

The Territorial Dimension of Sewage Networks: the Case of Recreio dos Bandeirantes, Rio de Janeiro, Brazil

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Abstract *The urban suburbs of Brazilian cities have grown without an adequate sanitation infrastructure. Different social groups try to overcome these shortcomings seeking local sanitation alternatives at individual or community levels, contrasting with the universal model of sewage networks. This study was developed in the suburban neighborhood of Recreio dos Bandeirantes, Rio de Janeiro, Brazil, in order to analyze the installation process of the sewage system under a territorial approach. Data facilitated the construction of territorial schemes related to conflicts during the implementation of sewage networks in this neighborhood, where middle class groups and favela residents coexist with environmental preservation areas, beaches and commercial activities. This work revealed the need for contextualized sanitation information made available by the Brazilian Institute of Geography and Statistics (IBGE) and state sewage collection company, which conceal these conflicts or the representation of residents about their sanitation problems. Overlapping territorial managing functions should be considered as one of the factors responsible for the conflicts identified in the neighborhood. Further studies are suggested as methodological complementation and data update.*

Key words *Sanitation, Territoriality, Health information*

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Introduction

Access to sanitation is a right and a condition for health and a sustainable environment. Sanitary sewage is one of the components of sanitation and is a condition for the control of disease transmission, vector proliferation and environmental pollution, as a complement to water supply, waste collection and management and urban drainage¹. Sanitary sewage is the collection of liquid, domestic and industrial wastewater, infiltration water and the fluvial parasitic contribution¹. Despite the apparent consensus on the urgency and need for the implementation of sewage collection and treatment systems, several alternative sanitation techniques are available, with different results on health, environment and quality of life². For example, the final disposal of waste in rivers and ponds removes sewage from households and reduces contact of residents with infectious agents, but pollutes the environment, threatens local fauna and exposes users of these water bodies to diseases.

On the other hand, the use of septic tanks can considerably reduce sewage load in the environment. However, it requires dwellers to invest some capital, a systematic maintenance and a minimum area for its implantation in the lot, which may hinder installation in favela areas.

The implementation of sanitation projects in heterogeneous territories always involves the denial of responsibilities of local social stakeholders in favor of government sectors³. In addition, the costs of connection to the network, which must be borne by the resident, may represent a barrier to the universal coverage of these services⁴. The adoption of universal technical solutions to the problem of sewage, therefore, ends up disregarding local particularities⁵ and may privilege some groups and interests to the detriment of others^{6,7}.

The water supply crisis experienced in the southeastern region of Brazil in 2012 and 2013 evidenced the perverse conjunction between climatic, political and environmental factors, which restricted water collection options for the cities. While some water sources near cities reduced their capacity due to lower volume of rainfall, others were prevented by the intense contamination of domestic and industrial sewage accumulated by decades of disinvestment. Population growth in urban areas in peripheral countries carries the challenge of equalizing this situation with the ability of States to promote the services necessary to maintain people's quality of life⁸. In Brazil, sewage services are attributions of the

State, directly or through a concession, which, among its various roles, must collect data on the service and develop the necessary infrastructure for its provision. Like other cities, Rio de Janeiro is one of the examples of this process of accelerated population growth in Brazil, and is one of the largest cities in the country and one of the main complexes of population attraction. According to data published by the Brazilian Institute of Geography and Statistics (IBGE), the absolute population living in the city of Rio de Janeiro increased from 1,764,141 inhabitants in 1940 to 5,858,904 inhabitants in 2010⁹.

The 1980s witnessed a marked increase in population flows towards Barra da Tijuca neighborhood and, later, Recreio dos Bandeirantes. Luxury condominiums were built along the coast, while favela spots were settling in the urban interstices, especially in apparently unowned areas, through the ownership of lands that are still under dispute.

Both types of occupation occurred in areas of vegetation characteristic of Mata Atlântica and sandbank, including marshy lands, mangroves and sandy ridges. The first buildings in the neighborhood of Recreio dos Bandeirantes did not have practically any urban infrastructure of streets, paving, health services or water and sewage networks. In recent years, however, works have been carried out for the implementation of infrastructure, and the sewage network is one of the most recent and conflicting issues.

It should be noted that the IBGE classifies census tracts as "subnormal" when they comprise clusters of housing units without basic public services, occupying or having occupied until recently third-party property (public or private) and generally constructed in disorderly and dense fashion⁹. In Rio de Janeiro, these criteria correspond to favelas.

This paper aims to show characteristics of the sanitary sewage services installation process in the Recreio dos Bandeirantes neighborhood and its related conflicts, involving global and local factors that affect territories. These characteristics were analyzed through a variety of sources of information, such as field research where questionnaires were applied and interviews conducted – following the guidelines of the Joaquim Venâncio Polytechnic Health School (EPSJV/Fiocruz) Research Committee and after approval by the same body, as well as data from the 2010 demographic census on sanitation conditions in the region.

Methodology

Two main sources of information were used for the analysis, namely, data of the 2010 demographic census and interviews about dwellers' perception vis-à-vis the neighborhood. The research involved initially the documentary survey of the Recreio dos Bandeirantes neighborhood's history in the context of urban expansion of the city. This survey allowed the identification of stakeholders and social processes that characterized the neighborhood over the last decades.

Then, field planning was carried out and, subsequently, empirical data were collected through semi-structured interviews directed at key informants, recorded on digital media and partially transcribed for later data review. These informants were chosen based on their representativeness among the communities in the neighborhood, and the presidents of the Resident Associations were contacted. Porters of neighborhood buildings were also considered key informants – considering those who participated in the process of installation and maintenance of sewage systems in the neighborhood buildings.

In addition, 39 questionnaires were applied to dwellers, distributed in the 104 census tracts considered by the IBGE in the neighborhood in 2010, according to socioeconomic profiles, and six of the 15 census tracts were identified as favela or sub-normal areas, and 33 of the 83 were related to more structured urban areas. The other six sectors were identified as covering environmental protection areas, areas targeted for urban expansion or, further, real estate speculation areas. The option for random selection of the census tracts was made with the intention of obtaining a significant spatial coverage in relation to the set of sectors existing in the neighborhood, avoiding a spatially restricted perception, since environmental issues are addressed and these vary significantly in the neighborhood of Recreio dos Bandeirantes. This sample had no statistical objective, but rather sought to identify the diverse inhabitants' perceptions according to their housing conditions.

Thus, the empirical research carried out is limited to the neighborhood of Recreio dos Bandeirantes, establishing residents of the neighborhood as a specific population. It sought to listen to social stakeholders involved in their relationships with the neighborhood, with emphasis on residents of middle-class buildings and households, as well as slum dwellers, not on health and sanitary engineering structures, that is, it was not

intended to analyze the type of sanitary structure installed in the neighborhood, but the way this installation process took place. Therefore, this study is of relational nature, and in this modality of knowledge elaboration, it intends to offer a framework of interpretations, or elements for understanding processes difficult to grasp only from just a quantitative analysis.

After data collection, the qualitative material results of interviews were systematized and analyzed. The issues raised in the interviews were segmented into three categories (health, infrastructure and sanitation) and, from interviews, we intended to record the appearance of terms and words, as well as to understand the object of this research based on the statements of neighborhood's residents in a contextualized way in the political, economic and social setting.

Data from the 2010 demographic census were tabulated and the sewage network coverage indicator was calculated by dividing the number of households connected to the general sewage network or rainwater network. Data were related to the mesh of census tracts, also made available by the IBGE⁹, which allowed its mapping.

The quantitative material was systematized and data were reviewed relationally with what was collected through qualitative research, promoting a methodological hybridization¹⁰. Thus, the diverse data collection tools and resources at the local level have brought consistent and complementary information, rather than contradictory ones, as predicted by Giné-Garriga et al.¹¹. For example, maps generated with census data were used in interviews as a means to stir a discussion about the actual conditions and needs of the neighborhood. In the last stage of the work, similarities and differences pointed out by different sources of information were highlighted.

Results and discussion

The Recreio dos Bandeirantes neighborhood's growth is related to the state infrastructure implantation movements in the bordering neighborhood, Barra da Tijuca, and speculation by real estate agents. The expanded transportation infrastructure, coupled with the marketing model promoted by real estate agents, accelerated the process of occupation of the Barra da Tijuca region and later included the Recreio dos Bandeirantes neighborhood.

According to Rezende and Leitão¹², one can clearly identify the role of the four urban space

formation agents, defined by Lefebvre¹³, related to growth of the neighborhood: The State, which has acted through public infrastructure policies aimed at aesthetics to the detriment of basic needs; landowners – large landowners in the region; the real estate developers – big builders who create the image of the new “life style” through real estate marketing; in addition to social groups poorly included, through claims for land tenure and in the fight against the removals imposed by the other agents. Thus, it can be observed that the neighborhood in question is characterized by the existence of socially and spatially segregated areas, as shown in Figure 1.

Associated with this model, growth based on the “urban spectacle”¹⁵ is observed, to the detriment of the basic city structures, making Barra da Tijuca and Recreio dos Bandeirantes an example of socio-environmental unsustainability, while aesthetically well-regarded by part of the population.

In 2010, in view of the events scheduled to be hosted in the city of Rio de Janeiro, specifically the 2016 Olympics and the 2014 Football World Cup, the State initiated a series of health infra-

structure projects aiming at fulfilling one of the goals imposed by organizing committees, which is the depollution of the lagoons in the Barra da Tijuca region.

Once again, implantation of sanitary infrastructure required for maintaining the quality of life of the population was directly linked to interests foreign to local needs, following the same model that occurred in 2007, when the municipality implemented the submarine emissary of the Barra da Tijuca meeting the demands imposed by the organizing committee of the Pan American Games in Rio de Janeiro. This model of State action shows how forces external to the territory override the interests of local stakeholders.

The survey carried out through the application of questionnaires to residents shows that approximately 37% of Recreio dos Bandeirantes dwellers identify the lack of sanitation as one of their main problems (Table 1 - item 1.1), and that, despite this, communication vehicles do not address this issue in their programs.

While approximately 60% of residents in the neighborhood claim that their households



Figure 1. Structure of the urban occupation of Recreio dos Bandeirantes, Rio de Janeiro (RJ), Brazil.

Source: Adapted from Mendes¹⁴.

are connected to the sanitation concessionaire, namely, State Water and Sanitation Company (CEDAE), (Table 1 - item 1.2), more than 94% of dwellers affirm that the sanitary sewage infrastructure in the neighborhood is inadequate. In addition, the sanitary sewage infrastructure in the region is poorly understood by residents, since approximately 60% of them do not know the final destination of their domestic waste (Table 1 - item 1.3), i.e., beyond the immediate limits of their residences.

Therefore, the use of individual sewage alternatives in the whole neighborhood, but with marked differences as to their forms is common. Septic tanks, for example, are options adopted by middle-class residences, but are impracticable for favela areas. Although investments in sanitary sewage services are being carried out in the neighborhood, their implementation model was criticized by the dwellers of Recreio dos Bandeirantes.

According to the president of the Residents' Association of the Canal das Taxas Community, one of the slums in the neighborhood, when implanting the community sewage network, the sanitation company's professionals did not take into account the inhabitants' tacit knowledge of that territory, stating that engineers who were installing the network argued they had already studied the area and were specialists in such works. This attitude reflects overriding knowledge in various actions of the State. This model of sewage network implementation in the community caused several network problems, such as sewage backflow into dwellers' households.

The socio-spatial segregation characteristic of neighborhoods such as Recreio dos Bandeirantes is directly related to the population's access to public sewage services. Based on territory definitions by authors such as Sack¹⁶, Raffestin¹⁷, Santos et al.¹⁸, Santos^{19,20}, Souza²¹ and Haesbaert²², we can observe the existence of four territorial agents related to sanitary sewage in the Recreio dos Bandeirantes neighborhood, with different interests, and they are: the inhabitant of the wealthiest areas; the inhabitant of the favelas; the residents' associations; and the State, in the figure of the Sanitation Company and the environmental agencies. The latter, in the case of Rio de Janeiro, are represented by the State Water and Sewage Company (CEDAE) and the State Environmental Institute (INEA), respectively.

Based on the authors mentioned in the previous paragraph, the Territory Used is adopted here as a category of analysis, that is, not only a

set of natural systems or superimposed things, but the "land plus identity"¹⁸, where identity corresponds to the feeling of belonging. Sack¹⁶ says that spatial delimitation becomes Territory when its boundaries are employed to affect behavior through access control. Thus, Territory implies a concept of boundaries that express a relationship of a certain group with a space portion¹⁷, highlighting a relationship of forces that often reflect contradictory interests. Worth emphasizing is the influence of *verticalities* – forces often imposed reflecting interests external to the territory – and *horizontalities* – processes inherent to those who experience the territory and their daily relationships – over the territories²⁰.

Souza²¹ defines the Territory as a field of forces, a web of social relationships that defines at the same time a limit, an alterity: the difference between the "we" and the "other". Thus, the concept of Territoriality is also taken into account. It carries the notion of appropriation and belonging, establishing a relationship of identity. The author affirms that the appropriation of the territory by a certain group may be fluctuating, that is, temporary, or even cyclical. Souza says that territoriality can be seen as "a certain type of interaction between man and space, which always embraces an interaction between human beings mediated by space"²¹.

According to Barcellos²³, the territory must be seen as a "product" and "producer" of inequalities, and should not be analyzed as a passive and decontextualized element. As a product of inequalities, it reflects a specific social, economic and political organization of the past that materializes through spatial segregation and market mechanisms. On the other hand, the territory can also be a "producer" of inequalities, since the conditions for the reproduction of society materialize in and through space. Thus, the territory adapts the general processes to the local conditions, not only reflecting the social structure itself, but the specific context in which it is inserted.

Residents of the neighborhood argue that interests about accessibility to sanitary sewage systems are related to the disposal of domestic waste produced, a traditional responsibility of conventional sanitation systems. In addition, they are interested in a visually clean environment with no negative impacts on nature. The characteristic bad smell of canals and drainage ditches in the neighborhood stands out as the main nuisance, mentioned by 74% of the residents. This inconvenience outweighs even concerns about possible

diseases related to water pollution, since 48% of the respondents worried about possible contact with the waters of the canals and drainage ditches in times of rain. If we highlight only respondents living in favelas, while 100% say they do not mind the stench, none of them showed concern about possible diseases caused by proximity to polluted waters. These data are systematized in Table 1 - item 1.4.

Another element that distinguishes the residents of each of these territorial contours is the way in which the residents dispose of their domestic sewage and the relationship of proximity to the rivers and canals of the region, since the poorest have a strong reference to these elements/resources of the territory.

Residents' associations propose to be an agent representative of the interests of residents, often playing a fundamental role in the actions developed by the State at the local level by recognizing specificities in the territory. In favela areas, the associations also act as land managers, supporting the management of urban infrastructure, in some cases promoting the cleaning of public places and maintenance of water and sewage networks.

The State, however, appears as a territorial agent through the management of sanitation services and as a sphere responsible for environ-

mental preservation. This role has been strengthened by the need to accelerate the process of infrastructure deployment in order to comply with the determinations of the committees of the major events that took place in the city of Rio de Janeiro. This stance strongly reflects one of the forces acting on the territory, highlighted by Santos²⁰ as verticalities, that is, global processes that manifest themselves locally.

Based on the analysis of the ways of space appropriation in the neighborhood as a way of installing formal or informal sanitary sewage systems by the population and the State, we found two models typical of a moment before investments in sewage infrastructure by the sanitation company, and two models typical of a moment after such investments (Figure 2).

In favela areas, prior to the implementation of the general sewage network, the State only acted as manager of the canal, responsible for its dredging in order to avoid possible overflows and the preservation of the flora and fauna of the canal. The resident was responsible for installing the sewage structure within his home, while the association and the resident himself established and maintained the connections of the collective and individual sewage network, respectively, from the households to the canal.

Table 1. Results of questionnaires applied in the field (in %).

	Middle Class Areas	Favela Areas	Total Residents Interviewed
1.1: What are the main problems of your neighborhood? (Mention two)			
Lack of sanitation	40	20	37.1
Traffic Jam	40	40	40
Violence	26.7	20	25.7
Expanded favelas	30	40	31.4
1.2: Where is your domestic sewage released?			
CEDAE's Collection Network	65.5	25	60.6
Canals, Drainage Ditches, Rivers, Ponds or Sea	13.8	75	21.2
Septic Tank	20.7	0	18.2
I have no sewer connection at home	0	0	0
1.3: How does the sewer of your neighborhood bother you?			
Bad smell	63	100	64.5
Possible Health Problems	55.6	0	48.4
It doesn't bother me	7.4	0	6.5
1.4: What is the final destination of your domestic sewage?			
Dumped in lagoons and canals	10.3	25	12.1
Dumped in the sea	20.7	0	18.2
Infiltrated in the soil through canals or pits	10.3	25	12.1
I don't know	58.6	50	57.6

Source: Adapted from Mendes¹⁴.

In this case, sewage appears to be a nuisance because of its bad smell, extremely strong according to residents, environmental impact and health risk due to the population's contact with canal waters – especially for children, who used canals as leisure spaces.

On the other hand, in the rest of the neighborhood, in the urbanized areas, the State was responsible for the management of the rainwater system and the canal. The resident appears as responsible for the installation of sewage infrastructure inside his home and the disposal of his domestic waste. The most common sewage alternatives pointed out by residents were septic tank and home connected to the rainwater network that flows into the canal. In a few cases, households' sewage system was directly connected to the canal, which would become an illegal practice after the installation of the sewage system in the neighborhood.

In this case, sewage appears as a nuisance to the resident who lives near or walks along near the canal, due to the stench, but not as a problem of his home. The environmental impact, the proliferation of mosquitoes and the risk of contact, while low, are also pointed out as problems caused by the lack of sanitation.

After the installation of the general sewage network in 2010 in the favelas, the State, through the Sanitation Company, assumes the service of sewage collection for the entire population, which is sent to the Treatment Station, also built in this period. Thus, residents' responsibility is limited to installations inside the households, while the State would assume responsibility for the sewage system and the canal.

According to the collected information, the sanitation company installed a sewage pipe with a diameter and slope smaller than necessary for its flow. Moreover, because the company is un-

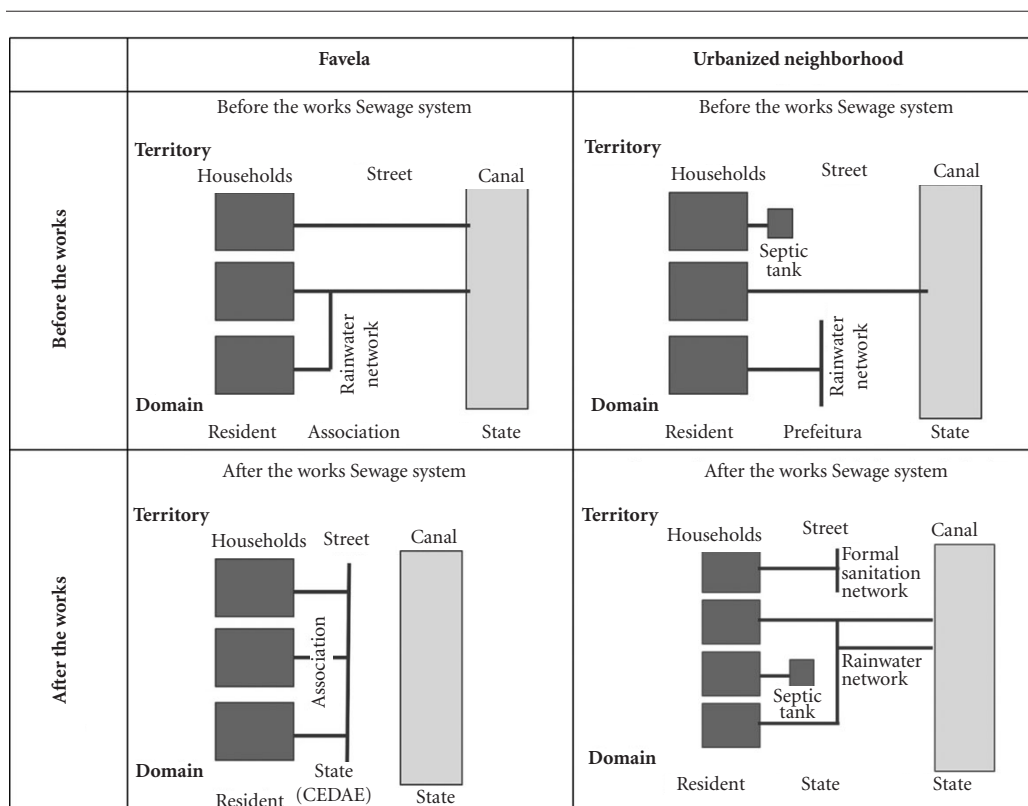


Figure 2. Territorial sewage scheme in urbanized and favela areas, before and after the construction of the general sewage network in the Recreio dos Bandeirantes neighborhood.

Source: Adapted from Mendes¹⁴.

aware of the reality of this population, or its previous sanitary facilities that do not have a runoff tank, the sewer network clogging and the consequent backflow into the households has become a frequent problem.

Thus, the residents' association is responsible for the emergency unblocking of the system, while residents, dissatisfied with the service provided by the state, threaten to dump their sewage pipes directly into the canal. In this case, the street becomes the scene of conflicts of interest between residents, association and Sanitation Company.

In the urbanized areas of the neighborhood, the state would assume the management of the canal and, through the sanitation company, the sewage system. Thus, the population becomes responsible for connecting their household systems to the network deployed by the Sanitation Company.

However, this implanted network is an additional cost for the connection of the household to the system. According to some residents, the system does not include all the streets, forcing them to build quite expensive connections with networks located in nearby streets. Thus, although many residents have made their connections to the Sanitation Company's system, others, for various reasons, refuse to carry out such action, keeping tanks or parallel and unofficial sewage networks.

Through these four scenarios shown previously, it was observed that, the implementation of the sewage network in the neighborhood of Recreio dos Bandeirantes ensued a redistribution of previously existing roles, changing the power structure and territoriality of social conflicts. However, this did not please some of the population, which insists in remaining disconnected from the formal sewage collection system, or threatens to disconnect from it.

The neighborhood, therefore, acquires different socio-spatial configurations with respect to the sewage systems, evidencing territorial conflicts between groups. However, the information disclosed by governing bodies about the conditions of sanitary sewage in the neighborhood does not reflect the issues inherent to these conflicts. The 2010 demographic census shows that most of the neighborhood is covered by sewage collection network (Figure 3), whether exclusive or mixed, of domestic and rainwater sewage. These data were collected in the period from August 1 to October 31, 2010, after the general sewage network installation works. During the

census, household's in-charge were asked about the disposal of domestic sewage (whether in sewers, ditches, river or sea, or general or rainwater sewage). The measure of the frequency of these census responses has been used as an indicator to assess coverage of the sewage network. However, this indicator is insufficient to understand the complex ongoing processes in the territories²⁴. Agglutination of the "general sewage or rainwater network" options in a single category hinders differentiation between the different forms of sanitary sewage and conceals the conflicting processes typical of the existing territories in the neighborhood.

This way of disseminating data contributes to the invisibility of the context in which the neighborhood sanitation process unfolds, since placing several variables in a single category of analysis suppresses the services already provided, adding areas that have networks to others, where this network is informal or non-existent.

When considering the CEDAE publications as a source of information about the sewage system in the neighborhood of Recreio dos Bandeirantes, it shows the implementation process as "completed". Such an attitude can be interpreted as a tendentious way of rendering accounts to the population about the progress of the works, since the people of the neighborhood are dissatisfied with the service and some of them affirm that they are undoing the connections made by the sanitation company and reconnecting their systems to the canals again. As various facilities of the sanitation company are causing sewage backflows, residents claim to prefer sewage in the canal rather than indoors. Thus, the real conclusion of these services is questioned.

Conclusion

Taking the process of installing the sanitary sewage infrastructure as a contour for the analysis of the processes that involve the various territories and territorialities in the neighborhood, we observed that the relational character of the territories leads to the overlapping of attributions and, consequently, to conflict, strengthened by territorialities. State, residents and associations of residents have distinct and complementary attributions in the process of implementation of this infrastructure.

Resuming previously discussed concepts, it is observed that, when taken as a set of systems of objects and systems of actions²⁰, space has con-

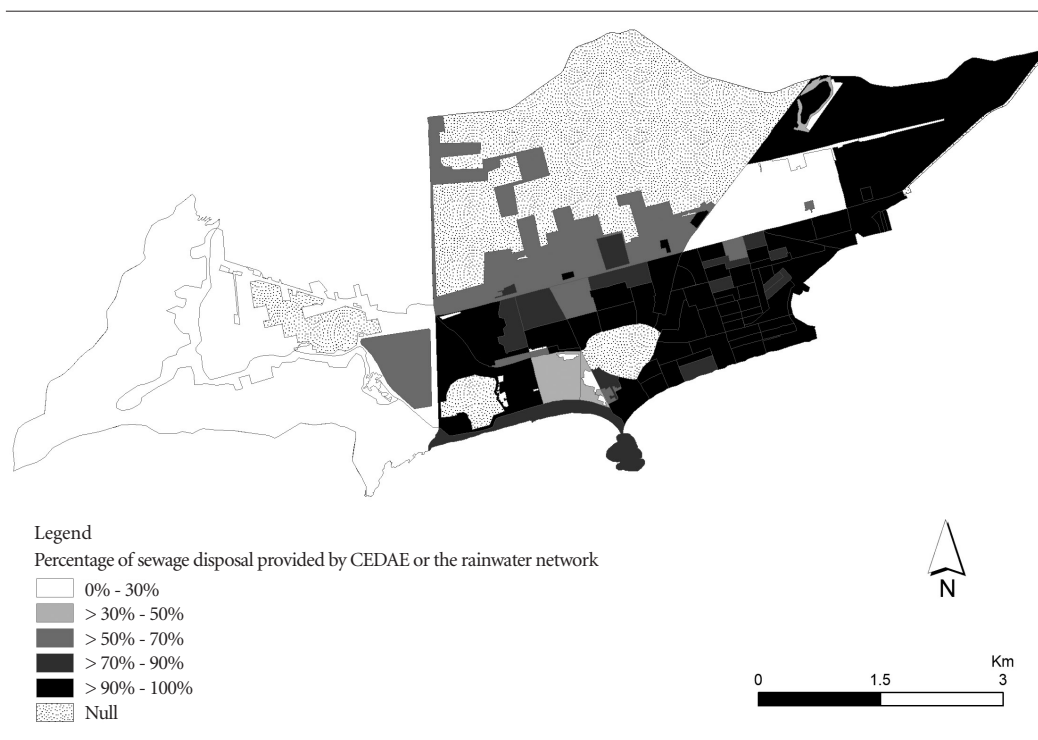


Figure 3. Coverage of the sewage network in the Recreio dos Bandeirantes neighborhood. Proportion of households connected to the general sewage network or rainwater network (in %) according to demographic census data.

Source: IBGE, adapted from Mendes¹⁴.

texts in which society stands out as a key element of the processes in and through it developed. Thus, the same cannot be considered something timeless, immutable and definitive. Space is thus dynamic and open, with various possible connections and changes. This space, when appropriate, is territory with limits and the locus of the power relationships found in it.

The implantation of urban infrastructure modifies the terrain conditions and the spatial organization of the neighborhood, bringing benefits, but also negative impacts on the life of residents. In the case of this study, there is an institutional conflict, since there is an overlap of State's interests and procedures both in the favela areas and the middle class areas, where the State designs and executes its actions without due social participation.

The conflicts generated are also territorial, since they are manifested in the spatial segmentation of the appropriation of benefits by the population (middle class/favelas areas), besides

defining territories of action of the three agents considered here (State/Associations of Residents/Residents). On the other hand, these conflicts have an informational dimension, that is, they are staged in public and private institutions that own data and information to fend for the interests of urban social groups.

When taking certain sources of information as a basis for the analysis of processes, we must bear that they have historicity and spatiality, and often this information corresponds to partial, strict and discontinuous representations of actions, that is, they seek to capture the state of a process at a given time. This type of action can be identified in the information collected by the 2010 Demographic Census, conducted by the IBGE. Although it is an important source of information, serving as a tool of great value for decision-making, IBGE has shown several limitations of interpretation, reducing the number of categories compared to the 2000 Census, and representativeness, because it does not represent

local processes. It is also necessary to emphasize the need to interpret the partiality of information, since in general it reflects the interests of those who produce them.

What seems to represent a setting of progress and success in public sanitation policies in the region actually conceals precarious facilities and actions that, when verticalized, placed “top-bottom” in relation to the social structure of region, do not have the involvement of central stakeholders in any territory-based process, that is, participation of the local population.

In light of the aforesaid, it is observed that, while the sewage system is installed and extends throughout most of the *Recreio dos Bandeirantes* neighborhood, it is still in the process of consolidation, creating new conflicts involving the various stakeholders that produce and experience the territory, such as residents, environmental agencies, municipality, state government, among others.

Taking access to sanitary sewage as one of the basic conditions for better health conditions, especially in urban areas, we can conclude that, in *Recreio dos Bandeirantes*, this condition has not been achieved, since the sanitary systems installation process is incomplete and is vulnerable because of tensions between the State and local population.

We can also observe that the analysis of such processes lacks a study that can identify which objects, actions and contexts are in the territory that cannot be shown in maps or other communication devices. Thus, we suggest further studies be conducted on this topic, seeking interdisciplinarity through the various knowledge areas that can shed some light on the construction and

representation processes. New studies may also contribute to raising the level of statistical security of the data and updating reflections regarding the new emerging dynamics in the neighborhood and in the city over the last years.

The problem of sanitation is complex and cannot be condensed in a dichotomous category of availability or lack of collection network²⁴. Sanitation acquires different local configurations depending on terrain conditions (land and soil type), socioeconomic conditions (types of housing, income, investment capacity) and policies (state action, organization of society)²⁵. Therefore, the service coverage indicator does not fit the analysis of local risk-prone contexts, and where technical alternatives may arise. It is important to emphasize that sanitation actions do not end with the construction of networks (hard technologies), but must consider the varied knowledge and users’ relationship with the system (light technologies). Thus, the project of universalization of sanitation services, necessary and urgent in the cities of peripheral countries, does not necessarily result in the homogenization of technical solutions, but rather must take into account local peculiarities²⁶.

Water and sewage services are the historic agenda of urban residents in developing countries. However, much of this movement is invisible in government documents²⁷. Access to detailed information and territorial bases is a key factor for the empowerment of social groups involved in conflicts. Thus, society’s participation - through its various forms of organization, from the initial conception of the project to its implementation and management phase - may indicate a design of sanitation projects more suited to local contexts.

\Collaborations

TM Mendes and C Barcellos collectively carried out this work, which includes the design, methodological approach, research and final writing, resulting from discussions and collaboration between authors during a master's research of the Information and Communication in Health Graduate Program (PPGICS/ICICT/Fiocruz).

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Article submitted 27/08/2015

Approved 18/05/2016

Final version submitted 20/05/2016