Public Management as a Risk causator in Brazilian Metropolis: the case of Florianopolis

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Abstract

Proposal - The Brazilian legislator instituted the National Policy on Basic Sanitation (PNSB) in 2007, Law 11.445, ten years after the creation of the National Policy on Water Resources, Law n. 9433/1997. The metropolitan region of Florianópolis (RMF), Santa Catarina, Complementary Law n. 636, which established a framework that proposes a change in the quality of life of the population. The aim of this article is to present a problematic panorama of urban planning that violates the human rights of an invisible population that is literally sidelined on hillsides and hillsides in areas far from the most valued urban areas.

Design/methodology/approach - Bibliographic review, documentary analysis, secondary data and participant observation were used as methodology.

Findings - However, there are a number of situations that characterize these regions, namely: lack of water, lack of sanitary sewage, lack of drainage, construction of houses in risk areas. Such conditions become more significant with the climate change context we are experiencing, with a higher incidence of rainfall in this region and, therefore, the need for a more effective disaster protection system in Santa Catarina Island.

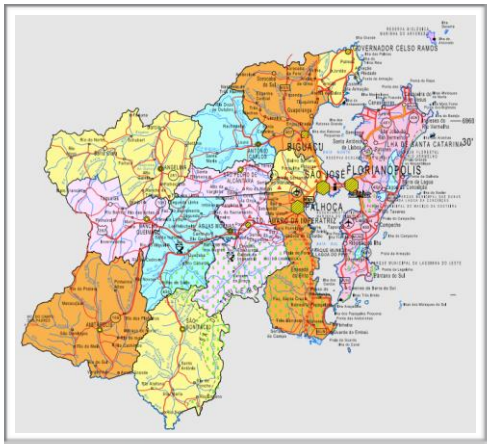
Originality/value This essay is not restricted to problems in a particular state of the Brazilian federation, but can be extended to other Brazilian regions, as well as to other regions in various parts of Brazil, by presenting factors related to urban planning that are essential for environmental balance and risk of living in a large city, considering that the tendency is for extreme events to occur more frequently.

Keywords: Risk; Disaster; Marginalization; Environment.

Introduction

The city of Florianópolis, capital of Santa Catarina, one of the 27 Brazilian states, is an important case for thinking about the disaster in the country, since it is a tourist city, a large urban center embedded between rivers and sea, with diverse rock formations and for having great possibility of disasters that can be potentiated from the imminent reality of the climatic changes.

Thus, the present study took place in the Metropolitan Region of Florianópolis (FMR). It is a very young metropolitan region formed by the municipalities of Águas Mornas, Antônio Carlos, Biguaçu, Florianópolis, Palhoça, Santo Amaro da Imperatriz, São José, São Pedro de Alcântara and Governador Celso Ramos. In addition to these municipal units, there is an expansion zone constituted by the municipalities Alfredo Wagner, Angelina, Anitápolis, Canelinha, Garopaba, Leoberto Leal, Major Gercino, Nova Trento, Paulo Lopes, Rancho Queimado, São Bonifácio, São João Batista and Tijucas . According to data from July 2018 of the Brazilian Institute of Geography and Statistics (IBGE) (Ibge, 2016), the population is approximately 1.2 million inhabitants, with a density of 167 inhabitants per km2, which would increase considerably to almost 700 inhabitants per km2 if the analysis were restricted to the area of Santa Catarina Island, which is the city of Florianópolis, see map 1.



Map 1 - Metropolitan Region of Florianópolis
Source: http://www.spg.sc.gov.br/visualizar-biblioteca/acoes/mapas/mapas-1/secretarias-regionais/610--13/file

However, it was noticed that among the great demands that exist in this territorial space, the demand for better sanitation was recurrent in opinion polls, in journalistic matters, it was, after all, a very debated subject, even in the academy. Santa Catarina, especially the metropolitan region of Florianópolis, stands out as being a prosperous region in comparison to the national territory, as the report of the Brazilian Service of Micro and Small Enterprises (SEBRAE) corroborates with this statement:

> The dynamism of the Santa Catarina economy is reflected in high rates of growth, literacy, employment and income per capita, significantly higher than the national average, guaranteeing a better quality of life for those who live here, but with contrasts regarding the socioeconomic development of their municipalities. (Sebrae, 2013, 5)

It is paradoxical that this distance between the proposed development-growth model, which analyzes the development of a metropolis from its economic performance, while on the other side has public services of dubious quality and that has a direct impact on the protection of the city in the face of extreme weather events. An example of this is basic sanitation, consisting of the supply of drinking water, treated sewage, drainage and the correct disposal of waste. In this work, one thinks of a dimension totally neglected by the municipal public management, although its attribution, the drainage of pluvial water. This service is essential to avoid and mitigate the effects of excessive weather events, for example.

Thus, in the context of the national context, with many urban disasters that could be avoided, the Florianopolis case is an important example that draws attention to the need for effective urban planning that focuses on prevention, mitigation of risks and that takes into account the climate change landscape.

The research problem presented is the following: does public management have responsibility for disaster mitigation in cities? This article aims to analyze how the public administration has responsibility for the potential of disaster risk in cities, by presenting the basic sanitation agenda as essential to mitigate the effects of these disasters. In this way, secondary data were

analyzed, primary data were collected in the observation of meetings and in official documents, as well as the applicable legislation was analyzed and the related bibliography.

Sanitation: a neglected agenda

The current situation in Brazil, at a time of crisis, of general elections, the sanitation agenda appears with force, however, without a deepening that is necessary, incurring in essential misunderstandings like the absence of a discussion about the National Water Resources Policy (PNRH), the National Policy on Basic Sanitation (PNSB) and the National Environmental Policy (PNMA), in a systemic way.

The issue is approached as if these policies were watertight sectors without any interconnection. It seems that the most rational thing would be to discuss sanitation, including water, treated sewage, waste and drainage, from a broader environmental policy that would encompass all these sectoral public policies.

Perhaps this process is a legislative artifice even to relativize the process of implementing this policy, see what happens with the PNSB that has just been modified by an executive rule n. 844/2018 which, for example, relativizes the principles of basic sanitation as one that is basic to the system, which is that of universalization, adding a restrictive definition to the term, as "a progressive extension of access to basic sanitation for households occupied by the country, "contrary to what has been decided in the judiciary regarding the obligation to carry out the sanitation, since it is a fundamental human right and needs to be implemented.

Table 1 shows how severe the sanitation situation in Brazil is, including access to safe drinking water and treated sewage, a human right provided for in the United Nations (UN) Resolution since 2010. There is a lack of universalization of basic sanitation in relation to water supply and sanitary sewage, especially in the State of Santa Catarina, which has one of the worst rates of sanitary sewage, without mentioning specifically its treatment.

Table 1 - Coverage of sanitary sewage by State

	ÁGUA (%)	ESGOTO (%)
DF	99,0	84,5
SP	95,6	88,4
PR	92,8	66,55
RJ	92,2	64,5
MT	87,8	25,6
GO	87,5	47,8
RS	87,2	29,4
SC	86,9	19,5
MS	86,1	42,7
SE	84,3	18,4
TO	83,4	22
MG	82,5	69,1
ES	82,2	47,4
RR	80,0	38,1
RN	79,5	22,5
BA	79,2	34,8
PI	76,5	20,9
AL	76,4	20,9
AM	76,3	7,7
PE	76,1	20,8

	ÁGUA (%)	ESGOTO (%)
PB	75,3	34,3
CE	64,0	25,2
MA	56,2	12,1
PA	47,1	4,9
AC	47,0	12,5
RO	44,2	4
AP	34,0	3,8

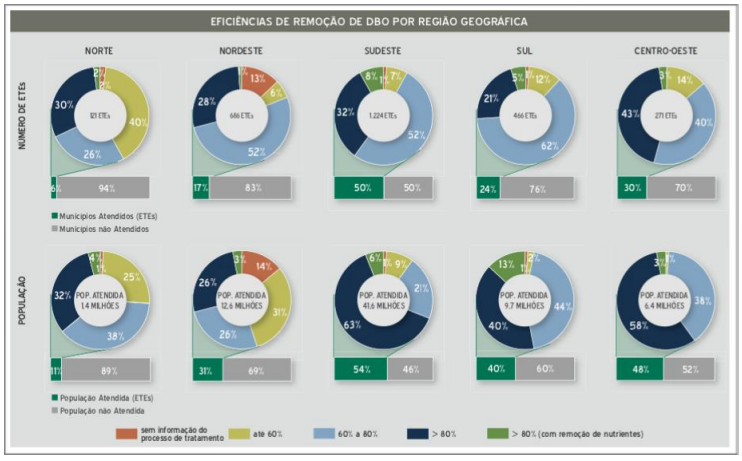
Source: SNIS, 2017

What happens in the supposed urban solutions in metropolitan regions is more of the same, when the solution is started for the end and not for the beginning, when the logical one would be to prepare the territories, before the buildings for example, to receive the water, to treat the drainage and non-waterproofing of the soil the resilience capacity, especially in regions with a high population index such as the metropolitan regions. It can be seen that the sanitation policy in Brazil is still very poor, which puts, especially the most vulnerable population, services of very poor quality, when they exist.

This policy should also be connected with a fundamental one, the National Environmental Policy (PNMA - Law N. 6.938/81), from which emerge the guiding principles for a sanitation policy or a National Water Resources Policy (PNRH - Law 9.433/1997). However, the inertia of the National Environmental System (SISNAMA), through the environmental agencies, is verified, except for discussing and issuing environmental licensing, which has become a purely sectoral activity, devoid of a higher discussion in terms of planning policies that interconnect sanitation and the environment, they are ultimately closely linked and essential for well-being in cities.

The Union has designed the policy and the states generally have their water and sewage companies and outline their policies, and it is up to municipalities to set themselves up as the holders of basic sanitation and, almost always, the most fragile link, especially when thinking about a model of federation that has 80% of the municipalities with less than 50 thousand inhabitants and a large part depending on the Participation Fund to be able to balance its budget and that do not generate good part of its revenue. However, what happens is that in cities with a high level of collection, sanitation has not been implemented either. It has become an announced tragedy that can be verified in the quality of sanitation in the country. Graph 1 shows the result after 10 years of PNSB, 20 years of PNRH, 36 of PNMA, and 30 years of Citizen Constitution.

Graph 1 - Status of the treatment of sewage treated by region



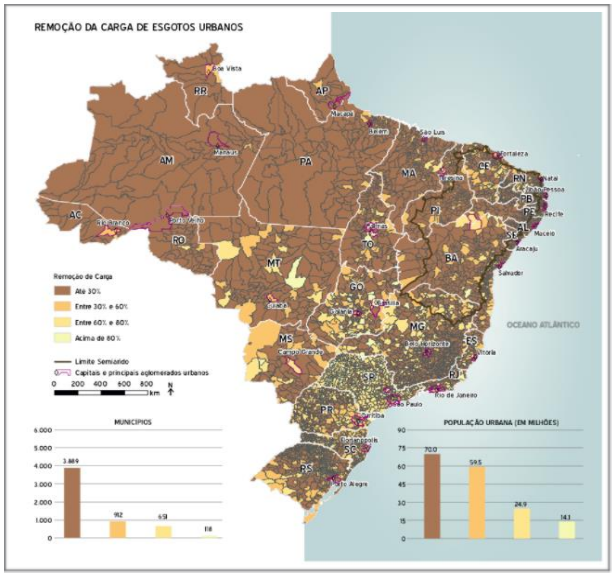
Source: BRASIL, ANA, 2017.

Graph 1 announces the result of years of neglect with sanitation in all regions of the country, through the efficiency of removal of BOD (Biochemical Demand by Oxygen), which means that the higher the amount of waste the greater the demand for oxygen and this makes it difficult or unfeasible for organisms to live in bodies of water or springs that receive sewage without proper treatment, that is, the more efficient the treatment, better is the availability of oxygen.

This is mainly due to the insufficient investment in Sewage Treatment Plants (ETS), as well as in the absence of these. In map 2 the result of this inefficiency is visible in national terms.

Almost the whole country can only remove 30% of the sewage load, note the brown part on map 2, the more pollution for water bodies, the more difficulty for urban drainage and the more environment conducive to urban tragedy that could be avoided by the action of the public administration.

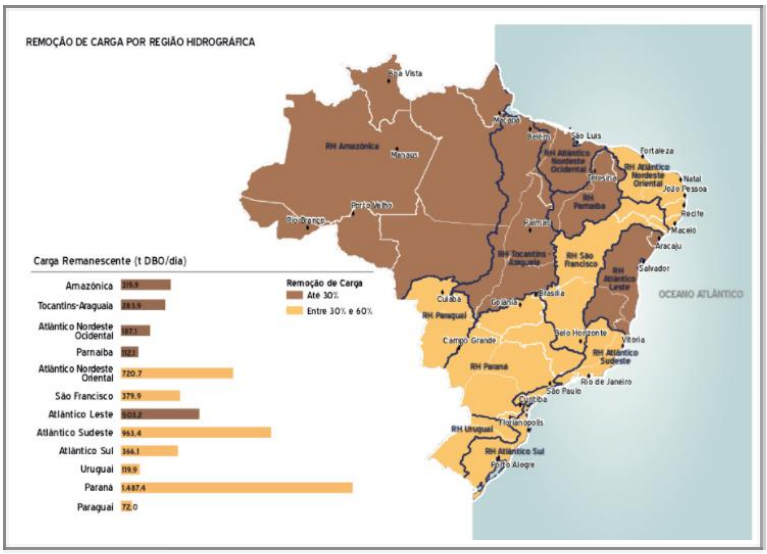
Map 2 - Removal of Urban Sewage Cargo



Source: BRASIL, ANA, 2017.

Another scale should be used to better understand the scale of the disaster with ecological impact. The most indicated in this case is the scale of the river basin, which offers the possibility of systemic treatment in terms of urban ecological planning of the various interventions. Map 3 demonstrates the efficiency in waste removal based on the watershed division. This fact raises the following question: what does not have the correct destination goes where? Is it deposited in urban spaces? are thrown into bodies of water in general? The signs point to potential pollution of water bodies and damage to cities in urban drainage and disaster prevention such as floods. This points to the imperative need for articulation, interoperative cooperation that needs to be working between the entities that make up the river basin.

Map 3 - Removal of sewage cargo by hydrographic region



Source: BRASIL, ANA, 2017.

Water policy and basic sanitation policy are a veritable tangle of tasks that are much more difficult than facilitating. Table 1 presents this scenario in a simplified way, which should be better designed to link environmental issues to water, waste and drainage issues.

Table 1 - Distribution of water regulation in Brazil

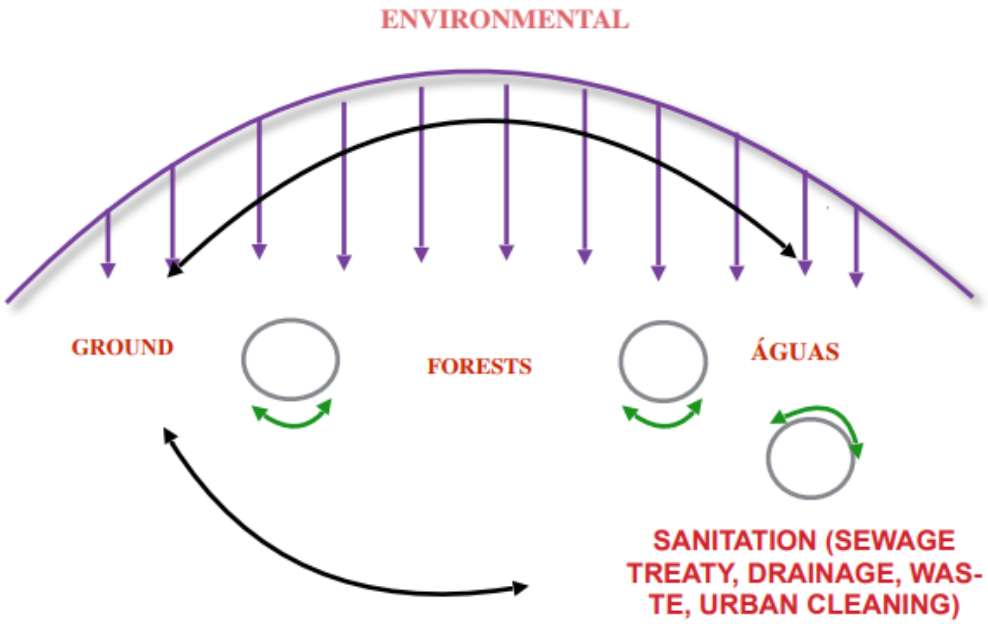
Territory	Ownership	Standard
UNDERGROUND WATERS ON THE LIMITS OF THE STATE OF THE FEDERATION	STATE	CF, art. 26, I
SURFACE WATER ON THE STATE OF THE FEDERATION	STATE	CF, art. 26, I
SURFACE WATER CUTTING OVER ONE STATE	CENTRAL GO-VERNMENT	CF, art. 20, III
SURFACE WATER CUTTING MORE THAN ONE COUNTRY	CENTRAL GO-VERNMENT	CF, art. 20, III
UNDERGROUND WATER PERPASSING MORE THAN ONE COUNTRY	CENTRAL GO-VERNMENT	CF, art. 20, III
LAKES OR ANY WATER BODY ON UNION LAND	CENTRAL GO-VERNMENT	CF, art. 20, III
THE HYDROENERGY POTENTIAL OF WATER COURSES	CENTRAL GO-VERNMENT	CF, art. 21, XII, b

Territory	Ownership	Standard
SANITATION	COUNTIES	art. 8-A, da Lei n. 11.433/2007

Source: elaboração própria

Concretely it is perceived that there is no dialogue, nor a proactive articulation between the public entities involved, which was well perceived in the data collection related to sanitation (water, sewage and drainage) in Florianópolis. If one more variable is added, the use and occupation of the soil, which is also of municipal competence, as provided by law n. 13.465/2017, certainly will be a real chaos situation. The management model to prevent disasters should be systemic, involving the various dimensions of the problem, considering the environment as a great umbrella of these policies, as represented in figure 1.

Figure 1 - Systemic arrangement for urban sanitation planning



This arrangement of Figure 1 can preliminarily represent what is defended here as a basis for thinking the order of priorities for urban planning, environment as the set of elements that will guide other policies, soil policy in circular relation, or with the policy of forests (it could be the

policy of conservation, protection), in a circular relationship with water policy and, in turn, with sanitation. In addition, soil, water and sanitation in permanent exchange, which means that a constant circular planning is required, in which the decision-making spheres are backed up.

The case of Florianópolis

It should be noted that there is a need for greater protection because of the high urbanization, existence of rivers and lakes that reinforce the relevance of special care in relation to floods and floods in the region. The conservation of lands with vegetation, and a whole system of interconnected ecosystems strengthens the protection of nature and the population. Photo 1 shows a view of the north and south of Santa Catarina Island, where Florianópolis is located, where it is possible to visualize the complexity of planning and the necessary environmental protection for disaster prevention.

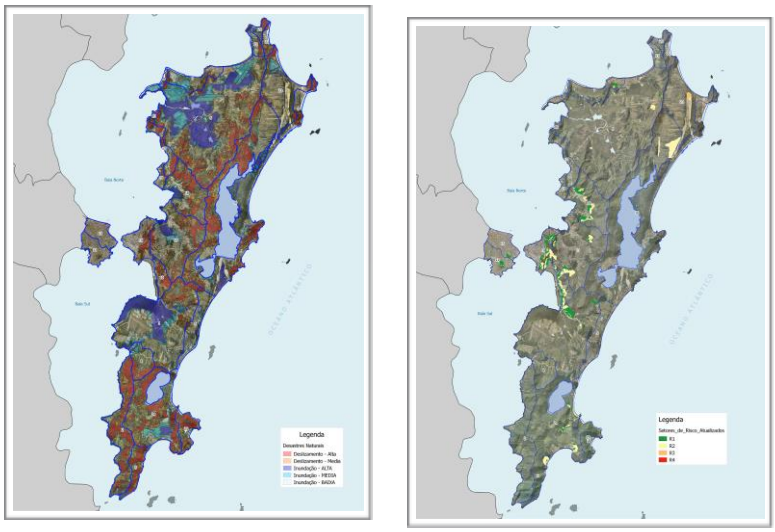
Photo 1 - Florianópolis Islan

Source: Own files

The implantation of urban centers, especially those tourist centers, must undergo a broad social and environmental urban planning in order to provide water security and avoid disasters. Map

4 presents the set of conservation units present along the Island that covers a large part of the city of Florianópolis.

Map 4 - Disaster map of Florianópolis Insular

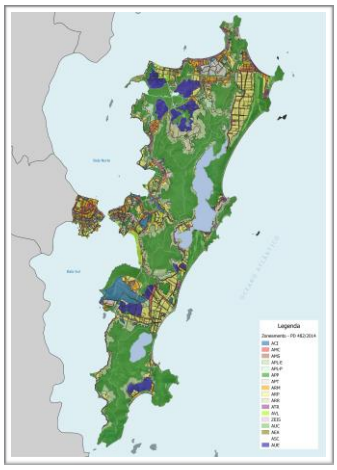


Source: IPUF, Florianopolis City Hall, 2018.

Map 4 combines two versions and shows to the left the risk areas of floods and landslides, and to the right new areas of the region. Risk georeferencing is fundamental for urban planning, including for the edition of norms that can help in the management of these risks, acting mainly in the use and occupation of the soil taking into account the ecosystems, water, waste and drainage.

The key instrument for urban planning in Brazil is the municipal directorial plan, mandatory in cities with more than 20 thousand inhabitants, established by law and that should establish the use and occupation policy of the soil, water use, depletion, drainage and solid waste. The master plan of the city of Florianópolis created by Complementary Law n. 482/2014, is already aimed at printing this integrated and systemic approach to urban planning, including, inter alia, the preservation of nature (soil, air, water, vegetation, fauna), buildings in general, tourism, preservation of springs, including underground ones, with the prevention of disasters. Map 5 presents zoning based on the current master plan.

Map 5 - Zoning of Florianópolis Island based on the Master Plan



Source: IPUF, Florianopolis City Hall, 2018.

It is necessary to emphasize from map 5 some areas that are predominant in this territory, such as ARPs, Permanent Light Areas, in light yellow, which should be the object of more careful planning for the protection of human lives in these regions, thinking in association with map 4 of risk areas; the APPs, Areas of Permanent Preservation, in dark green, are other urban concerns of Florianópolis, since its predominance is characteristic ecosystem of the Island.

Photo 2 shows that these areas of permanent preservation on the island are not respected, which corresponds to a process of increasing the potential for social and environmental vulnerability caused by the action of the human being, which combined with the effects of climate change, could result in potential disaster.

Photo 2 - Region of Morro da Cruz in Florianópolis, irregular occupation

Source: http://www.pmf.sc.gov.br/noticias/index.php?pagina=notpagina&noti=12129

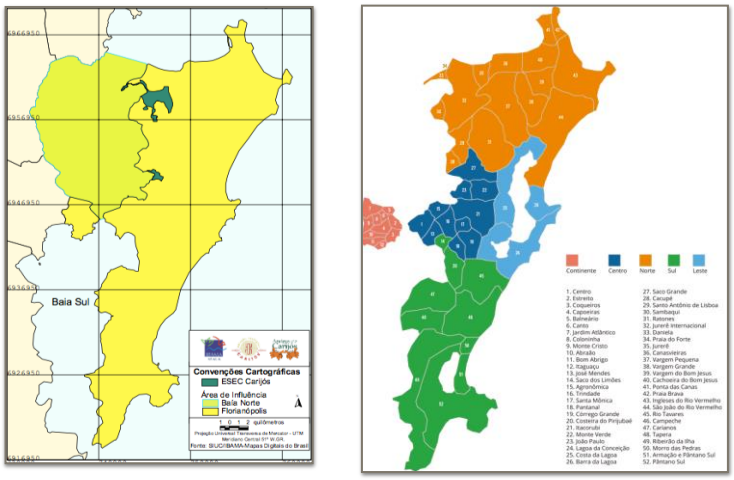
As part of a larger project called JustSide, coordinated by the University of Coimbra and partnering with 8 other institutions, the Brazilian team chose a region on the island of Santa Catarina, where a large part of the state capital city of Florianópolis is located. A large area known as "Saco Grande", area 27 in blue on map 6, located in a very urbanized area with residences, a shopping mall, commerce, companies, a series of activities that tend to increase, being a region that already suffers problems of drainage and use and occupation of the soil, as can be seen in the photo 3.

Photo 3 - Saco Grande watershed area

Source: Own collection

Photo 3 presents a synthesis of the problems experienced in the everyday life of the metropolis considering the peculiarities of island ecosystems. In addition, all this area influences and suffers the influence of the Carijós Ecological Station, attributed by the Union, an area of protection very relevant to the ecosystemic balance of the island. Map 6 shows this dimension of this influence well, reinforcing the need for socio-environmental planning aimed at preserving the ecological rights of nature and human occupation.

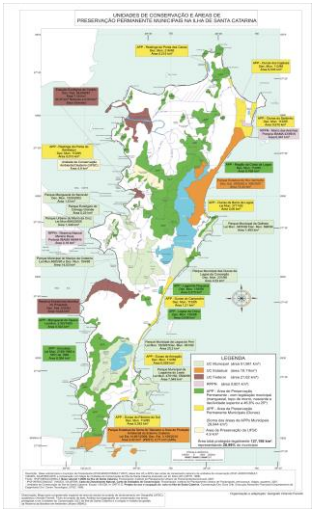
Map 6 - area of influence of the preserved area Carijós



Source: Management Plan ESEC Carijós e https://www.acif.org.br/a-acif/historico/attachment/mapa-acif-1/

Map 7, presented by the Center for Environmental Education of the Federal University of Santa Catarina (NEAMBI), presents the protected areas of the island, which demands more systemic planning coordinated by the environmental dimension, since disasters can reach multiple proportions.

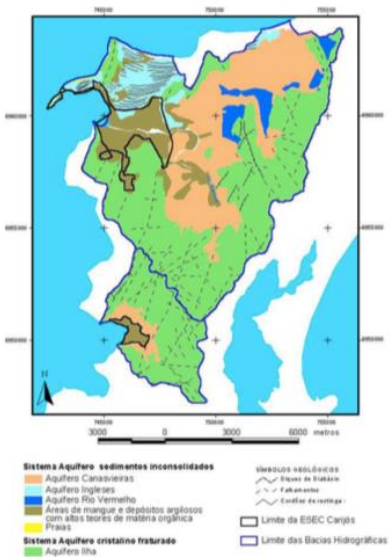
Map 7 - Mesh of Units of Conservation in the Island of Florianópolis



Source: NEAMBI, UFSC

There is concern about planning that does not take into account the existing life systems on the island, as well as the water sources that support these systems, as presented in map 8, which brings the water system that exists under the earth, whose correct management is fundamental, given that this is a resource that is not immediately visible, but of fundamental importance for the sustainability of the next generations. It is a complex system that depends on sanitation correctly carried out so that there is no pollution that, in most cases, is not perceived, besides a system of grants for the use of this water efficiently implemented.

Map 8 - Aquifers from the north of the Island, in the zone of influence of Saco Grande



Source: Plano de Manejo da ESEC Carijós

Fragmentation of regulation

Initially it is possible to understand, when observing the national legal order on water and sanitation, that this issue came to be treated as a legal problem almost 20 years after the 1988 Constitution, in the case of water resources management, and almost 10 afterwards, in the case of sanitation management, with emphasis on treated exhaustion. Obviously, that many could affirm that there were several issues to be resolved in the Brazilian Republic, the demands were

many, and the country needed several fronts of action. Years have passed, and yet these demands are part of the national public agenda.

One of the symptomatic points of this is a strong process of fragmentation of water management in the country, which is already born in the wrong way, based on a more anthropocentric focus, separated from an environmental issue, which is one of the essential causes of the existence of this problem, as well as the most immediate consequence of a possible solution.

It must be said that this segmentation of environmental issues is already a worldwide trend (Bosselmann, 2011), and lawmakers have acted to deepen this segmentation, moving away from a perspective of ecosystem integrity, in which beings human beings are part of this, which points to a lack of protection of nature from a pluralistic notion of the environment, and it is necessary to rescue the notion of nature to know what to protect. Bosselmann (2011 and 2014) points out that there has been a deconstruction of the national legislation of what was agreed at the international level.

The Federal Constitution of 1988 in its art. 20, III, in the caput established that are under the ownership of the Union, among them the watercourses inserted in this spectrum: "lakes, rivers and any water currents in lands of its domain, or that bathe more than one State, serve as boundaries with other countries, or extend to or from foreign territory, as well as marginal lands and river beaches. " This dominance does not extend to the river basins, but to the bodies of water itself. The hydrographic basins are part of the territory and are subject to various legal acts.

The constituent power also instituted the National System of Management of Water Resources (SINGREH), in art. 21, XIX: "to institute a national water resources management system and define criteria for granting rights to its use; (...) ". In this way, the union has the competence to design the system, by means of corresponding laws. The Union shall also compete for the use

of energy directly or indirectly through concessions, in agreement with States (Article 21, XII, b); has the attribution, also, of legislating on water (article 22, IV).

In addition, it is important to highlight the role of the Union in prospecting actions that drive regional development and the constitutional text brings something related to water management, in art. 43, which establishes a landmark for the articulation of the federal government to areas that comprise geo-economic and social complexes, and should encourage: "the economic and social exploitation of rivers and water bodies that are dammed or repressed in low-income areas subject to drought periodic. "

In addition, art. 200 (IV and VI) of the Constitution, establishes explicitly joint responsibilities in the Unified Health System, being responsible for monitoring, through inspections, water intended for human consumption and participating in the formulation of policy and implementation of basic sanitation actions.

In the field of urban development, the mother constituent inserted basic sanitation as an item to be highlighted together with housing and public transportation, and whose general guidelines should be established by the Union (article 21, XX). While the responsibility for establishing general rules for sanitation has remained with the Union, the responsibility for planning and designing such a program has been jointly and jointly vested with federated entities, the Union, States, Municipalities and the Federal District (art. 23, XIX).

As for the member states of the Brazilian federation, the bodies of water that are within its territory will be competing, according to the wording: "surface or groundwater, fluent, emerging and deposited, excepted, in this case, according to the law, of works of the Union "(article 26, I)

The national legislator, on the other hand, has segmented water management into National Policy on Water Resources (PNRH - Law No. 9.433 / 1997) and the National Policy on Basic Sanitation (PNSB - Law 11455/2007), without speaking that a law was also created that

instituted the National Solid Waste Policy in 2010 (Law 12305/2010), and in 1981 the National Environmental Policy was instituted (Law 6.938/1981).

Thus, law n. 9.433/1997 elected the river basin as the territorial unit in which integrated actions would be carried out with the purpose of managing the bodies of water, that is, the existing water resources, under the founding parameters of a good that has economic value and which, at the same time, is in common use (Articles 1, I, II and V). SINGREH will act on the river basin to enforce the PNRH, fulfilling the following objectives:

- coordinate integrated water management;
- administratively arbitrate conflicts related to water use;
- implement the National Policy on Water Resources;
- plan, regulate and control the use, preservation and recovery of water resources;
- promote water charges.

In addition, they integrate this system:

- the National Water Resources Council;
- the Water Resources Councils of the states and the Federal District;
- the River Basin Committees;
- the governing bodies whose competencies relate to the management of water resources;
- Water agencies.

As a decision-making unit for water management, the hydrographic basin now has the river basin committees (CBHs) that have the role of managing and being the decision-making body of the PNRH within the river basin. According to art. 38 of the law establishing the PNRH:

> It is incumbent upon the River Basin Committees, in the scope of their area of activity:
>
> I - promote the debate on issues related to water resources and articulate the actions of the intervening entities;
>
> II - to arbitrate, in the first administrative instance, conflicts related to water resources;

> III - approve the Basin Water Resources Plan;
> IV - monitor the implementation of the Water Resources Plan of the basin and suggest the measures necessary to achieve its goals;
> V - propose to the National Council and to the State Councils of Water Resources the accumulations, diversions, abstractions and launches of little expression, for the purpose of exemption from the obligation to grant rights of use of water resources, according to their domains;
> VI - establish the collection mechanisms for the use of water resources and suggest the amounts to be collected; (...)
> IX - establish criteria and promote the apportionment of the cost of works of multiple-use, of common or collective interest.
> Single paragraph. Decisions of the Hydrographic Basin Committees shall be subject to recourse to the National Council or to the State Councils of Water Resources, within their sphere of competence.

Therefore, the committees are essential cells for the dynamics of local and regional management of water resources, along with other entities created within the scope of the PNRH, which were the "Water Agencies", which serve as the executive secretariat of the PNRH of one or more committees of (PNRH, arts. 41 and 42), and that it has, therefore, geographical performance according to the committees it represents.

It seems that this codification, this segmentation, follows a characteristic trait of the model of the modern world, but that would no longer suit the model of a postmodern world, based on complexity of observed phenomena. This, it seems, contributes to nature becoming the "other", a meaningless separation, as defended by Bosselmann (2011), in a line contrary to the formation of international environmental constitutionalism, based on the mandatory rules of nature that countries should respect (Bosselmann, 2014).

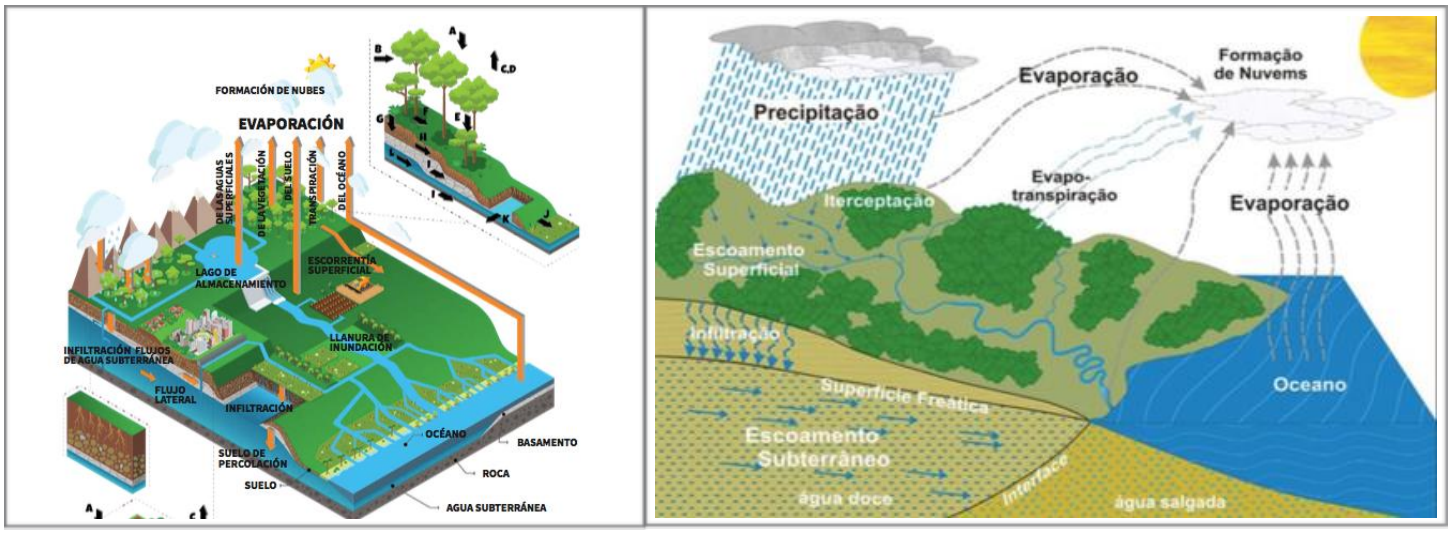
Law 11.455 of 2007, which establishes the National Policy on Basic Sanitation, included in its definition scope four dimensions to be regulated: access to drinking water, access to treated

sewage, drainage and urban cleaning, and disposal of solid waste. At the heart of this issue is the regulation of water resources, especially in relation to the economistic vision employed in legislation, where water has economic value. But it seems that the National Policy on Water Resources, Law no. 9.433 / 97, has as its core integrated water management, including the multiplicity of users, human and non-human, a perspective of a more ecological trend.

However, it seems that the fragmentation of these policies also undermined the more holistic view, separating water policy and basic sanitation policy, and the figure of the "basin committee" and the "water agencies", which stood on the sidelines of the sanitation discussion, since it is a matter that occurs within one or more basins, has a direct impact on these, in short, there is a complete disconnection in the face of an integrative perspective of water policy, emphasizing that it is a management, seeking to bring together sanitation, environmental management and land use and occupation. Hearing and taking into account what the basin committees decide gives a local and regional view of what occurs at the "tip" of the public policy process. In fact, these organizations should be taken into account in urban planning, especially when it comes to disaster prevention, and planning is essential from the geographical unit of the basin.

The public agenda of water management, this implies regulation, must be unified, integrated and systemic, this means a concrete interrelation of planning and dialogue between the various legal and administrative dimensions with the environmental dimension. The absence of pragmatic actions such as this comes, perhaps, from a non-legal approach to the concept of water security. It is necessary, therefore, to include a hydrological socio-economic reality in the management of the hydrological cycle. This involves both the administrative sphere and the legal area overlapped to approach a parameter of water security, which should not be focused only on meeting the needs human. Figure 2 represents well what is being discussed here, stating that many elements are involved and interconnected and that there is an extraordinary provision of environmental services to the river basins that need to be taken into account.

Figure 2 - graphical representation of the



Hydrological Cycle
Source: UNESCO, 2018 e FINOTI *et al*, 2009

The water cycle should be understood as a socio-eco-hydrological system where the interactions of the different components are permanently produced, developing a state of dynamic equilibrium (UNESCO, 2018). This implies the establishment of environmental flows that require consideration of the needs of downstream ecosystems, such as wetlands, lakes, plains, estuaries and coastal areas and groundwater systems (UNESCO, 2018). Cultural, social, political and economic issues, among others, must also be considered. It is necessary to adopt a broad vision based on the integrated management of water resources. This becomes all the more clear as a mapping of the problem associated with the implementation of policies in a legal and environmental dimension is made.

In addition to these elements, it is necessary to take into account an analysis updated by the lens of climate disasters with the dynamics of climate change in the globe. The mapping, the environmental cartography is essential to have a full diagnosis, including the applicability of standards and hence influence public decision-makers, as well as the formulation of ecological

jurisprudence in the courts, taking into account all possible arrangements before of constant change.

In the Brazilian case, there is a fragmented responsibility among federative entities, which may denounce a chaotic panorama of this issue. The Union shall take care of transboundary watercourses, and of those on land under its control; the States have control over their territorial waters, those that flow only in their territory, and are responsible for the use of these waters and their groundwater. The municipalities were responsible for taking care of the sanitation, that is, of the four dimensions here already reported. It is considered that municipal responsibility is high and has not been satisfactorily carried out in the Brazilian case. In addition, the legal instrument of granting is highlighted, that is authorization of how and how much to remove water from a water body, whose effectiveness is doubtful, which contributes to the indiscriminate use of water.

The need to retake the centrality of the concept of Hydrographic Basin

Since the 1990s, with the Dublin principle, integrated water resources management has gained momentum at preparatory meetings for Eco-92 in Rio, and there is a need to adopt an integrated and systemic unit for environmental planning, which includes, of course, water planning (Porto et al, 2008). There is a whole mobilization of the entities related to the management of water resources in general, including the recommendation of the creation of basin committees.

This territorial unit called a river basin would be the basis for legal-systemic analysis of environmental damage, problems with sanitation, deforestation, reforestation, permanent preservation areas, conservation units, environmental services, and an extraordinary number of variables to be taken into account in judicial decisions and the formation of jurisprudence with an ecological bias and to take care to prevent disasters. A technical definition of river basin follows:

> (...) is an area of natural abstraction of precipitation water from the rain that converges the flows to a single point of exit. This exit point is termed exuter. A river basin is composed of a set of sloping surfaces formed by the surface

> of the ground and a drainage network formed by the watercourses that converge until reaching a single bed at the point of exit. (Finkler, s.d., p.5)

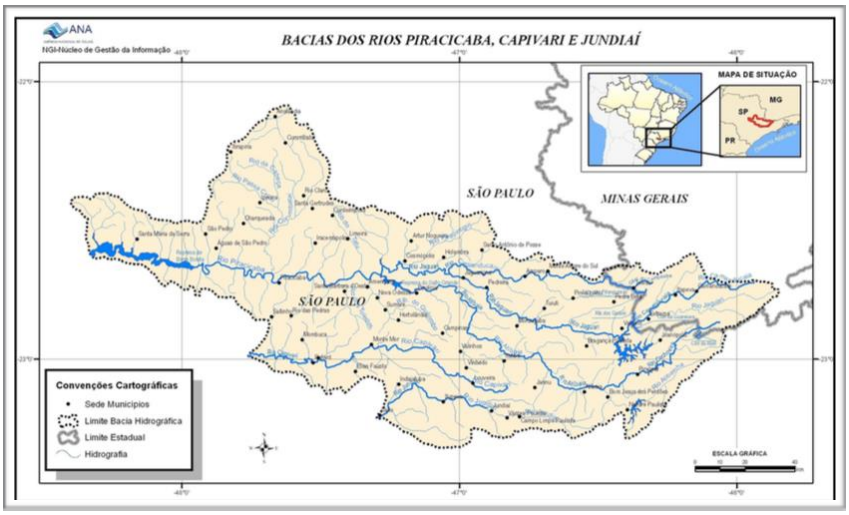
Porto et al (2008, p. 45) reinforces the need to consider the river basin as a systemic entity:

> over the territory defined as a river basin is that human activities are developed. all urban, industrial, agricultural or preservation areas are part of some river basin. It can be said that in your exutório, will be represented all the processes that are part of your system. what happens there is a consequence of the forms of occupation of the territory and the use of the waters that converge there.

In this way, the river basin is considered as the ideal laboratory for water management, including sanitation, or in a more complete modality, integrative environmental management. It can cross urban, rural, environmental, and water planning, which certainly makes the management task more complex, including the task of preventing environmental damage and natural disasters. Map 9 presents the hydrographic regions at the federal level, allowing states to subdivide into other hydrographic units, according to Resolution n. 32/2003, of the National Council of Water Resources (CNRH).

Map 9 - Brazilian hydrographic regions, federal plan
Source: CNRH, 2003

Lima (2005) emphasizes the systemic character of the hydrographic basin space unit classifying it as a unifier of environmental processes and human interferences, and taking it into consideration is fundamental in a context of environmental crisis, which has aroused interest in considering a vision of based on a systemic paradigm (Leff, 2006). Map 10 presents the example of a river basin to give an idea of the need to think about environmental and water issues in a systemic way, especially the judiciary in decisions that require analysis on environmental damage, the extent of pollution and disasters.



Map 10 - Example of a river basin within a river basin district
Source: http://arquivos.ana.gov.br/institucional/sag/CobrancaUso/BaciaPCJ/_img/MapaPCJ.jpg

Table 1 - Level of urbanization by hydrographic region

Hydrographic Region	Urbanization Rate (%)
Amazonian Hydrographic Region	67
Hydrographic Region of Tocantins / Araguaia	74
Northeast Atlantic Hydrographic Region	57

Hydrographic Region	Urbanization Rate (%)
Hydrographic Region of Parnaíba	62
Eastern Northeast Atlantic Hydrographic Region	76
San Francisco Hydrographic Region	74
Eastern Atlantic Hydrographic Region	70
Southeast Atlantic Hydrographic Region	90
South Atlantic Hydrographic Region	85
Hydrographic Region of Uruguay	68
Hydrographic Region of Paraná	91
Hydrographic Region of Paraguay	85

Source: MMA, 2007

Viewing map 9 and table 1 and thinking about their information together, one can see the extent of the problems to be faced, in the face of the accelerated process of urbanization. Carvalho (2014) proposes an integrated environmental planning that must necessarily be interconnected with the Economic-Ecological Zoning (ZEE), which, certainly, should be a standard of analysis for the legal and environmental demands presented in the basins. In view of the administrative and legal plurality of the river basin, it is necessary to have a shared management with an integrating view of this territory.

According to Leite et al. (2015), it is important to emphasize that the State's responsibilities to protect the environment, as macrobem, whether exclusive or common, provided for in the Federal Constitution (articles 21, 23 and 24), draws a panorama of common protection of the same, including from legislation to implementation itself. In this context is the water policy

whose responsibility is to establish the general guidelines and a National System of Water Resources Management, but whose implementation will be the responsibility of all entities in a shared way.

Conclusions

This article presents the main dilemmas faced in the metropolises for the prevention of disasters. This study has been developed since the analysis of the situation of the city of Florianópolis, which has peculiarities for having most of its territory on an island, which has several environmental protection regimes, that is, a series of restrictions for the intervention.

However, it was based on an analysis focused on the issue of basic sanitation as a preventive factor for disasters and the need for socio-environmental water planning from the space unit of the river basin, from which all incursions of the public administration would leave. Nevertheless, some obstacles that deserve to be listed have been perceived:

1) Lack of interrelationship among key stakeholders for problem analysis and subsequent decision making;
2) Normative fragmentation, which does not help in the process of carrying out disaster planning and prevention actions;
3) A non-ecological vision in the planning of basic sanitation, especially in the case of drainage that has a relevant impact on the potential of disasters;
4) The geographical scale of the river basin is not taken into account, which contributes to a non-systemic view of the socio-environmental problems of the territory;
5) The process of urbanization is not being guided by an urban planning environment and the “saco grande" neighborhood is an example of this, in which the repercussions of the growth of buildings to their environment does not follow this model and can impact others ecological aspects;
6) The master plan is a planning tool that needs to be implemented and monitored.

Thus, it is possible to affirm that systematic negligence and inertia are a characteristic of the public administration with regard to disaster planning taking into account, rainfall drainage, treated exhaustion and land use and occupation. Regarding the latter, no mention was made during the data collection that supported the present study. Sanitation conferences, meetings in which civil society can participate in sanitation planning, did not hear mention of disaster prevention, an agenda currently neglected in Florianopolis and certainly in many other metropolis of the country.

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