

Housing Complexes in Itaim Paulista: Exploratory Research in Stream Areas

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Conjuntos habitacionais no Itaim Paulista: Pesquisa exploratória em áreas de córregos

RESUMO

Objetivo - Investigar, por meio de estudos de caso, a condição atual dos córregos inseridos em conjuntos habitacionais produzidos pela CDHU entre 1989 e 2014 no Itaim Paulista, São Paulo, para os quais foram previstas áreas verdes e faixas de proteção ambiental.

Metodologia - Revisão bibliográfica acerca de inundações e habitação em área de risco, com foco no Sul Global. Levantamento dos conjuntos habitacionais da CDHU por meio de: mapas e desenhos disponibilizados pela companhia, dados obtidos no Geosampa, imagens aéreas, fotos e visita ao local. Verificação da condição atual das áreas junto a córregos nos conjuntos habitacionais selecionados. Quantificação e apresentação dos resultados. Discussão por meio do cruzamento dos levantamentos empíricos com a base teórica de fundamentação.

Originalidade/relevância - A pesquisa aborda um problema urbano concreto em uma região permeada por córregos na cidade de São Paulo: o Itaim Paulista. Foram encontradas ocupações em áreas de risco dentro de conjuntos habitacionais produzidos pelo Estado, com população instalada em áreas críticas cuja situação tende a se agravar com as emergências climáticas. Aborda-se um processo complexo e contraditório de origem e desenvolvimento destas áreas, que contrapõe a implementação de um programa habitacional que previa solução técnica, por parte do setor de projetos, para preservar as áreas verdes e de proteção de córregos, aos desdobramentos e transformações que ocorreram após a finalização dos conjuntos habitacionais, com a consequente ocupação de muitas áreas, indicando-se os pontos críticos de ocupação.

Resultados - Demonstra-se que as áreas livres previstas em conjuntos habitacionais incluídas nas faixas de proteção de córregos e rios foram ocupadas na maioria dos casos apresentados. Estas são, muitas vezes, as únicas alternativas para a construção de moradia para a parcela da população que se instala em áreas de risco. A pesquisa evidencia a falta de uma política habitacional abrangente que acomode a população mais vulnerável, bem como a incapacidade do Estado em gerir e manter áreas verdes que foram demarcadas em projeto para a proteção ambiental junto a rios e córregos. Nas ocupações, a falta de saneamento básico e a proximidade da população com as bordas dos córregos contribuem para a poluição das águas e a impermeabilização do solo, aumentando o risco da população contrair doenças e sofrer com episódios de transbordamento e arruinamento das casas. A leniência da gestão pública para cuidar das áreas verdes, aliada à falta de uma política de moradia que atendesse à totalidade da população, contribuíram para consolidar um cenário urbano desfavorável que se agrava com as mudanças do clima.

Contribuições teóricas/metodológicas - Esta pesquisa consolida uma contribuição teórica ao validar, em um contexto específico, relações da produção estatal de moradia com o aumento do risco ambiental em áreas urbanas. Durante a revisão da bibliografia, foram revisados autores que trouxeram levantamentos sistemáticos da produção bibliográfica sobre urbanização precária e alagamentos em cidades do Sul Global. Após uma verificação, conclui-se que algumas causas apontadas pelos autores em suas pesquisas estão presentes nas áreas focalizadas neste artigo. A pesquisa contribui também pelo recorte e amostragem, selecionando conjuntos da CDHU construídos entre 1989 e 2014 em um distrito da Zona Leste da cidade de São Paulo, e verificando a situação dos córregos que interferem nessas áreas.

Contribuições sociais e ambientais - A pesquisa, em diálogo com os ODS 6 - Água Potável e Saneamento; 11 - Cidades e comunidades sustentáveis e 13 - Ação contra mudança global do clima, traz elementos para compreender os processos de ocupação de margens de rios em comunidades que vivem sob risco, identificando um padrão recorrente em áreas de conjuntos habitacionais. Aponta-se, deste modo, para a necessidade de buscar uma solução conjunta entre as políticas de moradia e as ações ambientais com ênfase na drenagem urbana, uma vez que o espaço livre destinado à preservação e acomodação das águas é disputado pela população não atendida por programas de moradia para a construção de suas casas.

PALAVRAS-CHAVE: Ocupação em área de risco. Proteção de rios urbanos. Vulnerabilidade climática em áreas urbanas.

Housing Complexes in Itaim Paulista: Exploratory Research in Stream Areas

ABSTRACT

Objective – To investigate, through case studies, the current condition of streams located within housing complexes built by CDHU between 1989 and 2014 in Itaim Paulista, São Paulo, for which green areas and protective buffer zones were originally planned.

Methodology – Literature review on floods and housing in risk areas, focusing on the Global South. Survey of CDHU housing complexes using: maps and drawings provided by the Company, data obtained from Geosampa, aerial imagery, photos, and site visits. Verification of the current condition of the areas adjacent to streams in the selected housing complexes. Quantification and discussion of the results. Cross-analysis of the empirical findings with the theoretical framework.

Originality/Relevance – The research addresses a concrete urban problem in a stream-permeated region of São Paulo: the Itaim Paulista district. Occupations were found in risk areas within housing complexes produced by the State, with populations settled in critical zones whose situation is likely to worsen with climate emergencies. The study addresses the complex and contradictory process regarding the origin and development of these areas. It contrasts the implementation of housing program which, from the design sector's perspective, included solutions to preserve green areas and stream protection zones, and the subsequent developments and transformations that occurred after the housing complexes were completed. These later changes involved the occupation of many areas, with critical points being identified.

Results – The findings demonstrate that the open spaces originally planned within the housing complexes, which were located in the protected buffer zones along streams and rivers, were occupied in the majority of the cases studied. These areas often represent the only available alternative for a segment of the population to build housing, leading them to settle in high-risk zones. The research highlights a dual failure: the lack of a comprehensive housing policy to accommodate the most vulnerable population, coupled with the State's inability to manage and maintain the green areas that were initially demarcated in the project for environmental protection alongside rivers and streams. Within these settlements, the lack of basic sanitation and the population's proximity to the stream banks contribute to water pollution and soil impermeability and increase the risk of the population contracting diseases and suffering from episodes of overflow and the ruin of their homes. Public management's leniency in caring for green areas, combined with the absence of a housing policy that served the entire population, contributed to the consolidation of an unfavorable urban scenario, which is further aggravated by climate change.

Theoretical/Methodological Contributions – This research consolidates its theoretical contribution by validating, within a specific context, the relationship between state-produced housing and the production of environmental risk in urban areas. The literature review engaged with authors who have conducted systematic surveys of the scholarly production on precarious urbanization and flooding in Global South cities. The empirical investigation conducted here confirms that several causal factors identified in this foundational literature manifest in the studied areas. Furthermore, the study advances the field through its precise methodological framework, which selected CDHU housing complexes built between 1989 and 2014 in a district on São Paulo's east side, enabling a detailed verification of the condition of the streams that intersect these spaces.

Social and Environmental Contributions – This research engages directly with the UN Sustainable Development Goals—specifically SDG 6 (Clean Water and Sanitation), SDG 11 (Sustainable Cities and Communities), and SDG 13 (Climate Action). It provides critical insights to understand the processes of riverbank occupation in communities living under risk, identifying a recurring pattern in housing complex areas. It thus points to the necessity of seeking an integrated solution between housing policies and environmental policies with an emphasis on urban drainage, once the majority of open space destined for water preservation and accommodation is being contested by populations not served by housing programs for the construction of their homes.

KEYWORDS: Settlement in risk areas. Urban river protection. Climate vulnerability in urban areas.

Conjuntos Habitacionales en Itaim Paulista: Investigación Exploratoria en Áreas de Arroyos

RESUMEN

Objetivo – Investigar, mediante estudios de caso, la condición actual de los arroyos insertos en conjuntos habitacionales producidos por la CDHU entre 1989 y 2010 en Itaim Paulista, São Paulo, para los cuales fueron previstas áreas verdes y franjas de protección.

Metodología – Revisión bibliográfica sobre inundaciones y vivienda en áreas de riesgo, con enfoque en el Sur Global. Inventario de los conjuntos habitacionales de la CDHU mediante: mapas y planos proporcionados por la compañía, datos obtenidos en Geosampa, imágenes aéreas, fotos y visitas in situ. Verificación de la condición actual de las áreas adyacentes a los arroyos en los conjuntos habitacionales seleccionados. Cuantificación y discusión de los resultados. Discusión cruzada de los levantamientos empíricos con el marco teórico de fundamentación.

Originalidad/Relevancia – La investigación aborda un problema urbano concreto en una región permeada por arroyos en la ciudad de São Paulo: Itaim Paulista. Se encontraron ocupaciones en áreas de riesgo dentro de conjuntos habitacionales producidos por el Estado, con población instalada en áreas críticas cuya situación tiende a agravarse con las emergencias climáticas. Se aborda un proceso complejo y contradictorio de origen y desarrollo de estas áreas, que contrasta la implementación de programas de vivienda el cual, desde el sector de proyectos, preveía soluciones técnicas para preservar las áreas verdes y de protección de arroyos, con los desdoblamientos y transformaciones ocurridos después de la finalización de los conjuntos habitacionales. Estas transformaciones posteriores implican la ocupación de muchas áreas, indicándose los puntos críticos de dicha ocupación.

Resultados – Se demuestra que las áreas libres previstas en los conjuntos habitacionales, incluidas en las franjas de protección de arroyos y ríos, fueron ocupadas en la mayoría de los casos presentados. Estas constituyen, a menudo,

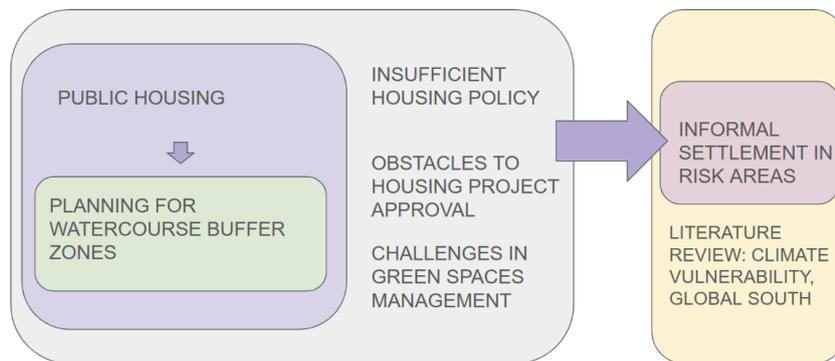
la única alternativa para la construcción de vivienda para un segmento de la población, que se instala en zonas de riesgo. La investigación evidencia la falta de una política habitacional integral que acomode a la población más vulnerable, así como la incapacidad del Estado para gestionar y mantener las áreas verdes que fueron demarcadas en el proyecto para la protección ambiental junto a ríos y arroyos. En las ocupaciones, la falta de saneamiento básico y la proximidad de la población a las orillas de los arroyos contribuyen a la contaminación del agua y la impermeabilización del suelo, aumentando el riesgo de que la población contraiga enfermedades y sufra episodios de desbordamiento y deterioro de las viviendas. La lentitud de la gestión pública para cuidar las áreas verdes, sumada a la falta de una política de vivienda que atendiera a la totalidad de la población, contribuyeron a consolidar un escenario urbano desfavorable, que se agrava con los cambios climáticos.

Contribuciones Teóricas/Metodológicas – Esta investigación consolida su contribución teórica al validar, en un contexto específico, las relaciones entre la producción estatal de vivienda y la producción de riesgo ambiental en áreas urbanas. Durante la revisión bibliográfica, se examinaron autores que presentaron relevamientos sistemáticos de la producción bibliográfica sobre urbanización precaria e inundaciones en ciudades del Sur Global. Tras una verificación, se concluye que algunas causas señaladas por los autores en sus investigaciones están presentes en las áreas focalizadas en este artículo. La investigación también contribuye mediante su recorte y muestreo, seleccionando conjuntos de la CDHU construidos entre 1989 y 2014 en un distrito de la zona este de la ciudad de São Paulo y verificando la situación de los arroyos que interfieren en estas áreas.

Contribuciones Sociales y Ambientales – La investigación, en diálogo con los ODS 6 - Agua Potable y Saneamiento; 11 - Ciudades y Comunidades Sostenibles y 13 - Acción por el Clima, aporta elementos para comprender los procesos de ocupación de riberas fluviales en comunidades que viven en situación de riesgo, identificando un patrón recurrente en áreas de conjuntos habitacionales. De este modo, se señala la necesidad de buscar una solución conjunta entre las políticas de vivienda y las acciones ambientales, con énfasis en el drenaje urbano, dado que los espacios libres destinados a la preservación y acomodación de las aguas son disputados por la población excluida de los programas de vivienda para construir sus hogares.

PALABRAS CLAVE: Asentamientos de alto riesgo. Protección de ríos urbanos. Vulnerabilidad climática en áreas urbanas.

GRAPHICAL ABSTRACT



1 INTRODUCTION

Urban expansion in metropolises like São Paulo often develops at the expense of its green areas and water bodies. This process generates a series of negative consequences, such as the intensification of floods, the formation of heat islands, and risks of physical and material damage, as well as to the health of the population that settles in flood-prone areas. Social interest housing complexes, due to their scale and location, are key territories for observing this phenomenon in the São Paulo metropolis. This article investigates the current state of occupation in green areas adjacent to streams within housing complexes developed by the São Paulo State Housing and Urban Development Company (CDHU) in the Itaim Paulista district of São Paulo. The study focuses on projects built between 1989 and 2014 in the city's far eastern zone, aiming to correlate the presence of streams and springs within the complexes' plots, the lack of municipal regularization for these complexes, and the environmental modifications along the watercourses' banks.

2 OBJECTIVES

The study aims to understand land use and occupation patterns in the open spaces of housing complexes, particularly in green areas alongside rivers, which are essential for environmental sustainability and urban quality of life. This is achieved by mapping the persistent situation of occupation that distances these areas from their initial condition as protected open space. The research seeks to delineate the recurring process of occupation in these areas, relating it to factors both internal and external to housing policy, in order to identify gaps, contradictions, and potential adjustments. As secondary objectives, it deepens a literature review on flooding in vulnerable areas in the Global South, its direct and indirect causes, and on urban resilience for confronting the climate crisis.

3 METHODOLOGY

The research comprises a literature review phase based on the book "CDHU 50 anos - Promovendo a habitação social no Estado de São Paulo" (2016), and on authors discussing the theme with a focus on urban areas in the Global South. Preference was given to works employing systematic literature reviews, such as Asiedu (2020) and Orimoogunje & Aniramu (2025), or works with a rigorous approach, such as the deductive research development methodology derived from the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) stages, as used by AhmadHussainzad and Gou (2024). The fourth article that was included, by Alshammari et al. (2023), provided a narrative literature review correlating land use with flooding. All cited authors drew upon a large number of references to advance their respective discussions and focused on complementary aspects of the problem, contributing to a comprehensive view of the theme.

Methodologically, the research employs cartographic and iconographic surveying, using aerial images from Google Earth, project drawings provided by CDHU, and maps extracted from GeoSampa. For the analysis of the study area, after verifying the images and maps of the

housing complexes, quantitative data were extracted from collected evidence, which were compiled into a summary table. In the discussion of the results, the contradictions between the fulfillment of technical requirements in the urban planning stages and the actual outcomes of the housing complex implementations are addressed, questioning the mechanisms within housing policy that led to the occupation of risk areas. In the conclusions, the obtained data are discussed by returning to the conceptual foundation derived from the literature review, cross-referencing empirical data with the research's theoretical framework.

4 RESULTS

4.1 Conceptual Framework: Urban Settlements and Vulnerability in the Global South

Aspects such as accelerated urbanization, vulnerability and infrastructure precariousness, as well as their association with other combined actions in the daily use of spaces, jointly affect the theme of this research and were addressed through a literature review that will be detailed below.

Alshammari et al. (2023), in the article "The Impacts of Land Use Changes in Urban Hydrology, Runoff and Flooding," establish a direct relationship between the urbanization process and increased flood risk in urban areas. The authors state that urbanization, by replacing permeable surfaces with paved and impermeable areas, stands as one of the main factors impacting the hydrological cycle and is a major cause of flooding. The consequences of the urbanization process are reduced water infiltration into the soil and the accelerated increase in surface runoff and peak flow, making low-lying city areas, which are prone to flooding, more susceptible to sudden and higher-volume floods.

After consulting several articles, the authors conclude that this phenomenon is valid for different climate types, and that its mechanisms operate at the drainage basin scale. The larger and more impermeable the watershed, the more pronounced the phenomenon. The authors point out that potential solutions to the problem should not be merely localized but should employ strategies that consider the watershed as an integrated system (Alshammari et al., 2023), since the consequences of an event in one location may be felt at another point downstream.

Asiedu (2020), through a systematic literature study reported in the article "Reviewing the argument on floods in urban areas: a look at the causes," discusses a set of complementary causes for understanding urban flooding in the Global South. The author establishes categories for these causes, called direct and indirect. Direct causes include: increased rainfall intensity due to climate change; soil sealing resulting from urbanization; and inadequate or non-existent drainage systems. On the other hand, there are indirect causes, which exacerbate the effects of direct causes, and are linked to inadequate solid waste management, which clogs gutters and culverts; stream sedimentation; and disorderly occupation of floodplains, eliminating water accommodation areas. The author argues that, in a context like Accra, Ghana, it is insufficient to focus solely on engineering solutions, such as channel widening, without addressing the indirect causes, since waste accumulation, for example, can compromise the effectiveness of drainage infrastructure. His study warns of the need to adopt combined strategies to tackle flooding in

vulnerable urban areas, addressing the different factors together through arrangements involving urbanization, public management, and educational and community practices.

Hussainzad and Gou (2024), in the article "Climate Risk and Vulnerability Assessment in Informal Settlements of the Global South," adopt a social approach to the theme by analyzing the correlation between climate risks and socio-spatial vulnerabilities in informal settlements of the Global South. Using the PRISMA methodology and selecting various articles, the authors identify and quantify the seven main climate risks, highlighting floods, temperature changes, and storms; and six types of structural vulnerabilities in informal territories, highlighting precarious housing and health risks. Based on the literature review, the authors present a multidimensional panorama of the pressures, conditions, and risks affecting vulnerable communities, aiding in the understanding of a complex problem.

Orimoogunje and Aniramu (2025), in the systematic review "Flood resilience strategies in Lagos Metropolis: pathways toward the 2030 sustainable development agenda," address urban resilience strategies for confronting floods. The authors identify that, despite existing efforts, current strategies in Lagos, Nigeria, are insufficient and hinder the city from achieving the Sustainable Development Goals (SDGs), particularly SDG 11 (Sustainable Cities) and SDG 13 (Climate Action). Among the factors undermining urban resilience are: insufficient public works, low application and enforcement of urban planning regulations, ineffective emergency warning systems, and low community engagement in designing and implementing solutions. The authors advocate for a multi-actor approach that simultaneously integrates and strengthens structural measures (such as improving drainage systems) and non-structural measures (such as sustainable waste management and community-based mitigation strategies) to address the problems.

It is noted that the consulted texts seek to understand the causes of urban flooding in a systemic way and conceive its solution in a networked manner, aligning with contemporary theories for confronting climate emergencies. After constructing a broad view of the problem that encompasses multiple factors and pointing to the difficulties of combined actions in emergency situations in risk areas, it is reinforced that the condition of populations living in flood-prone areas tends to worsen with climate change. In our study, we seek to correlate two problems: the inefficiency of the housing program and the occupation of risk-prone areas within housing complexes, highlighting the state's incapacity to provide adequate housing for this population while also maintaining the necessary open spaces for stormwater accommodation—a process which requires the simultaneous improvement of drainage systems, protection of water quality, and the provision of proper housing.

4.2 Green Areas in CDHU Housing Complexes in São Paulo's Eastern Zone: Actual Use versus Original Planning

The implementation of housing complexes in the Eastern Zone of São Paulo municipality by the Housing and Urban Development Company (Companhia de Desenvolvimento Habitacional e Urbano - CDHU), and their subsequent evaluation, reveal some contradictions arising from the application of public housing policies, which will be discussed after the presentation of the case studies below.

Mass-produced housing complexes in urban peripheries under different housing programs, from the military period to the democratic era, have received substantial criticism regarding their environmental and urban quality. Monofunctional, reduced to the quantitative proliferation of identical units, distant from urban centers, and lacking infrastructure and services, the adopted model drew criticism for its isolation and lack of intersectoral and urban integration from its conception. Kowarick (1979) and Ferreira (2012) argue that providing housing is not limited to supplying housing units in isolated areas on the peripheries. The authors acknowledge other needs and complementary uses associated with housing that, combined with the homes, will promote complex and dynamic urban systems, offering the population a higher quality of life and broad access to opportunities for employment, education, healthcare, leisure, culture, etc.

An important initiative for establishing the quality of new urbanized areas on city peripheries was Law 6766/79. By regulating the opening of subdivisions during a period of rapid growth and expansion, this law mandated the installation of infrastructure systems and guaranteed a percentage of green and institutional areas for new subdivisions. Consequently, the law increased the cost of producing popular subdivisions, restricting their reach and accelerating the process of favela formation in metropolitan areas (Bonduki, 1983).

Notably in São Paulo, favelas emerged in areas close to housing complexes. These complexes, besides indicating the city's growth vectors, enabled the construction of infrastructure networks and attracted public transportation to remote areas, while simultaneously providing, in their interstices, urban voids that were assimilated into popular occupation processes (Caldeira, 2016).

When planned to comply with the prevailing regulations, housing complexes produced by the state, in addition to implementing infrastructure and reserving a quota of institutional lots for the installation of schools, healthcare, cultural, and leisure facilities, etc., stipulated green areas in general and, especially, alongside watercourses and springs, providing the necessary setback strips according to municipal legislation.

The housing complexes built by CDHU between 1989 and 2011 in Itaim Paulista, Eastern Zone of São Paulo municipality, constitute a public policy response to the popular pressures from social movements fighting for housing in the 1980s. In the Eastern Region alone, there were over 200 land occupations in 1987 (Trani, Gussoni, 2016, p.121). The state acquired the last large available plots of land for housing provision through mutual aid programs. The projects for these areas included complete urbanization, with roads, infrastructure, and public facilities.

A survey of the technical drawings of these complexes indicates the reservation of protection areas surrounding streams within the plots of the complexes, which were foreseen in the designs, meeting the required distances according to the legislation of the time. An example is the Itaim Paulista A complex, as shown in Figure 1.

Figure 1 – Drawings of the Itaim Paulista A Complex. Note the 30-meter protection strip on each side of the stream and the 50-meter radius around the spring.



Source: CDHU¹

Next, we will present seven housing complexes from this period located in Itaim Paulista, chosen for being situated in very close proximity to one another. For each complex, a map extracted from GeoSampa is presented. This map reinforces the location of the complex, indicated by a red circle, and shows its irregular land status, according to the orange color in the legend. Next to the map, we show a delimitation of the complex's perimeter provided by CDHU on a Google Earth aerial image, where it is possible to observe the occupations alongside the streams. A brief description completes the information about each complex.

Itaim Paulista A Complex (Figure 2) comprises distinct construction phases with different typologies. In addition to the houses, it has institutional areas, featuring four schools (two early childhood education centers and two elementary schools) and a sports facility called CDC Jd Nélia - Instituto Didi Santana. The stream on the northwestern border of the plot, a tributary of the Itaim Stream, exhibits an intensively occupied strip, which precisely corresponds to the green area shown in Figure 1.

Figure 2 – Itaim Paulista A Complex, in an irregular status with the municipal authority. Note the presence of the stream on the northwestern limit, which corresponds to the occupied area.

Case Examples - Itaim Paulista A - 2005-2009



Source: GeoSampa² and CDHU³.

¹ Available at: <https://www.cdhu.sp.gov.br/cdhu>. Accessed on Jan. 12, 2025.

² Available at: <https://geosampa.prefeitura.sp.gov.br/PaginasPublicas/SBC.aspx>. Accessed on Jan. 12, 2025.

³ Available at: <https://www.cdhu.sp.gov.br/cdhu>. Accessed on Jan. 12, 2025.

Itaim Paulista C, D, and P Complexes (Figures 3 and 4) border the Itaim Stream. The areas adjacent to the stream are occupied along the entire length of the three housing complexes, as well as the area with a probable spring that occupies the center of São Miguel Paulista P complex. The lack of integrated management of green areas alongside housing provision compromised the opportunity to simultaneously preserve both banks of the stream, as well as the spring area, in order to constitute an extensive green and draining area.

Figure 3 – Itaim Paulista C and D Complexes, in an irregular status with the municipal authority and with the presence of a stream on the northeastern border.

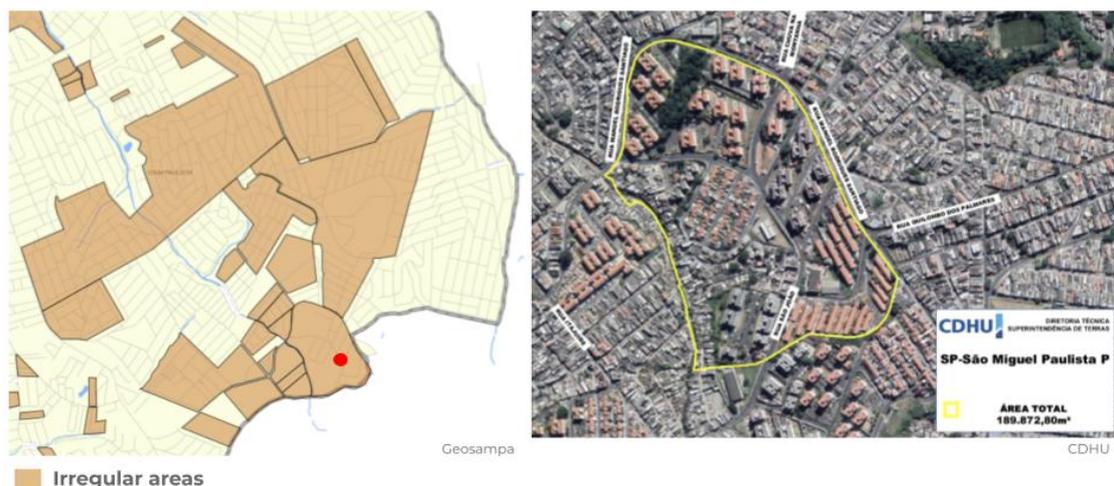
Case Examples - Itaim Paulista C and D - 2011



Source: GeoSampa⁴ and CDHU⁵.

Figure 4 – São Miguel Paulista P Complex, in an irregular status with the municipal authority and with a stream on the western border. Note the presence of occupation in the central part of the complex, possibly in a spring area.

Case Examples - São Miguel Paulista P - 1999-2010



Source: GeoSampa⁶ and CDHU⁷.

⁴ Available at: <https://geosampa.prefeitura.sp.gov.br/PaginasPublicas/SBC.aspx>. Accessed on Jan. 12, 2025.

⁵ Available at: <https://www.cdhu.sp.gov.br/cdhu>. Accessed on Jan. 12, 2025.

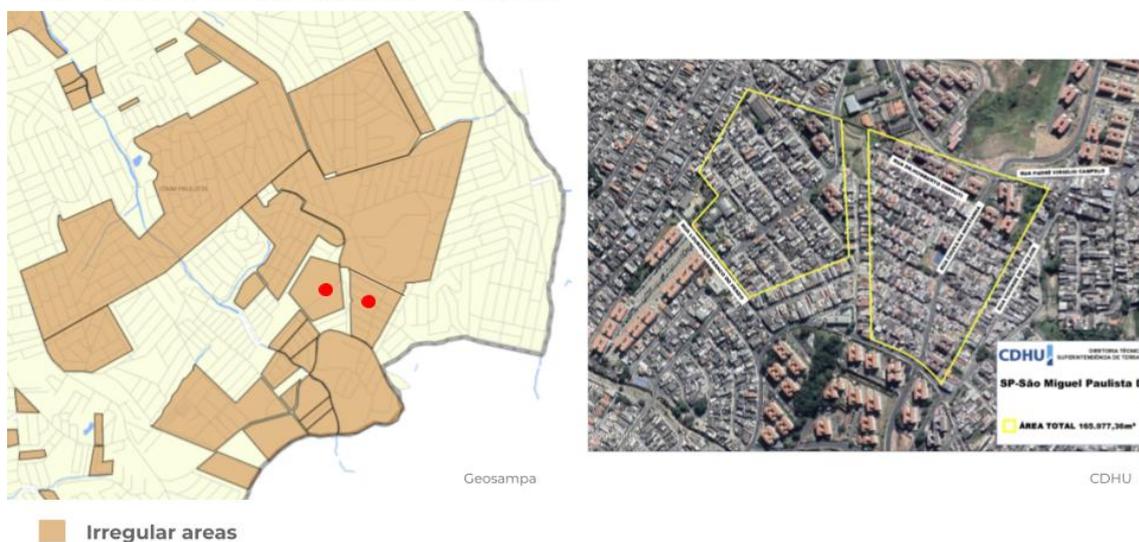
⁶ Available at: <https://geosampa.prefeitura.sp.gov.br/PaginasPublicas/SBC.aspx>. Accessed on Jan. 12, 2025.

⁷ Available at: <https://www.cdhu.sp.gov.br/cdhu>. Accessed on Jan. 12, 2025.

São Miguel Paulista D Complex (Figure 5), in addition to single-family houses, has two schools within its perimeter. A stream demarcated in GeoSampa crosses one side of the complex. Although channeled, its course is visible as it corresponds to a service alley. In this complex, small occupations occur along the cul-de-sacs, at the boundary between the complex and the surrounding subdivision. In the original project, each side of the complex, with a fishbone street layout, would have dead-end streets terminating in a green area that would interconnect all the roads.

Figure 5 – São Miguel Paulista D Complex, in an irregular status with the municipal authority and with the presence of a stream crossing one side of the complex.

Case Examples - São Miguel Paulista D - 1989-1994



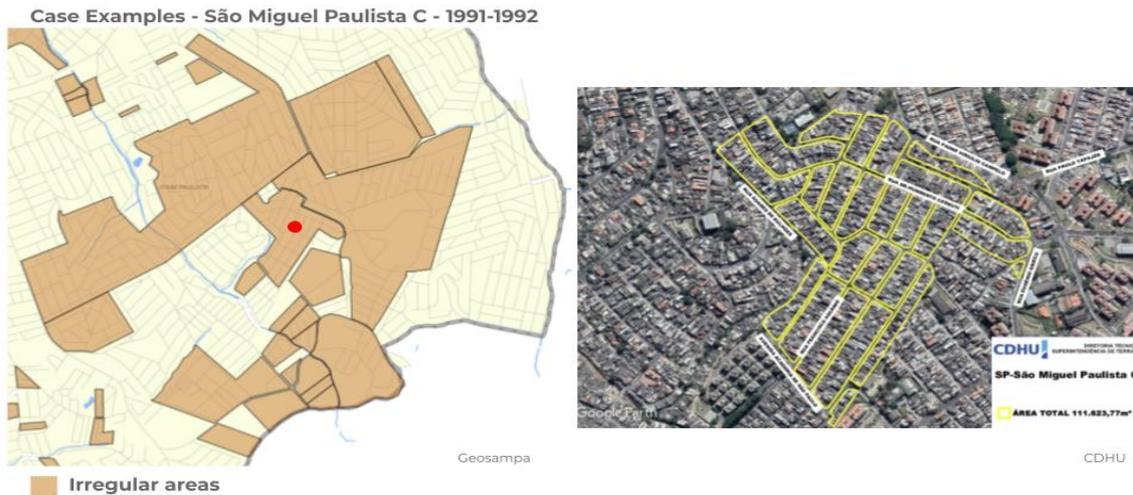
Source: GeoSampa⁸ and CDHU⁹.

São Miguel Paulista C Complex (Figure 6) has, as its western boundary, a tributary of the Itaim Stream. Alongside the stream, on the edge of this complex, there is also a small occupied area.

⁸ Available at: <https://geosampa.prefeitura.sp.gov.br/PaginasPublicas/SBC.aspx>. Accessed on Jan. 12, 2025.

⁹ Available at: <https://www.cdhu.sp.gov.br/cdhu>. Accessed on Jan. 12, 2025.

Figure 6 – São Miguel Paulista C Complex, in an irregular status with the municipal authority.



Source: GeoSampa¹⁰ and CDHU¹¹.

São Miguel Paulista E Complex, known as Encosta Norte (Figure 7), comprises 14 distinct phases, different typologies, and various institutional areas, including 11 schools, a UBS (Primary Health Care Unit), a CIC (Integrated Community Center), a CAE (Center for Children and Youth Support), and a Fábrica de Cultura (Culture Factory). Among all the complexes shown in this study, it is the only one with large unoccupied green areas, containing the springs of a tributary on the left bank of the Três Pontes Stream (Pinheiro, Paula, Imbronito, 2022). Within the same complex, the spring of the Tijuco Preto Stream is found, making Padre Virgílio Campelo Avenue a watershed divide between the Três Pontes Basin and the Tijuco Preto Basin.

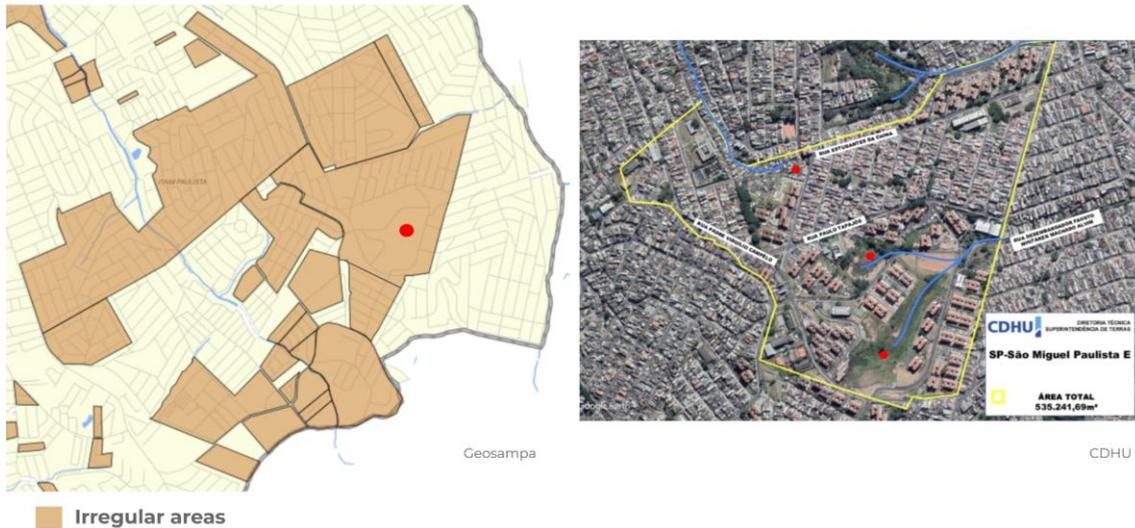
While the green area planned for the Tijuco Preto spring is occupied by the Jagatá community, the remaining areas remain vacant, awaiting a definition to become urban parks. Their preservation would guarantee the continuity of conserved springs from three tributaries on the left bank of the Três Pontes, adding to those located within Parque Santa Amélia and Parque das Águas (Paula, Imbronito, 2023).

¹⁰ Available at: <https://geosampa.prefeitura.sp.gov.br/PaginasPublicas/SBC.aspx>. Accessed on Jan. 12, 2025.

¹¹ Available at: <https://www.cdhu.sp.gov.br/cdhu>. Accessed on Jan. 12, 2025.

Figure 7 - São Miguel Paulista E Complex in an irregular status with the municipal authority. The complex contains springs belonging to different sub-basins. Two unoccupied green areas are highlighted. The watercourses intersecting the area are marked.

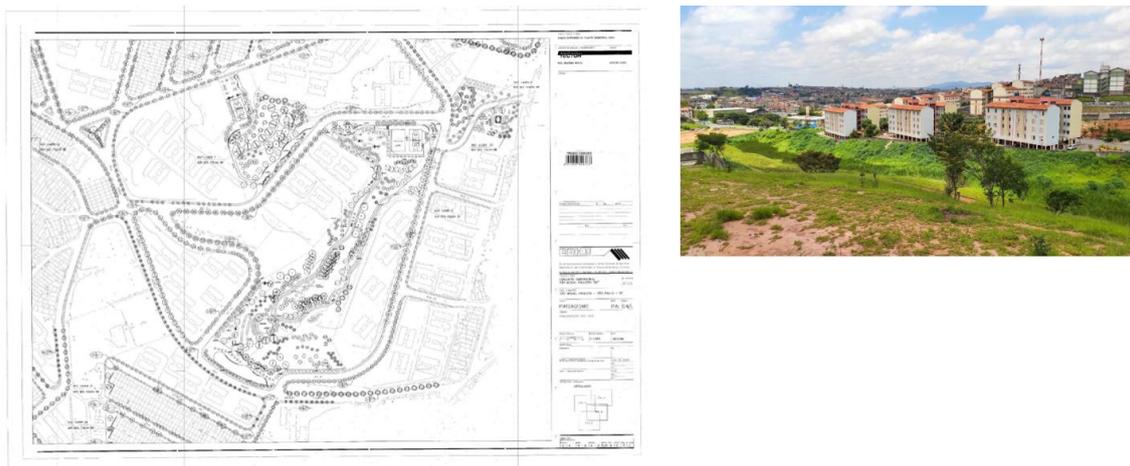
Case Examples - São Miguel Paulista E - 1998-2009



Source: GeoSampa¹² and CDHU¹³, modified by the author.

As we delve deeper into the study of São Miguel Paulista E Complex, we see that the green areas accompanying the springs and watercourses are not merely demarcated but were detailed by CDHU's landscaping sector, containing paths, vegetation, sports equipment, etc. The landscaping project was never implemented. In figures 8 and 9, it is possible to see CDHU's original landscaping design and the current state of the two main green areas of the complex.

Figure 8. Central green area of São Miguel Paulista E Complex. CDHU's landscaping design and current state.



Source: CDHU¹⁴, picture by the author.

¹² Available at: https://geosampa.prefeitura.sp.gov.br/PaginasPublicas/_SBC.aspx. Accessed on Jan. 12, 2025.

¹³ Available at: <https://www.cdhu.sp.gov.br/cdhu>. Accessed on Jan. 12, 2025.

¹⁴ Available at: <https://www.cdhu.sp.gov.br/cdhu>. Accessed on Jan. 12, 2025.

Figure 9. Green area at the spring of the Tijuco Preto Stream in the São Miguel Paulista E Complex. CDHU's landscaping design and current state.



Source: CDHU¹⁵, picture by the author.

A summary table with the information obtained about the complexes reveals a pattern regarding the project approval process and the post-construction situation.

The data indicate that the complexes named Itaim Paulista A, C, and D and São Miguel Paulista P, C, D, and E did not undergo the proper legal construction approval process with the São Paulo Municipality. All of them have the presence of a stream and have experienced occupation in these areas. Only São Miguel Paulista D complex had occupations in green areas, but these were not related to the stream. São Miguel Paulista E complex, in turn, exemplifies both situations: it had occupation in the green area corresponding to the Tijuco Preto Stream spring, but it has two other green areas with springs that remain unoccupied. In the first case, populations inhabit risk areas. Due to the lack of sanitation, waste and solid refuse are dumped into the stream, exposing them to contracting diseases. In the second case, the green areas await a definition to become urban parks, to join, together with two other parks (Parque Santa Amélia and Parque das Águas), a preserved set of springs from tributaries on the left bank of the Três Pontes Stream.

Table 1 - Status of areas alongside streams in the Housing Complexes in Itaim Paulista

Housing Complex Name	Municipal Approval Status	Contains Stream?	Occupation alongside the stream
Itaim Paulista A	not approved	yes	yes
Itaim Paulista C	not approved	yes	yes
Itaim Paulista D	not approved	yes	yes
São Miguel Paulista P	not approved	yes	yes
São Miguel Paulista D	not approved	yes	no
São Miguel Paulista C	not approved	yes	yes
São Miguel Paulista E	not approved	yes	yes/no
Total	7	7	6

Source: Author (2025).

¹⁵ Available at: <https://www.cdhu.sp.gov.br/cdhu>. Accessed on Jan. 12, 2025.

5 CONCLUSION

The housing complexes built by CDHU in the Eastern Zone of São Paulo were the result of a housing policy that sought to respond to popular pressures for housing in the 1980s (Trani, Gussoni, 2016, p.121). The acquisition of the last large plots of land by the state for housing construction was provided for, and implemented, among other means, through a mutual aid system, with the population organized into associations assisted by technical advisory services. The complete urbanization process of these areas involved opening roads, installing infrastructure, designating institutional areas and constructing healthcare facilities. It also included the reservation of green areas alongside rivers and springs, in compliance with the legislation of the time.

This research reveals the changes that occurred over time in the green areas through processes of occupation by the population not served by public housing policies. This finding highlights the lack of comprehensiveness of housing programs, which failed to include a significant portion of the population during a period of accelerated urban population growth in the city of São Paulo. Lacking alternatives, the population settled in stream areas, in settlements without infrastructure, basic sanitation or accessibility.

The occupation of these areas aligns with the phenomenon described by Alshammari et al. (2023), which associates urban flooding with the accelerated process of soil sealing and the occupation of floodable areas. At the watershed scale, the effects of flooding are particularly felt in these low-lying areas, whose population becomes susceptible to floods. In the studied complexes, in addition to the occupation of areas reserved for water and the lack of drainage infrastructure, as direct causes of flooding, indirect causes emerge that intensify flooding (Asiedu, 2020), since the lack of sanitation and accessibility promotes the disposal of waste into the streams, increasing sedimentation and impairing urban drainage.

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DECLARAÇÕES

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DECLARAÇÃO DE CONFLITOS DE INTERESSE

Eu, Maria Isabel Imbrunito, declaro que o manuscrito intitulado "Conjuntos habitacionais no Itaim Paulista: pesquisa exploratória em áreas de córregos ":

1. **Vínculos Financeiros:** Não possui vínculos financeiros que possam influenciar os resultados ou interpretação do trabalho.
 2. **Relações Profissionais:** Não possui relações profissionais que possam impactar na análise, interpretação ou apresentação dos resultados.
 3. **Conflitos Pessoais:** Não possui conflitos de interesse pessoais relacionados ao conteúdo do manuscrito.
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