



“From the city of mango trees to the city of concrete”: study on urban public green leisure areas in Belém (Pará, Brazil)

“Da cidade das mangueiras à cidade do concreto”: estudo sobre áreas verdes públicas urbanas de lazer em Belém (Pará, Brasil)

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ABSTRACT: The Urban Public Green Areas (UPGA) in the Amazon represents a small environmental and cultural sample of different spaces and ways of traditional populations life's and cities in the region. Although, such areas have been under pressure from urban expansion, and in some cases, they do not meet the citizens needs and use of these spaces for leisure. Thus, this research aimed to analyze the distribution, access and reduction of urban public green areas for leisure in Belém. The qualitative-quantitative methodology uses bibliographic and documental research, based on official data on demography and geolocation. The data were submitted to three indicators calculation, namely: Territorial Proportion of Vegetation Coverage Indicator, Vegetation Coverage per Inhabitant Indicator and, within UPGA scope, the Territorial Distribution of Leisure Spaces Indicator. As a result, it was possible to verify that Belém has been progressively losing green areas. In the reduction in UPGA, a significant difference in distribution was also identified, either due to the absence of quality spaces or due to inadequate infrastructure and access. In this way, the leisure practices and sociability in these spaces have been made impracticable, and the population has started to resort to other leisure experiences, which are often nature disconnected.

KEYWORDS: Leisure; Belém; Vegetation Coverage; Urban Public Green Areas; Indicators.

RESUMO: As Áreas Verdes Públicas Urbanas (AVPU) na Amazônia representam uma pequena amostra ambiental e cultural dos diferentes espaços e modos de vida de populações tradicionais e citadinas da região. Contudo, tais áreas vêm sofrendo pressões pela expansão urbanística, além de alguns casos não suprirem as necessidades dos cidadãos no uso de espaços para a prática de lazer. Diante disso, esta pesquisa objetivou analisar a distribuição, o acesso e a redução das áreas verdes públicas urbanas de lazer em Belém. A metodologia, de cunho quali-quantitativo, utiliza pesquisa bibliográfica e documental, a partir de dados oficiais de demografia e de geolocalização. Os dados foram submetidos ao cálculo de três indicadores, quais sejam: o Indicador de Proporção Territorial da Cobertura Vegetal, o Indicador de Cobertura Vegetal por Habitante e, no âmbito das AVPU, o Indicador de Distribuição Territorial de Espaços de Lazer. Como resultados, foi possível averiguar que Belém vem perdendo progressivamente áreas verdes. Além da redução das AVPU, identificou-se também uma significativa diferença na distribuição, seja pela ausência de espaços de qualidade, seja pela infraestrutura e de acesso inadequados. Desse modo, as práticas de lazer e as sociabilidades tecidas nesses espaços têm sido inviabilizadas, passando a população a recorrer a experiências outras de lazer, as quais frequentemente são desconectadas de relações com a natureza.

PALAVRAS-CHAVE: Lazer; Belém; Cobertura vegetal; Áreas Verdes Públicas Urbanas; Indicadores.

Introduction

Nowadays, the quality life concern in cities is increasingly common, especially in large urban centers. Among the reasons that generate this concern is the urbanization process and its resulting population density, which has been generating serious urban problems. In this sense, it is possible to observe social exclusion processes that demarcates the urban area between peripheral areas, equipment and services lacking, besides the areas considered noble, profiled by horizontalization and, more recently, by the constructions verticalization that overload the city's environmental balance (CONSORTI *et al.*, 2021; GRAÇA; TELLES, 2020; PINHEIRO *et al.*, 2018)

In this scenario, commonly guided by the market, urban planning and management have ignored the importance of green areas and their ecosystem services. The accelerated and intense urbanization process, by not considering or incorporating green spaces in territorial planning, has sometimes contributed to the formation of cities that do not have enough green areas to serve the local population (SILVA, 2017). As a reflection of this panorama there is the difficulty in exercising the city rights, citizenship and an ecologically balanced environment, considering that the inexistence of these spaces makes it impossible for the population to enjoy social leisure and tourism practices.

This process has not been different in Belém (PA), a Brazilian municipality located in the Amazon, northern region of Brazil. Considered the Amazon Metropolis, the city has about 1,393.399 inhabitants and has a territorial extension of 1,059.466 km², according to Belém Statistical Yearbook (BELÉM, 2011). Although it is known as the 'Mango Trees City' or 'City of Waters' – as it consists of forests and river waters, with an expressive fauna and flora Amazon biodiversity (LOBATO, 2021) – recent studies (LUZ; RODRIGUES, 2014; SILVA; RODRIGUES, 2019) have found that, in 34 years, more than 50% of the vegetation cover in Belém has been reduced. This affects the social functions of leisure and sociability, as well as ecological functions, such as damage to hydrographic basins and the consequent soil waterproofing (MIRANDA, 2020).

Furthermore, another issue that has demanded great concern is public spaces, equipment and services urban democratization. In Belém, for example, most Urban Public Green Areas (UPGA) with relatively adequate infrastructure, according to Bahia (2012), can be found mostly within parks, military areas and research and teaching institutions. However, they are not always accessed by the population, both for geographic reasons and for symbolic barriers. Democratic uses and access to these places are essential for improving society's life quality, as they contribute to thermal comfort, species conservation, urban beautification, environmental awareness educational activities and space of leisure practices (BAHIA, 2012).

Therefore, considering that most urban vegetation is being suppressed, giving way to buildings, based on a discourse of the new needs of a modern society (MILLER JUNIOR, 2007; DANTAS, 2021), this article has the objective of analyze the distribution, access and reduction of Urban Public Green Areas (UPGA) for Leisure in Belém (Pará/Amazon/Brazil), adopting a critical look at effective use of these areas by the local population.

Material and methods

Primarily, a bibliographical research was developed according to Martins and Theóphilo (2016), this technique is configured as a fundamental strategy in scientific research development, as the topic is known, analyzed and explained, based on published references, '[...] *aiming at constructing of theoretical platform of the study*' (MARTINS; THEÓPHILO, 2016, p. 52). In addition, the following categories were used in this research analyses: urban growth, vegetal coverage, Urban Public Green Areas (UPGA) for Leisure.

For urban growth, research and document analysis were used, which served as a study source, so the *'[...] documents are used as a source of information, indications and clarifications that brings their content to elucidate certain questions and serve as proof for others, according to the researcher's interest'* (SÁ-SILVA; ALMEIDA; GUINDANI, 2009, pp. 5). With regard to Vegetal Coverage, obtaining these data was made possible by accessing the MapBiomass database. A mapping of each from the eight administrative districts of Belém was carried out: 1) Administrative District of Icoaraci (DAICO); 2) Administrative District of Mosqueiro (DAMOS); 3) Administrative District of Outeiro (DAOUT); 4) Administrative District of Bengui (DABEN); 5) Administrative District of Entroncamento (DAENT); 6) Administrative District of Sacramento (DASAC); 7) Administrative District of Guamá (DAGUA); and 8) Administrative District of Belém (DABEL).

Thus, considering indices calculation or indicators has been used in the specialized literature to measure the disposition of vegetation coverage in urban areas (LUZ; RODRIGUES, 2014; SILVA; RODRIGUES, 2019), this research chose to use two indicators calculations:

(1) Territorial Proportion of Vegetation Coverage Indicator (TPVCI): which expresses a percentage relationship between the vegetation cover area (m²) and the territorial extension (m²) of the districts of Belém (Equation 1);

$$TPVCI(d) = \frac{\text{Vegetable coverage area (m}^2\text{)}}{\text{Territorial extension (m}^2\text{)}} \times 100\% \quad (1)$$

Where: d is the administrative district.

(2) Vegetation Coverage per Inhabitant Indicator (VCIHI): represents the proportion between the vegetation cover area (m²) and the number of inhabitants (h) of each district in the city of Belém (Equation 2):

$$VCIHI(d) = \frac{\text{Vegetable coverage area (m}^2\text{)}}{\text{number of inhabitants (h)}} \times 100\% \quad (2)$$

Where: d is the administrative district.

Regarding the analysis of Urban Public Green Areas (UPGA), data from documents requested from the Secretaria Municipal de Meio Ambiente (SEMMA)¹ were used, in which, from these, it was possible to analyze demographic and geolocation data. Which were also consulted in Belém Statistical Yearbook (2011), on the IBGE website (2010) and on the Google Earth program.

With these data in hand, the UPGA in Belém was cataloged, which made it possible to observe the distribution and access of population to these spaces. These results were submitted to the calculation of the Territorial Distribution of Leisure Spaces Indicator (TDLSI), which considers the ratio between the area of each district (m²) and the number of spaces (UPGA) present in them (Equation 3) (LOBATO, 2021).

$$TDLSI(d) = \frac{\text{territorial extension (m}^2\text{)}}{\text{total number of UPGA leisure (m}^2\text{)}} \quad (3)$$

Where: d is the administrative district

This mathematical expression resulted in a value that corresponds to how many m² a single space would be available to the population. Thus, TDLSI ($0 \geq TDLSI \leq 1$) can vary between no UPGA in the district total area, utopically, indicate that, for each m² of the district, there would be a leisure UPGA available to the population. To have a more simplified dimension of this correlation, 10,800 m² represents, approximately, a football field (90m x 120m or 1.08 hectare).

Results and Discussion

Urban growth and reduction of vegetation coverage: an inversely proportional correlation

Urban life in large and medium-sized Brazilian cities is commonly characterized by population, territory and society urbanization (TRINDADE JÚNIOR, 2013, 2015). Thus, the studies that deal with the urban issue list problems in relation to population swelling, deficits in urban transport, basic sanitation, housing and health. There is also an increase at violence rates, unemployment and underemployment, which results, in the urban area landscape, inequalities and exclusions (LOBATO; BAHIA, 2020).

In the Amazon, spatial reorganization has been taking shape, either indiscriminately or planned, with settlement commonly developed in environmentally fragile areas, such as the spaces that border rivers, streams and igarapés². These occupations represent a danger, both to environment and to inhabitants, since, usually the vegetation deforestation on its banks is for houses construction, which ends up causing, in some cases, river siltation, flow alteration and, constantly, some floods (LOBATO; BAHIA, 2020).

Therefore, the effects of these environmental imbalances reflect on the daily dynamics of the population itself (CARDOSO; VENTURA NETO, 2013). Over the years, the rapid growth of Brazilian cities has been observed as inversely proportional to the loss of vegetation coverage. This relationship points to a significant reduction in green areas, which, leads to a decrease in people's quality of life.

The vegetation coverage performs a series of ecosystem services, especially in the urban space, which are considered as determinants in the environmental quality of cities (CONSORTI *et al.*, 2021; TOLEDO; SANTOS, 2008). Among such services, Duarte *et al.* (2017) highlight the climate balance with shading; greater absorption of solar radiation, with photosynthesis process; storing more CO₂, such as plant cell respiration; the improvement in air quality; creation of a natural barrier to winds; rains filtration, among others.

It is also possible to point out the socio-environmental importance of green areas, as the vegetation coverage contributes to river origin sources protection, with visual harmony, ornamentation and enjoying leisure practices, etc. (CONSORTI *et al.*, 2021; GRAÇA; TELLES, 2020). The authors also emphasize the psychological functions of these areas, as urban vegetation is configured as a representation of the break in built-up areas routines in cities and can produce stress and irritability reduction. This can provide a peaceful, calm and tranquility feeling (DUARTE *et al.*, 2017).

However, even these numerous and important functions, the green areas offer – which is already insufficient considering the number of people and urban territory – over the years has been suppressed by new modernity logics. This causes nature to be seen only as a synonym for beautifying the city: a mere exchange value (LOBATO, 2021).

For Loboda and De Angelis (2005), this green area insufficiency is also due to the way Brazilian public authorities deal with it. Especially in resources allocation deficiency, so these areas are considered a fundamental element in urban planning. In cases where these areas are addressed by management instruments as the Master Plan and its subdivision, occupation and land use laws, there is a certain 'loosening' or non-compliance with these legal and regulatory provisions of urban space ordering, which are commonly permeated by capital discourses and city's 'entrepreneurship' (DANTAS, 2021).

The Master Plan, which is characterized as an instrument that must be prepared as a full municipal planning process for cities with more than 20,000 inhabitants, valid for 10 years, must reflect, through guidelines, norms and laws, and meet the citizens needs of each municipality. For this, both city's social function and sustainable development must be sought, guaranteeing everyone access to decent housing, transport, education, health, sanitation, security, employment and leisure services. For Bassul (2002), together with law enactment, popular organization and the political conduct of municipal management are equally important.

In the Bahia (2012) conception, the City Statute and Master Plan represents a certain advance for a fairer and more democratic territory struggle. However, there is still a very large gap between law enactment and effective application of their principles in city planning in all Brazilian regions, a fact that can be seen in Amazonian cities, such as Belém.

As the city appropriation forms express the production relations mode, unequal development, concentration, exclusion, etc., all of this is also present in urban life. In this sense, it is not possible for the money and speculation power to draw the cities design (BAHIA, 2012, p. 79).

Regarding the green areas planning, it is common to see such areas, especially public ones, being 'strangled' by the gray cement that builds cities. In Belém there is

no difference, as can be seen in Figure 1, it is possible to see an aerial image of the city, which confirms this situation, with a clear perception of few green areas distributed among the buildings.



Figure 1: Aerial view of Belém – PA
Figura 1: Vista aérea de Belém – PA
Source: CRF-UFGA Disclosure Photo (2020).
Fonte: Foto Divulgação CRF-UFGA (2020).

In 2013, the Observatório das Metrópoles³ researchers, from Instituto de Pesquisas em Planejamento Urbano e Regional (IPPUR)⁴, of Universidade Federal do Rio de Janeiro (UFRJ)⁵, developed a study aiming to calculate the Indicador de Bem-Estar Urbano de Municípios Brasileiros (IBEU Municipal), in which *'[...] the urban dimension of well-being enjoyed by Brazilian citizens was evaluated [...] related to the collective living conditions promoted by the city built environment, on housing scales and its nearby neighborhood, and for urban equipment and services'* (RIBEIRO; RIBEIRO, 2016, p. 5).

The IBEU-Municipal was composed, considering five dimensions to be evaluated: *'Urban Mobility, Urban Environmental Conditions, Urban Housing Conditions, Urban Collective Services and Urban Infrastructure'* (RIBEIRO; RIBEIRO, 2016, p. 5). In that study, the Urban Environmental Conditions Dimension (D2) was conceived based on three indicators: afforestation open sewage and accumulated garbage around the households. In this dimension, Belém appears with a bad or extremely bad (0.251) Urban Well-Being Index (IBEU), together with two other cities, Recife (0.443) and Manaus (0.395). Paradoxically, two cities located in Amazonian regions (Belém and Manaus) that, should be cities with satisfactory environmental indices, in fact, have bad and extremely bad levels of urban environmental conditions.

So, this research proposal adds to the research concerns, in order to obtain updated data, analyzing distribution, access and reduction of Urban Public Green Areas (UPGA) for Leisure in Belém. From this research, this reality is also reflected in the empirical data collected in Belém. The calculations were used referring the Territorial Proportion of Vegetation Cover Indicator (TPVCI). In these data, 30% percentage was considered, recommended as ideal for urban areas (SILVA, 2014), as it allows for more adequate thermal comfort.

Specifically, in Belém case, the numbers found here were measured in Table 1, using indicators between ‘Insufficient’ and ‘Decent’, in order to qualify the differences between areas with bigger or smaller vegetation coverage. The administrative districts vegetation coverage is directly related to urbanization the process and centrality in Belém territory.

Table 1: Territorial Proportion of Vegetation Coverage Indicator by district, in Belém (PA).
Tabela 1: Indicador de Proporção Territorial da Cobertura Vegetal, por distrito, em Belém (PA)

Administrative District	Vegetation coverage (m ²) *	Territorial extension m ² **	TPVCI (%)	Indicator level
1. DAICO	6.466.136,65	33.153.400,00	19,50	Unrecommended
2. DAMOS	195.527.713,66	219.673.300	89,00	Decent
3. DAOUT	89.082.596,47	110.262.800	80,79	Decent
4. DABEN	4.496.142,41	32.887.000	13,67	Unrecommended
5. DAENT	37.862.201,86	67.521.700	56,07	Decent
6. DASAC	376.280,72	14.902.800	2,52	Insufficient
7. DABEL	149.463,21	13.697.600	1,09	Insufficient
8. DAGUA	626.365	14.403.200	4,34	Insufficient

Rating:

10% < X	10% ≥ X < 20%	20% ≥ X < 30%	X ≥ 30%
Insufficient	Unrecommended	Regular	Decent

Source: Prepared by the author (2021), based on data from the Mapbiomas Platform (2021) * and the Statistical Yearbook of Belém (2011) **.

Fonte: Elaborado pelo autor (2021), a partir de dados da Plataforma Mapbiomas (2021)* e do Anuário Estatístico de Belém (2011)**.

Geographically, the Administrative District of Sacramento (DASAC), of Belém (DABEL) and of Guamá (DAGUA), with ‘Insufficient’ indicators, they are the most central neighborhoods in the city, which had vegetation coverage loss in exchange for residential or commercial buildings. These are areas that have a significant number of inhabitants and few spaces with vegetation coverage. In these districts, the existence of green areas is punctual, commonly limited to squares, streets and tree-lined avenues, as can be seen in Figure 2.



Figure 2: Green spaces amid buildings in the city center of Belém – PA
Figura 2: Espaços verdes em meio a prédios no centro da cidade de Belém – PA

Source: Lobato (2021).

Fonte: Lobato (2021).

With an indicator considered ‘Unrecommended’, the districts of Icoaraci (DAICO) and Bengui (DABEN) have their vegetation coverage based on many housing complexes in these districts. In addition, the Parque dos Igarapés is in this region, a private park, which maintains a leisure area with approximately 160,000 square meters of remaining forest. These two districts are considered expansion areas of Belém and have a disorderly configuration occupation process due to the absence of an urban planning that considered the vegetation coverage as an essential factor in the quality of life.

The districts of Mosqueiro (DAMOS), Outeiro (DOUT) and Entroncamento (DAENT) had indicators considered ‘Decent’, which must be associated with the existing environmental protection areas in the region, such as the Utinga Camillo Vianna State Park, which has a territorial extension about 14km². The park has an intense people flow, who seek to practice leisure (trails and tours). It also houses the Batalhão de Polícia Ambiental (BPA) and housing developments squares.

On the other hand, when considering the population variable, the Vegetation Coverage per Inhabitant Indicator (VCIHI) was calculated and shown in Table 2. The objective was to identify whether the range of vegetation coverage between 12m²/h and 15m²/h, indicated as ideal for thermal comfort in urban areas (LUZ; RODRIGUES, 2014), it is met in Belem districts. To facilitate the identification, a classification was created between the VCIHI of each district analyzed, which is measured between ‘Insufficient’ and ‘Decent’.

The data in Table 2 allow us to infer that Sacramento (DASAC), Belém (DABEL) and Guamá (DAGUA) districts had an indicator considered insufficient when considering the relationship between vegetation coverage and the number of

inhabitants. In these districts are considered the most central of the city, which comprise the considerable financial, commercial and residential center of Belém population, with corporate buildings, condos, historic buildings, malls and large department stores are common. Thus, tiny green areas are observed, with isolated and dispersed form characteristics. The vegetation is spread out in a small dimension. In this way, they are limited to squares, flowerbeds and a few backyards, which historically had their area reduced and transformed into parking lots and new homes (LUZ; RODRIGUES, 2014).

Regarding the indicators presented in Tables 1 and 2, it is highlighted the situation of Administrative District of Belém (DABEL), which concentrates part of the most economically favored social strata in the city, is also a reflection of the historical process of urban space production. Since the mid-70s, financed by the rubber economic cycle, this municipality portion had significant European influences, reproducing patterns of historic buildings, squares, streets and avenues. In Belém, the green spaces were designed for contemplative purposes only, in which nature was 'built' with a view to the city ornamentation (SARGES, 2010).

Table 2: Vegetal Coverage per Inhabitant Indicator in Belém (PA).
Tabela 2: Indicador de Cobertura Vegetal por Habitante em Belém (PA)

Administrative District	Vegetation Coverage (m ²) *	Inhabitants (h) **	VCIHI (m ² /h)	Indicator level
1. DAICO	6.466.136,6	167.035	38,71	Decent
2. DAMOS	195.527.713,66	33 232	5.883,71	Decent
3. DAOUT	89.082.596,47	38 731	2.300,03	Decent
4. DABEN	4.496.142,41	284.670	15,79	Decent
5. DAENT	37.862.201,86	125.400	301,93	Decent
6. DASAC	376.280,72	256.641	1,46	Insufficient
7. DABEL	149.463,21	144.948	1,03	Insufficient
8. DAGUA	626.365,22	342.742	1,87	Insufficient

Rating:

9 m ² /h < X	9 m ² /h ≥ X < 12 m ² /h	12 m ² /h ≥ X < 15 m ² /h	X ≥ 15 m ² /h
Insufficient	Unrecommended	Regular	Decent

Source: Prepared by the author (2021), based on data from the Mapbiomas Platform (2021) * and from the IBGE Census (2010) **.

Fonte: Elaborado pelo autor (2021), a partir de dados da Plataforma Mapbiomas (2021)* e do Censo do IBGE (2010)**.

On the other hand, due to these socio-spatial transformations having occurred without formal planning, in addition to the higher and better located lands having been occupied by the population with greater economic power, a considerable number of people were relocated. This part of the population went to places that surround the space that today comprises the Administrative District of Belém (DABEL). This district is characterized as the land in lowland areas popularly known as 'baixadas' (Trindade Júnior, 1998), located today in the districts of Sacramento (DASAC) and Guamá (DAGUA).

Considered as new areas of the city expansion, the districts of Icoaraci (DAICO), Mosqueiro (DAMOS), Outeiro (DAOUT), Bengui (DABEN) and Entroncamento (DAENT) achieved a 'Decent' indicator, as the vegetation coverage per inhabitant is above 15m²/h. In this sense, it is important to emphasize that these districts present, according to Luz and Rodrigues (2014), a form of connected vegetation coverage. The coverage is wide and with a high degree of connectivity and can be considered as reticulated as it presents an elongated green network in areas that are not yet so urbanized with buildings. This vegetation coverage has unquestionable importance about the thermal comfort of the city. However, they are areas considered to be in urban expansion or conservation areas, which need adequate planning.

Regarding the Entroncamento Administrative District (DAENT), specifically, it is worth noting that there are marine areas and institutional lands. These have been owned by federal government since the 1940s and 1950s, and were used to build Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA), Campus de Pesquisa do Museu Paraense Emílio Goeldi (MPEG), Universidade Federal Rural da Amazônia (UFRA) e Universidade Federal do Pará (UFPA) (LUZ; RODRIGUES, 2014). These institutions still have expressive extensions of green areas on their land.

Furthermore, Entroncamento alone (DAENT) currently has more than 50 squares (LOBATO, 2021). On the other hand, Mosqueiro (DAMOS) and Outeiro (DAOUT), which are islands, have areas with many forests, without occupation and with a small population compared to other parts of the city. The districts of Icoaraci (DAICO) and Bengui (DABEN), in turn, despite being in an urban transition area, still have residences with extensive backyards, as it contributes to the Vegetation Coverage per Inhabitant Indicator (VCIHI) (m²/ h) satisfactory.

From the data systematized in Tables 1 and 2, it can be inferred that, in addition to differences between districts, there is a discrepancy of green areas within the districts, such as the Administrative District of Bengui (DABEN), which has different modes of occupation and land use, with unequal urban space production. On the one hand, there is irregular occupation with dwellings in streets created in an organic way, where there is no standards for width and length, where sometimes the streets do not interconnect and commonly there is no pavement or paving. On the other hand, there are horizontal condominiums that have better infrastructure, with paving, basic sanitation and road planning, which significantly contributes to the soil waterproofing process.

Considering this scenario, in Belém, according to Miranda (2020) studies, urban growth has been advancing rapidly through the city and its metropolitan region, suppressing vegetation coverage. This suppression has a direct impact on UPGA and, consequently, on the reduction of spaces for leisure activities. If the rate of vegetation cover reduction associated with urban growth and soil sealing continues to accelerate in the hydrographic basins of Metropolitan Region of Belém, in the coming decades the environmental problems will be much more serious and will affect more and more people (MIRANDA, 2020, p. 115).

Thus, the loss of vegetation contributes to the formation of areas with greater heat absorption, creating 'heat islands'. These, since they are linked to the climate, have implications for the population quality of life, as environmental comfort influences health and, therefore, social well-being, from physical exhaustion, fatigue, heat stroke and, in some cases, Cerebral Vascular Accident (CVA) (SILVA *et al.*, 2020). Within this context, Miranda (2020) draws attention to the fact that this context does not affect

the entire population in a homogeneous way. The consequences of this process fall on certain population groups, in fact, they are shaped by racism, social inequality and social interest's crystallization considered to be dominant.

Public Urban Green Areas (UPGA) for Leisure: distribution, access and reduction in Belém; (Pará – Amazônia – Brazil)

The city of Belém is characterized by the existence of numerous green areas, which historically have the social function and leisure spaces. In these areas, *'[...] permeate not only the individuality of its passers-by and users, but, above all, the everyday life of the community'* (LOBODA; DE ANGELIS, 2005, pp. 135). For Figueiredo (2008), public areas have two functions: at the same time that they allow residents to practice leisure, they also comprise a space which a cultural sample of local practices can be found, a fact that can act as a 'decoy' for visitors. The decrease in green areas directly influences experiencing the city process, as well as the sociability process.

For this study, the Urban Public Green Areas (UPGA) category was used and defined by Bahia (2012, pp. 151) as: *"[...] a type of free space, publicly appropriated per excellence, generally managed by the government, located in open urban areas (as opposed to built-up areas), where there is a predominance of arboreal vegetation and soil with little or no waterproofing"*. Bahia (2012) corroborates Toledo and Santos (2008) when stating that the UPGA have ecological, aesthetic and leisure configurations. This results in areas destined for public use, also with a rest, walking and various practices perspective. Tree-lined squares, urban parks, public gardens, urban gardens, botanical gardens, Integral Protection Conservation Units, zoos, areas with urban afforestation and the connecting strips between green areas are considered UPGA (BAHIA, 2012).

Also, according to Bahia (2012), the UPGA assume different configuration possibilities in a society. These areas must be interrelated and contextualized in the urban environment, according to the used type they are intended for, for example: social, aesthetic, ecological, psychological and educational. All of this significantly contributing to the population well-being.

Thus, these areas can take on some functions, such as: social function - social interaction and leisure (sociability); aesthetic function – built landscape diversification and city beautification; ecological function – improvements in the city's climate and air quality, water and soil, resulting in the well-being of inhabitants and fauna diversification; Psychological Function – performing physical, leisure and recreational activities, contributing to biopsychosocial health; and educational function – environment for the development of educational activities, extracurricular and environmental education programs.

According to Cardoso and Miranda (2016), Belém expansion process, over the last 50 years, has been shaped by different conceptions among the city's producing agents. Changes in the way of developing the city contributed to the discarding of *'traditional forms of sociability and leisure, which depended on nature preservation, physical infrastructure and security for public access, spreading private solutions that exclude those who are not fit for the consumption'* (CARDOSO; MIRANDA, 2016, pp. 9).

From the data collected in this research, it was possible to verify how the distribution of Leisure UPGAs is configured in the eight administrative districts of Belém. The table below shows a survey on the distribution in the administrative districts of Belém. Based on Table 3, one fact stands out: the amount of green areas in the Administrative District of Belém (DABEL) is greater when compared to other districts. As mentioned above, DABEL was classified as 'Insufficient' in the Vegetation Coverage Indicator (VCI) (Table 2), but even so it is the district that has the greatest green areas amount. This happens, firstly, through urban planning that organized the land occupation since the Belle Époque period and has been maintained by UPGA for leisure practice.

Table 3: Distribution of leisure UPGAs in the administrative districts of Belém (PA).
Tabela 3: Distribuição das AVPU de lazer nos distritos administrativos de Belém (PA)

Administrative District	Square	Crossroads	flower beds	Roundabouts	Rescess	Park	seashore	Subsidiary Green Areas	Total
1. DAICO	11	---	---	---	---	01	01	---	13
2. DAMOS	19	06	07	---	---	01	06	---	39
3. DAOUT	03	---	---	---	---	---	01	---	04
4. DABEN	40	08	10	---	---	---	---	08	66
5. DAENT	56	07	12	03	---	02	---	17	97
6. DASAC	32	04	10	---	---	02	---	01	49
7. DABEL	61	04	14	02	01	04	04	08	98
8. DAGUA	22	02	05	01	---	---	---	---	30
Total	244	31	58	06	01	10	12	34	396

Source: Prepared by the authors (2021), based on data from the Belém Tourism Offer Inventory (2020), SEMMA (2016) and Google Earth (2021).

Fonte: Elaborado pelos autores (2021), a partir de dados do Inventário da Oferta Turística de Belém (2020), da SEMMA (2016) e do *Google Earth* (2021).

This contradiction between Vegetal Coverage Indicator (VCI) and distribution of UPGA in the district of Belém (DABEL) may be linked to green areas concentration in Belém central areas, which are also overloaded with residents from other administrative districts. This overload happens because in other districts there is a shortage of UPGA, and when they do exist, there is precarious maintenance, such as squares without benches and neglected gardens, lighting lack, trash and toys for children. Another relevant point for this discrepancy is that DABEL covers, quantitatively, most tourist attractions. This factor has a direct influence on greater maintenance and concern with urban cleaning.

Another district that stands out is Outeiro (DAOUT), which achieved a 'Decent' assessment in terms of vegetation coverage per inhabitants (Table 2) and has the lowest amount of UPGA (4) among the other districts. One of the reasons that could justify this result is that the Fundação Escola Bosque (FUNBOSQUE) is in this district, with a preserved area of secondary tropical forest that reaches 120 thousand m², which

only 4,100 m² are occupied by the school's facilities. This school and its territorial extension, however, are not counted by the UPGA categories.

In addition to these aspects related to spatial distribution, in order to observe the access issue and proportion of UPGA absolute number in the districts, the Territorial Distribution of Leisure Spaces Indicator (TDLSI) was calculated, as mentioned in the methodology section. Again, this indicator comprises a mathematical equation that is expressed by the ratio between the area of each district (m²) and the number of areas (UPGA) present in them. In other words, this indicator makes it possible to see how many m² of the district there would be a leisure UPGA available for people.

In this sense, considering the data shown in Table 4, it appears that, although the district of Mosqueiro (DAMOS) has a considerable number of UPGA, each one of them is within and/or within a radius of 2,250.23 m², and therefore, the TDLSI was considered as 'Insufficient'. In district of Outeiro (DAOUT), despite being a district with one of the highest percentages of vegetation coverage (80.79%) in the city (as seen in Table 1), it was noted that the absolute number of UPGA is very restricted, resulting in an indicator classified as 'Insufficient', since there is one UPGA for every 27,565.70 m² of the district area.

Table 4: Territorial Distribution of Leisure Spaces Indicator in Belém (PA).
Tabela 4: Indicador de Distribuição Territorial de Espaços de Lazer em Belém (PA)

Administrative District	Territorial extension (m ²)	Number of UPGA**	TDLSI (m ² /UPGA)	Indicator Level
1. DAICO	33.153.400	13	2.550.23	Regular
2. DAMOS	219.673.300	39	5.632.64	Unrecommended
3. DAOUT	110.262.800	04	27.565.70	Insufficient
4. DABEN	32.887.000	66	498,28	Decent
5. DAENT	67.521.700	97	696.10	Decent
6. DASAC	14.902.800	49	304,13	Decent
7. DABEL	13.697.600	98	139,77	Decent
8. DAGUA	14.403.200	30	480,10	Decent

Rating:

X > 5.000.000,00	5.000,00 > X ≤ 3.000,00	1.000,00 > X ≤ 3.000,00	X ≤ 1.000,00
Insufficient	Unrecommended	Regular	Decent

Source: Prepared by the author (2021), based on data from the Belém Yearbook (2011)*, the Belém Tourism Offer Inventory (2020)** and SEMMA (2016)**.

Fonte: Elaborado pelo autor (2021), a partir de dados do Anuário de Belém (2011)*, do Inventário da Oferta Turística de Belém (2020)** e da SEMMA (2016)**.

A fact that should be highlighted refers to the districts evaluated with 'Decent' indicator. Sacramento (DASAC), Belém (DABEL) and Guamá (DAGUA) districts are located in the municipality central part, in addition to having the smallest territorial extensions, have a representative amount of UPGA, contributing to a satisfactory TDLSI, Belém district (DABEL) reached one UPGA for every 139.77 m² (Table 4) – demonstrating that central flowerbeds numbers, squares, parks and other complementary green areas are present in greater numbers in these parts of the city.

Furthermore, it is important to highlight that districts of Bengui (DABEN) and Entroncamento (DAENT), which are in areas of the most recent urbanization advance, while having a representative territorial extension, have benefited recently from infrastructure improvements, either through central flowerbeds or squares construction and other green spaces. However, it is important to point out the improvements are usually within or around the condominiums recently designed in these districts – with a view to serving the middle class that has migrated to this region. This scenario, on the other hand, is problematic, as it has contributed to the extensive reduction of swaths vegetation coverage.

Leisure and sociability practices have suffered obstacles, since UPGA reduction of interferes and restricts the population from being able to enjoy experiences in nature, as well as establishing social and environmental relationships, either through interaction with the fauna or from contemplation of the landscape shaped by the Amazonian flora. In this sense, as the UPGA have given way to concrete spaces, such as malls and other types of public spaces, what is left for the population is the enjoyment of experiences disconnected from reality and from the riverside ancestry that is so striking in the region – passing, now, to consume conventional leisure practices mediated by capital.

Conclusion

The UPGA have fundamental importance for a city dynamic. Besides of being able to become a locus of representation of a 'conserved and preserved' green space in urban dynamics, it can be one of the mediating elements of a human experience. This means that there is a greater proximity to the best quality of life for the city's population. These areas can be characterized as spaces intended for leisure experiences, contact with nature, which provides sociability, moments of greater introspection and awareness about the importance of these spaces for the city's dynamics and dwellers.

However, based on what was possible to ascertain, through the indicators calculated in this research, Belém has been increasingly losing these areas, in a continuous advance that brings more and more consequences. The decrease in UPGA directly influences the population's quality of life. Specifically, leisure practices are also becoming more restricted in green areas. Also regarding to this decrease in UPGA, a significant difference was identified in the UPGA distribution in Belém, whether due to the absence of quality spaces (with gardens maintenance), structure and access.

In the Belém District (DABEL), which has the most central districts with a greater concentration of economic power, with easier access to UPGAs than in the other districts. Another point to be highlighted refers to the fact that the UPGAs that have a better structure (banks, dumps, toys, pavement, etc.), turn out to be the options with more access to leisure for residents of other districts. More than overloading these central areas, the people flow from other districts points to a democratization lack of leisure spaces, especially the UPGA. This demonstrates that in order to access these areas, users must travel (with time and money expenses).

So, the presented reality directs this reflection towards the understanding and perception of effective urban planning absence and the need for public policies that can provide greater democratization in these areas for the entire population of Belém.

Notes:

¹ Environmental Police Battalion.

² These lands are close to or on the edge of rivers and streams – because they are lower and/or subject to flooding, which would later be known as lowlands (TRINDADE JÚNIOR, 1998) – have become a form of affordable housing for the low-income population. According to Ribeiro and Prost (2003, p. 181), ‘Technically, the term lowland applies to land with elevations of 4 meters above sea level and even make up 40% of the most valued area of the city, the first patrimonial league, close to the center of Belém’. However, historically, Trindade Júnior (1998) points out that ‘downtowns’ are associated with urban poverty.

³ Brazilian Agricultural Research Corporation.

⁴ Museu Paraense Emílio Goeldi Research Campus.

⁵ Federal Rural University of Amazon.

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