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Urban contrasts in access to sanitation services in substandard agglomerations: the case of ``Lagoa Azul`` 2 Community in Jacareí-SP

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ABSTRACT

The objective of this study is to analyze the scenario of sanitation services in subnormal agglomerations, taking as a study case the Community: ``Lagoa Azul`` 2, located in the Municipality of Jacareí-SP. The investigation presents updated data on the collection and treatment of waste water, the panorama of subnormal agglomerations and the precariousness of sanitation services in areas characterized by vulnerable conditions in the housing infrastructure. A dialectical approach and a methodological procedure based on the strategy of indirect documentation in statistical sources originating from government agencies were adopted, in addition to a bibliographical review. The data revealed the challenges faced by residents of this agglomeration regarding access and the quality of sanitation services and revealed that the increase in the number of subnormal agglomerations in Brazil is a worrying trend, related to the lack of access to a decent housing. The results of this study contribute to the understanding of social disparities, shedding light on basic sanitation conditions in peripheral communities and offering subsidies that can guide efforts aimed at improving actions that promote the overcoming of these difficulties.

KEYWORDS: Basic Sanitation; Sanitation Services; Subnormal agglomerations.

1 - INTRODUCTION

In the Brazilian context, the urbanization process is intrinsically linked to the functioning of the real estate market, which is based on the reproduction of urban space under the aegis of a capitalist accumulation logic, with repercussions on the economy, education, health, sanitation and all social areas. This system results in the expulsion of a considerable portion of the population to peripheral areas, hillsides and edges of cities, generating a long-standing housing crisis and precarious living conditions (Villaça, 2012). This scenario illustrates the challenge of providing essential services, such as sanitation, in substandard settlements, exemplified in the case study that had as its object the ``*Lagoa Azul*`` 2 Community, located in the Municipality of Jacareí-SP. The expansion of the outskirts of Brazil is characterized by self-construction, in which workers (laymen) themselves build their homes by hand and in precarious ways. Thus, urban exploitation and real estate speculation cause an urban crisis that manifests itself through socio-spatial segregation and the submission of populations in situations of poverty that live in areas lacking urban infrastructure. Such spaces are often referred to as “swellings”, “poverty belts” and “marginal spaces” (Maricato, 1982, p. 83).

The lack of adequate sanitation services provided by the public administration results in significant challenges and deprivations, especially for the less privileged classes, who are relegated to areas of precarious housing, which causes discomfort and implications for the quality of life and health of these groups (Vieira, 2023). This situation reveals the importance of inclusive urban planning, which takes into consideration, specific details and nuances for better quality and broader sanitation, including all people, without distinction. Neglecting the efficient provision of these services not only contributes to social inequality, but also undermines the fundamental principles of public health and collective well-being, which must be the pillars of a civilized and equitable society (Neves-Silva; Heller, 2016).

In Brazil, some public managers often consider sewage systems as non-priority policies, based on the belief that these initiatives do not provide visibility and do not generate votes. This perception is aggravated by the fact that such systems remain hidden, with their structures hidden underground. This study seeks to deepen the understanding of this phenomenon, as discussed by Iorio et al. (2009). The public policies associated with these social

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statistics reflect socio-spatial segregation and low quality of life in substandard agglomerations, resulting from the lack of an adequate public sewage service, in places that appear to be inhabited by a population that is often marginalized, according to Bastos Filho (2019).

It is known that good management of sewage services is extremely important in preventing and reducing adverse effects on health, the environment, and social and economic development, since sewage is also a potential source of pollution. With regard to the health and well-being of communities, the correct treatment and disposal of sewage plays an essential role (Philippi Jr.; Malheiros, 2005).

Inadequate disposal of human waste is associated with a variety of diseases, such as hookworm, ascariasis, amoebiasis, cholera, infectious diarrhea, bacillary dysentery, schistosomiasis, strongyloidiasis, typhoid fever, paratyphoid fever, salmonellosis, taeniasis, and cysticercosis, according to the Sanitation Manual of the National Health Foundation (Funasa). Regarding the transmission of diseases related to inadequate sewage disposal, the main route is direct contact with waste, especially when considering that, in substandard settlements, the predominant destination of untreated domestic sewage involves open-air ditches or bodies of water (Funasa, 2015). This clearly contributes to the spread of several diseases, whether through ingestion or contact with the skin and mucous membranes. In addition, the disposal of sewage directly into the soil can be responsible for the transmission of diseases through contact of feet and hands with the soil. Additionally, this type of disposal can result in water and air contamination (Nuvolari, 2003). This research is justified by the need to understand the impacts of the lack of sewage services in vulnerable urban areas. Although it is recognized that satisfactory sewage services are fundamental for public health and people's quality of life, many regions of Brazil still do not have these improvements. In the case of substandard settlements, the situation is even more worrying, with inadequate services and sewage being disposed of inappropriately, which affects the health of the community and the environment. Therefore, it is pertinent to investigate the consequences of the lack of sewage services in this context.

The term substandard settlements is defined by the Brazilian Institute of Geography and Statistics (IBGE), which defines them as irregular forms of occupation of public and private land for housing purposes in urban areas. These areas are generally characterized by a disorganized urban layout, a lack of essential public services, and their location in regions with restrictions on occupation, such as the ``Lagoa Azul`` 2 cluster. According to the IBGE (2020), the concept of substandard clusters encompasses various types of settlements, such as irregular and clandestine subdivisions, slums, precarious settlements, informal settlements, invasions, grottos, lowlands, tenements, communities, villages, stilt houses, etc.

We adopted a dialectical approach here, with the aim of critically analyzing the problem of the precariousness of sewage services in substandard clusters, presenting their complexity. The methodological procedure of indirect documentation was adopted, through documentary research in statistical sources originated by government agencies, as well as a bibliographic review, considering works, technical and scientific articles, and research reports (Marconi; Lakatos, 2003).

This article is structured in six sections. In the introduction, we contextualize the issue at hand. The second section presents the collection and treatment indicators, highlighting the complexity of sewage services. The third section provides a simplified overview of the situation

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of substandard agglomerations. The fourth examines the case of ``*Lagoa Azul*`` 2 Community, promoting an investigation into the current situation of this community, with an emphasis on the needs related to sewage services. The fifth section promotes a discussion based on the analysis of the case of the agglomeration studied, comparing it with the variables collected and presented throughout the research. Finally, the final considerations consolidate the main conclusions derived from this study, outlining suggestions, paths and proposals.

2 - INEQUALITIES IN ACCESS TO SEWAGE SERVICES

The Thematic Diagnosis on Water and Sewage Services, focusing on Technical Sewage Management, published in 2022 by the National Sanitation Information System (SNIS), of the National Sanitation Secretariat (SNS), linked to the Ministry of Regional Development (MDR), reveals that, in 2020, approximately 55.8% of the Brazilian population had access to sewage collection networks. However, it is important to note that approximately 100 million inhabitants still did not benefit from this service. For example, the North region recorded a rate of only 14.0%, while the Southeast region had a considerably higher rate, reaching 81.7%, as we can see in Table 1 below.

Table 1: Sewage Collection Index with Collection Network by Region

REGION	PERCENTAGE OF TOTAL POPULATION WITH ACCESS TO SEWAGE COLLECTION
North Region	14,0%
Northeast Region	30,2%
Midwest region	61,9%
Southeast Region	81,7%
South Region	48,4%

Source: Adapted from MDR (Brazil, 2022).

This discrepancy highlights the pressing need to address these deficiencies, aiming to ensure broader, more equitable and effective access to essential sanitation services throughout the country, in addition to highlighting the sanitation service as the most complex element of sanitation to be achieved by the entire population (Brazil, 2022).

As far as the states are concerned, a marked inequality in sewage collection and treatment rates becomes evident. Only São Paulo (93.5%) and the Federal District (90.9%) manage to exceed the 90% mark. On the other hand, the presence of sewage collection rates below 20% is concentrated in the North region, in the following states: Amazonas, Acre, Pará, Rondônia, Amapá and Maranhão. This highlights a worrying reality of inequality and neglect in relation to essential basic sanitation services in these more vulnerable regions (Brazil, 2022).

When comparing the capitals, a notable contrast is evident between São Paulo and Curitiba, with rates above 90%, in relation to the capitals of the North region. After analyzing the data, a disturbing finding emerges: Belém-PA, Macapá-AP and Porto Velho-RO have service rates below 20%, with Porto Velho having the lowest service rate in the country, with an absurd rate of only 6.4% of the population served by sewage collection networks (Brazil, 2022).

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Regarding sewage treatment in Brazil, according to the SNIS diagnosis for the year 2020, we observe that the sewage treatment rate, in general, reaches 79.8% when considering the total volume of sewage collected. However, the treatment rate in relation to the total volume of sewage calculated based on the proportion between the volumes treated, using water consumption as a reference, shows a reduction of 50.8% in the treatment rate.

This divergence highlights critical issues related to the effectiveness of sewage treatment. The analysis therefore reveals a situation that requires critical evaluation and the implementation of effective measures to improve the management and effectiveness in the provision of these services. Table 2 provides a visual representation of the urban coverage rates in sewage treatment in relation to the total volume collected, divided by region, in 2020 (Brazil, 2022).

Table 2: Sewage Treatment Index by Region

REGION	P PERCENTAGE OF TREATED SEWAGE IN RELATION TO COLLECTED SEWAGE
North Region	84%
Northeast Region	78%
Midwest Region	95%
Southeast Region	77%
Southern Region	94%

Source: Adapted from MDR (Brazil, 2022).

The municipality of Jacareí has demonstrated significant advances in sewage collection and treatment indicators in recent years, which places it among the municipalities with relatively positive indices, according to the SNIS, as seen in Table 3.

Table 3: Sewage Collection and Treatment Index for the Municipality of Jacareí

Service Description	Percentage (%) of total population served
Sewage collection	78,35
Treatment of collected sewage	86,81

Source: Adapted from MDR (Brazil,2022).

These indices suggest a favorable statistical situation. However, it is important to note that most of the municipality's substandard agglomerations still do not have access to sewage collection networks, as is the case of the ``*Lagoa Azul*`` 2 substandard agglomeration, which faces serious difficulties in relation to this essential service. This dissonance points to the critical need to improve the equitable distribution of basic sanitation services in the municipality, in order to cover all communities adequately (Brazil, 2022).

3 - GROWTH OF SUBNORMAL CLUSTERS

The increase in the number of substandard housing developments has caused social and environmental problems, in addition to being an obstacle to the expansion of basic

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sanitation. When the population does not receive adequate assistance, it is forced to occupy areas that are often unsuitable for housing.

Furthermore, inadequate sewage disposal is a common practice in these locations, and this situation is a clear manifestation of the distortions in urban planning and the management of essential services, requiring a critical analysis of the mechanisms to correct these problems and improve the living conditions of the affected populations (``*Instituto Trata Brasil*`` 2016).

Returning to the context of capitalist logic, the various forms of access to housing in cities are intrinsically related to the spatial contradictions arising from the social relations of production. These contradictions manifest themselves through conflicts related to land use and access to urban infrastructure (Maricato, 2012). Data provided by the IBGE reveal a significant increase in substandard housing developments throughout Brazil, reaching 13,151 occupations, as can be seen in Table 4.

Table 4: Quantities of Subnormal Clusters in Brazil

Features	Year 2010	Year 2019
Municipalities with subnormal clusters	323	734
Total number of subnormal clusters	6. 329	13. 151
Number of occupied households in substandard clusters	3. 224. 529	5. 127. 747

Source: Adapted (IBGE, 2020).

The increase in the number of substandard clusters leads us to reflect on the urbanization process driven by the capitalist mode of production and its consequent disparities in access to housing and social and economic infrastructure. Therefore, these clusters represent a visible manifestation of the socio-spatial inequalities present in cities (IBGE, 2020).

The state of São Paulo, despite being the richest in the country, leads the ranking when it comes to the number of households located in substandard clusters (IBGE, 2020). Among these households are those in the ``*Lagoa Azul*`` 2 substandard cluster, whose reality exposes a significant contradiction, since the state's wealth coexists with the marked presence of precarious housing areas, highlighting the complexity of the issues highlighted in this study. The data shown in Table 5 confirm this critical scenario, through the list of some states with the total number of households located in substandard clusters, in the year 2019. Among these states, São Paulo stands out with a frightening total of 1,066,813 households in this situation. In addition, Rio de Janeiro, Bahia and Pará also present alarming numbers.

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Table 5: Number of Households Located in Substandard Clusters by State

States	Total number of households located in Subnormal Agglomeration – base year 2019
São Paulo	1. 066 813
Rio de Janeiro	717. 3026
Bahia	469. 677
Pará	432. 518
Amazonas	393. 995
Pernambuco	327. 090
Espírito Santo	306. 439
Ceará	243. 848
Minas Gerais	231. 385
Maranhão	114. 625

Source: Adapted (IBGE, 2020).

4 ``LAGOA AZUL`` 2: FACING THE SHORTAGE OF BASIC SANITATION

The municipality of Jacareí is located in the interior of São Paulo and is part of the Metropolitan Region of Vale do Paraíba and North Coast (RMVPLN). It borders the city of São José dos Campos along the Presidente Dutra Highway - BR 116. Jacareí is the third most populous municipality in the RMVPLN, with an estimated population of around 240,275 people, with a population density of 517.53 inhabitants per square kilometer (IBGE, 2022).

The urban evolution of Jacareí has reflected its growth over the years. Initially, it was a settlement on the banks of the Paraíba River, which became a town in 1653, separated from the old Vila de Mogi das Cruzes. In 1849, it achieved city status, becoming an important regional center. The arrival of ``*Central do Brasil*`` Railway at the end of the 19th century facilitated communication between Rio de Janeiro and São Paulo, which boosted the city's growth. Industrialization in the region, mainly with the installation of the first textile mills between 1880 and 1890, attracted more residents and contributed to urban expansion. This led to the creation of the first suburbs and an increase in the urban population at the expense of the rural population, which contributed to the decline of coffee production (Müller, 1969).

During the 1950s and 1960s, Jacareí witnessed a notable population growth, driven by migrations from other regions. This movement resulted in the expansion of the less privileged classes, mainly in the outskirts, an issue that persists to this day and for which a solution is awaited. This expansion of substandard agglomerations continues to challenge the city, becoming a concern that requires continuous attention and the search for effective solutions (Moreira Neto; Zanetti; Lima, 2012).

Currently, in Jacareí, there are 44 consolidated substandard clusters, monitored and suitable for regularization, of which 17 are qualified for the application of social interest land regularization, ``*Lagoa Azul*`` 2 being one of them. The other 27 are eligible for specific interest land regularization, which refers to the situation in which the law allows the regularization of occupied areas, mainly by populations with better income and social conditions than those considered low-income (Abdo, 2023).

The ``*Lagoa Azul*`` 2 substandard cluster is located in ``*Parque Meia Lua*`` District, in the northern part of the municipality of Jacareí, Figure 1. Its origin occurred in 2016 and the

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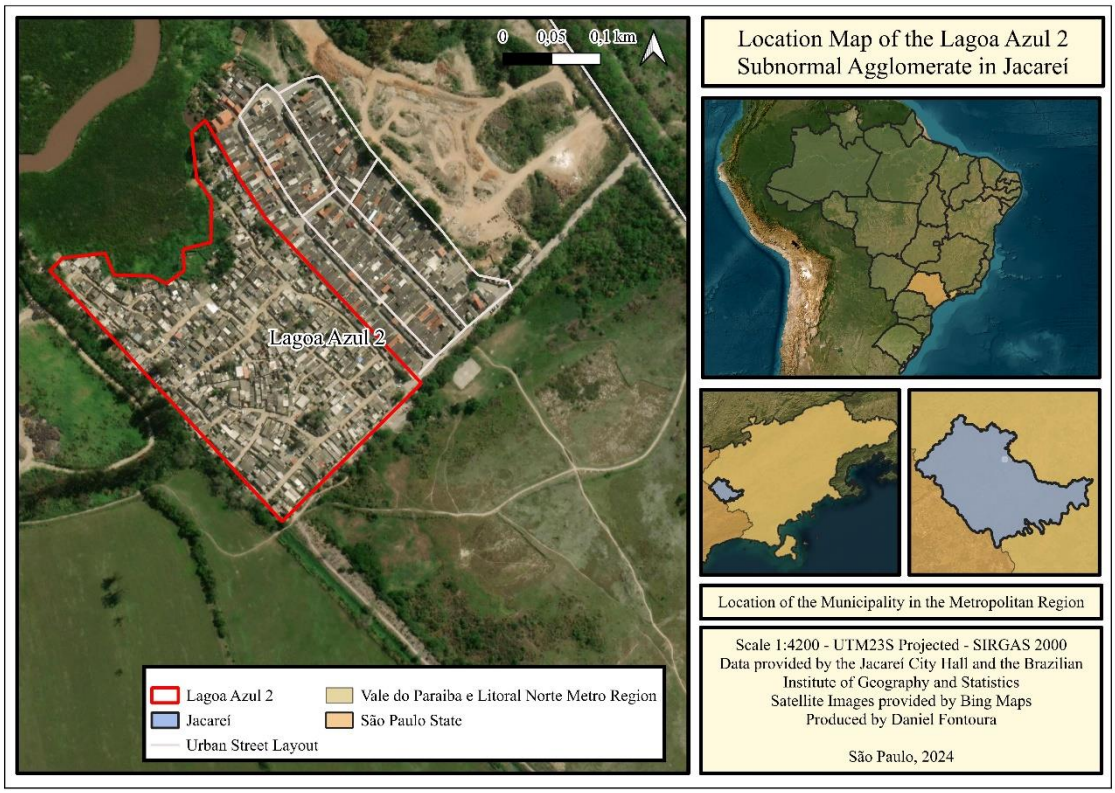
place quickly attracted residents, including those who were waiting for the opportunity to obtain their homes through a local public housing program. It is an abandoned space, privately owned, previously used for sand extraction. The soil composition is varied, with the upper part of the settlement being predominantly clayey and the lower part, a little sandier and less stable. Unfortunately, the area was abandoned by the extractive company and, consequently, suffered environmental degradation, without any recovery effort (Souza; Gomes, 2019).

Figure 1: Location Map of the Subnormal Cluster ``Lagoa Azul`` 2 in Jacareí-SP



Source: Prefeitura Municipal de Jacareí (2019).

The families that occupy this space had to settle and organize themselves, given the adverse circumstances already presented. Regarding the treatment of domestic sewage, many of them chose to use rudimentary septic tanks in their homes. However, it is important to mention that not all families have this type of septic tank, which means that many of them end up dumping their sewage directly into the stream that runs through the community, aggravating the environmental and sanitation problems in the area (Souza; Gomes, 2019).

Over time, the cluster grew and developed near the ``Lagoa Azul`` 1 cluster (now regularized), hence the name ``Lagoa Azul`` 2, as we can see in Figure 2.

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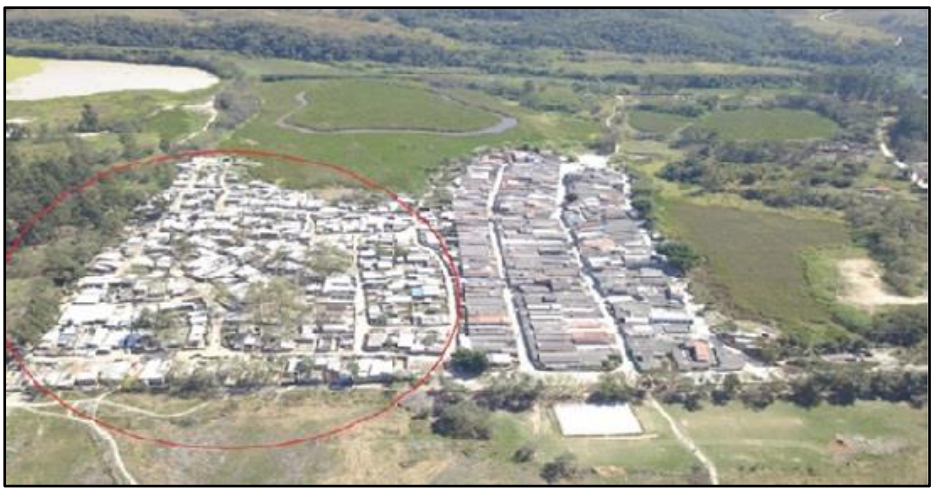
Figure 2: View of ``Lagoa Azul`` 2 Subnormal Cluster taken by drone



Source: Souza and Gomes (2019).

Families in the community use drinking water from the supply network through clandestine connections. Some homes are equipped with water tanks, however, residents who do not have this resource report difficulties in obtaining good quality water. This is due to the large number of families that share the same supply connection (Souza, 2019). Residents use a community trash can near the entrance to the neighborhood to dispose of their solid waste, due to the narrow streets, which do not allow access to the garbage collection truck. Improper garbage disposal is a recurring problem, with waste scattered near the trash can. Reports from residents indicate that, during collection, bags break, dogs tear up the garbage, and the urban cleaning service is deficient. In addition, along the stream, there is a large amount of debris, including plastics that, after rain, can enter the water, serving as breeding grounds for insects and causing adverse environmental impacts (Souza, 2019). Given this situation, the community's Residents' Association, which has an organized headquarters, plays a fundamental role in the search for improvements. In this space, meetings are held that represent an opportunity for residents to express their concerns and seek measures that aim to improve local living conditions. Figure 3, below, shows the headquarters of the Residents' Association, where these meetings take place in favor of the community's progress (Souza, 2019).

Figure 3: View of the Community Center of ``Lagoa Azul`` Community 2

Source: Souza (2019)

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5 - DISCUSSION OF THE PRECARIOUSNESS OF SEWAGE SYSTEM IN SUBNORMAL AGGLOMERATIONS

The case study of the ``Lagoa Azul`` 2 substandard housing estate presents a vivid image of the lack of basic sanitation, portraying the plight of a community living without the bare minimum. This occurs in the state of São Paulo, the richest in Brazil, in Jacareí, which boasts good sanitation rates. Located in an abandoned area of private property, this housing estate emerged as a response to the scarcity of affordable housing options. The families living there face precarious conditions, numerous challenges regarding access to drinking water and proper disposal of solid waste, in addition to the lack of sewage services (Souza; Gomes, 2019).

The lack of access to adequate sewage services, as already mentioned, has very worrying consequences for both public health and the environment. Inadequate sewage disposal is intrinsically linked to a series of waterborne diseases, which overwhelmingly affect communities in vulnerable situations. These diseases directly impact the lives of people who already face unfavorable conditions. Furthermore, soil and water contamination pose a significant environmental risk (Funasa, 2015).

It is obviously alarming that this reality persists in more than 5 million homes occupied by less privileged social classes in substandard settlements (IBGE, 2020). This critical situation requires an in-depth analysis and the implementation of public policies and effective, concrete actions with the aim of protecting health, ensuring the well-being of the most vulnerable communities and, at the same time, preserving the environment.

6 – FINAL CONSIDERATIONS

In this article, we present a quick analysis of the scenario of sewage services in substandard agglomerations, focusing on the case study of the ``Lagoa Azul`` 2 Community, in the Municipality of Jacareí-SP, concluding that the results demonstrate inequality in access to sewage services in Brazil, with very significant regional disparities that are already unreasonable given the historical moment that the country is going through, in which remarkable development indices are being achieved.

Through a dialectical argument related to the indicators presented, we seek to better understand the need for a qualitative transformation and interpretation of the contradictions in the disparities in the provision of public sewage services. Thus, this study revealed profound discrepancies in sewage collection and treatment indices in the Brazilian context.

While some regions enjoy relatively high rates of sewage collection and treatment, others face significant deficiencies, such as the ``Lagoa Azul`` 2 substandard agglomeration, which clearly exposes the challenges faced by residents of these communities in relation to access to sewage services in the strict sense and in all their dimensions. Even in a prosperous municipality, the lack of access to this essential service persists, harming the quality of life and health of the families living there.

In addition, from a broader perspective, the increase in the number of substandard agglomerations in Brazil is a worrying trend, related to the lack of access to housing, which is a

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fundamental factor for the exercise of minimally dignified citizenship. The growth of substandard agglomerations reflects the expansion of the presence of the less privileged classes in suburban areas. ``Lagoa Azul`` 2 illustrates this reality, as it arises in a previously degraded area used for sand extraction, lacking essential sanitation services, among others.

In view of the above, the priority need for much more comprehensive and assertive political actions and guidelines becomes clear. We still await the initial step of will and intervention aimed at improving the living conditions of the inhabitants of these communities in all areas of the country. It is important that urgent measures be implemented to guarantee full basic sanitation for all. Furthermore, it is imperative that there are policies aimed at combating regional inequalities, which do not fit into the critical framework of Brazilian history. These coordinated actions can build a more just and equitable future, bringing hope and opportunities to the ``Lagoa Azul`` 2 Community in Jacareí, as well as to so many others in similar situations.

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