTO; STUDART; CAMPOS, 2016, p. 11)

In this sense, the results obtained by the research so far suggest measures for cities to become sensitive to their waters, shaped in an ecologically oriented urbanism to the approximation of the city to nature. Measures aimed at mitigating floods, increasing biodiversity, removing pollutants, increasing green areas, assisting in regulating the water cycle and boosting the increase of fauna, always in the perspective of the well-being of the population.

5. CONCLUSION

Upon considering the theme of urban waters as fundamental in the harmonization among the different normative instruments produced – legal city, so that they can adapt to the new realities of cities that undergo constant transformations – the real city, it is expected to delegate to the municipalities more autonomy to be able to operate the waters within their territory.

It is with this purpose that this article has committed itself, by bringing to the debate some reflections, based on theoretical-practical investigations. The research presented does not intend to exhaust the theme, but to situate it as relevant before the reality of the problems surrounding cities, especially Brazilian cities in contemporary times.

And rescuing Tucci (2008) we emphasize that much still needs to be done in confronting the theme by the cities.

> Currently, it is necessary to effectively integrate the goals of Water Resources Management to those of environmental sanitation. Although this integration is implicitly foreseen in the legislation, in practice it does not occur. The Hydrographic Basin Plan provides for the framing of rivers, and cities should act in the control of urban effluents to achieve the goal of the framing of internal and external rivers to the basin. However, it is necessary that there are plans and that these frame the rivers in which cities influence, followed by an action plan to achieve the goals. (TUCCI, 2008, p. 111)

In this sense, practical and feasible solutions permeate a highly complex and broad framework, which involves politics, economy, environment, urbanization, and sustainability, among other issues, this still deserves to be deepened and discussed in the context of this research.

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