

**A STUDY ON THE VERTICALIZATION OF THE SOUTH SHORE OF ILHÉUS IN
RELATION TO SHADING ON THE BEACH STRIP**

**UM ESTUDO SOBRE A VERTICALIZAÇÃO DA ORLA SUL DE ILHÉUS, EM
RELAÇÃO AO SOMBREAMENTO NA FAIXA DE AREIA DA PRAIA**

**UN ESTUDIO SOBRE LA VERTICALIZACIÓN DE LA COSTA SUR DE ILHÉUS,
EN RELACIÓN AL SOMBREADO EN LA FRANJA DE ARENA DE LA PLAYA**

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ABSTRACT

This study investigates the effects of shading caused by the verticalization of buildings in the southern area of Ilhéus (BA), focusing on the impacts on the economy of beach huts and the thermal comfort of the region. Accelerated and disorderly urban growth has resulted in the

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construction of tall buildings close to the shore, generating extensive areas of shade on the sand for much of the day. This change in environmental dynamics compromises tourist attractive-ness, reduces the time visitors spend on the beaches and, consequently, affects the revenue of local merchants, especially those who depend on sun exposure to attract customers. The research adopts a mixed methodological approach, combining bibliographic review, shade mapping, interviews with workers at the huts and on-site environmental sensory inspections, such as thermal sensations. The data collected allow us to understand the relationship between vertical urbanization and microclimatic changes, in addition to highlighting the resulting socioeconomic losses. The results obtained aim to support more balanced public urban planning policies, which consider the environmental limits of the coastal zone and promote sustainable development, integrating economic growth, social well-being and preservation of coastal ecosystems.

Keywords: Shading. Thermal Comfort. Thermal Sensation. Vertical Urbanization. Coastal Zone. Sustainable Development.

RESUMO

O presente estudo investiga os efeitos do sombreamento provocado pela verticalização das edificações na zona sul de Ilhéus (BA), com foco nos impactos sobre a economia das barracas de praia e o conforto térmico da região. O crescimento urbano acelerado e desordenado tem resultado na construção de prédios altos próximos à orla, gerando extensas áreas de sombra na faixa de areia durante grande parte do dia. Essa alteração na dinâmica ambiental compromete a atratividade turística, reduz o tempo de permanência dos visitantes nas praias e, conseqüentemente, afeta o faturamento dos comerciantes locais, especialmente os que dependem da exposição solar para atrair clientes. A pesquisa adota uma abordagem metodológica mista, combinando revisão bibliográfica, mapeamento de sombra, entrevistas com trabalhadores das barracas e verificações sensíveis ambientais in loco, como é o caso das sensações térmicas. Os dados coletados permitem compreender a relação entre urbanização vertical e alterações microclimáticas, além de evidenciar os prejuízos socioeconômicos decorrentes. Os resultados obtidos têm como objetivo subsidiar políticas públicas de planejamento urbano mais equilibradas, que considerem os limites ambientais da zona costeira e promovam um desenvolvimento sustentável, integrando crescimento econômico, bem-estar social e preservação dos ecossistemas litorâneos.

Palavras-chave: Sombreamento. Conforto Térmico. Sensação Térmica. Urbanização Vertical. Zona Costeira. Desenvolvimento Sustentável.

RESUMEN

El presente estudio investiga los efectos del sombreado provocado por la verticalización de las edificaciones en la zona sur de Ilhéus (BA), con énfasis en los impactos sobre la economía de los quioscos de playa y el confort térmico de la región. El crecimiento urbano acelerado y desordenado ha dado lugar a la construcción de edificios altos cerca del litoral, generando amplias áreas de sombra en la franja de arena durante gran parte del día. Esta alteración en la dinámica ambiental compromete la atracción turística, reduce el tiempo de permanencia de los visitantes en las playas y, en consecuencia, afecta los ingresos de los comerciantes locales, especialmente aquellos que dependen de la exposición solar para atraer clientes. La investigación adopta un enfoque metodológico mixto, combinando revisión bibliográfica, mapeo de sombras, entrevistas con trabajadores de los quioscos y verificaciones ambientales sensoriales in situ, como la percepción térmica. Los datos

recolectados permiten comprender la relación entre urbanización vertical y alteraciones microclimáticas, además de evidenciar los perjuicios socioeconómicos resultantes. Los resultados obtenidos tienen como objetivo fundamentar políticas públicas de planificación urbana más equilibradas, que consideren los límites ambientales de la zona costera y promuevan un desarrollo sostenible, integrando crecimiento económico, bienestar social y preservación de los ecosistemas litorales.

Palabras clave: Sombreado. Confort Térmico. Sensación Térmica. Urbanización Vertical. Zona Costera. Desarrollo Sostenible.

1 INTRODUCTION

Accelerated urban development in coastal areas has generated a series of environmental and socioeconomic impacts. In the southern zone of Ilhéus, the growing verticalization of buildings near the sand strip of the beaches has caused a relevant phenomenon: prolonged shading over areas of public and commercial use, such as beach huts. This shading can directly affect the thermal comfort of visitors, tourist attractiveness and, consequently, the local economy. With the reduction of solar incidence in certain areas, the beach environment loses one of its main characteristics, which is high exposure to the sun, which can influence the choice of visitors and impact the revenue of local merchants.

Experts warn that this type of densification compromises the ecological balance of the region. The disorderly growth of verticalization, associated with the shading caused by buildings on the beaches, tends to negatively impact the local economy over time. Beaches, which are essential for leisure and tourism, can suffer from the reduction of direct sunlight on the sand, causing thermal discomfort, a drop in the number of visitors, conflicts in the use of the sand strip, changes in recreational activities and losses to commercial operations (Jesus; Silva, 2023).

In view of this scenario, the present study seeks to analyze the effects of shading caused by the verticalization of buildings in the south zone of Ilhéus, focusing on the economic impacts for beach huts and changes in thermal comfort in the surrounding area. The research intends to provide data and reflections that can support more sustainable and balanced urban planning policies for the region.

1.1 OBJECTIVES

1.1.1 General Objective

To analyze the impacts of shading caused by the verticalization of buildings in the southern zone of Ilhéus, with emphasis on the impacts on the economic activity of beach huts and the thermal comfort conditions of the surrounding region.

1.1.2 Specific Objectives

- Identify the areas of the sand strip impacted by the shading of vertical buildings, considering different times of the day and periods of the year, through mapping, satellite images and field observations.

- Evaluate the perceptions of beach hut owners and workers about the economic impacts resulting from shading, including aspects such as reduced visitor flow, drop in sales, change in busiest times and strategies adopted to mitigate the effects.
- Propose recommendations to minimize the negative impacts of shading on the beach environment, based on the data collected, seeking alternatives that favor urban planning, environmental preservation, maintenance of tourist attractiveness and economic sustainability of local activities.

1.2 JUSTIFICATION

The disorderly growth of coastal cities often ignores the effects of vertical constructions on the environment and the local economy. In the case of the south zone of Ilhéus, the real estate expansion has generated areas of prolonged shade on the beaches, affecting the recreational use, the tourist flow and the profitability of beach huts, which depend on the attractiveness of the sunny environment. In addition, shading also influences the thermal comfort of users, who can look for other more pleasant places.

It is also worth noting that in addition to the problematization of verticalization, it can generate the so-called Heat Islands, which can be one of the consequences.

Heat islands are formed in urban and suburban areas because many common building materials absorb and retain more heat from the sun than natural materials in less urbanized rural areas. There are two main reasons for this warming. The first is that most building materials are waterproof and watertight, and summer. Vegetation usually keeps the temperature equal to or lower than the air temperature, as long as it is properly hydrated. (Gartland, 2008, p.9)

According to (Gartland, 2008) the rise in temperatures in cities is linked to the presence of materials that absorb heat and the way buildings are organized, forming urban "canyons" that make it difficult to cool down at night. In addition, soil waterproofing prevents water evaporation, aggravating heating. Pollution also interferes with the thermal balance by reducing the entry of solar radiation during the day and retaining heat during the night. Therefore, with the growing increase in verticalization, the heat islands in Ilhéus may intensify.

This process of urban expansion, often accelerated and without proper control, has advanced over environmentally sensitive areas, such as permanent protection zones. Intensive land occupation leads to impermeabilization, compromises water resources and requires a reassessment of urban and environmental planning strategies. Given this

scenario, it is essential to consider the conservation of coastal ecosystems as a central part of the debate on urban development, in order to ensure environmental quality and long-term sustainability.

According to (Paula 2016), although the advance of the real estate market continues to accelerate, it shows an imbalance between economic interests and environmental preservation. On the other hand, scholars point out that urban verticalization can bring environmental, social, and economic benefits when it occurs in a planned manner, favoring the concentration of public investments, improving access to infrastructure, and containing expansion over green areas. However, disorderly verticalization leads to overloading of supply systems, increased energy consumption, worsening urban mobility, and intensification of the so-called heat islands — urban areas with temperatures higher than adjacent rural areas (Viva Decora, 2021).

Therefore, understanding these impacts is essential to promote sustainable urban development, balancing the economic, environmental, and social interests of the region.

2 THEORETICAL FRAMEWORK

According to (Krause 2021), Ilhéus, whose location is at latitude 14°47'26"S, has a very intense solar energy potential for photovoltaic energy generation. And this potential is also widely explored on the city's coast for tourism through its large expanse of sand along much of the southern shore.

However, the verticalization of this region has been bringing a discussion about urban, social and economic development due to the increase in shading on the strip of sand on the beach, causing thermal discomfort due to the reduction of solar radiation, which causes a reduction in temperature and bringing losses to the seaside trade.

According to Ramires and Gomes (2020), verticalization has significantly modified the Brazilian urban landscape, especially from the second half of the twentieth century, driven by the intensification of urban land use through the creation of new construction levels, both in inland and coastal cities. The verticalization of coastal areas, although it carries with it an aesthetic and modern appeal that attracts tourists and investors, has generated significant environmental impacts. Among the main problems are the shading of the sand strip in the afternoon, the interference with sea currents — fundamental for urban thermal regulation — and the overload on water and sewage systems. Experts point out that this type of urban densification compromises the ecological balance of the region.

In addition, as pointed out by (De Oliveira, 2015), verticalization in Brazilian cities occurs mainly as a response to the scarcity of space in the most valued and well-structured areas, with residential buildings being the main result of this process. The popularization of apartments reflects changes in the housing pattern, especially among smaller families. However, this vertical expansion, when conducted without planning, accentuates urban problems such as excessive population density, creation of microclimates, increased energy consumption, soil impermeabilization and overload on urban infrastructure systems, according to . In addition to harming the quality of life in the surroundings, it tends to favor sectors linked to real estate speculation, failing to fulfill its social function. Although inevitable in many contexts, vertical growth needs to be regulated to become a tool for democratizing urban space, and not just a profit strategy.

In addition to the loss of solar radiation, verticalization can alter sea currents, which are essential for the thermal regulation of the city. This change directly interferes with the environmental balance of the coastal zone and can aggravate the overload on water and sewage systems. Environmentalists and urban planners consider this model of urban densification worrying, given its potential to compromise the local ecosystem. Despite these impacts, the real estate market continues to expand, increasing the need for more careful and environmentally responsible planning (PAULA, 2016).

3 METHODOLOGY

The methodology of this study will be divided into two complementary approaches: bibliographic research and field research, allowing a broader and more grounded analysis of the impacts of verticalization in the southern zone of Ilhéus, especially with regard to shading on the sand strip of the beaches and its economic and environmental implications.

3.1 LITERATURE RESEARCH

A literature review will be carried out addressing the themes of urban verticalization, impacts of shading in coastal areas, thermal comfort and local economy in tourist areas. Scientific articles, books, dissertations, theses and technical reports related to the theme will be consulted in order to theoretically support the research.

3.2 FIELD RESEARCH

The field research will be carried out in the south zone of Ilhéus, covering the following stages:

- **Shade Mapping:** Use of satellite images and on-site measurements to identify areas of shadow in the sand strip throughout the day.
- **Interviews with Merchants:** Application of questionnaires with owners and beach hut workers to assess the perception of economic impacts.
- **Sensory Analysis of Thermal Comfort:** Interview with people on the southern edge of Ilhéus to question the thermal sensation in shaded and sunny areas.
- **Data Analysis:** The data collected will be organized, analyzed, and interpreted, allowing for an in-depth understanding of the effects of shading in the region.

4 RESULTS AND DISCUSSION

The analysis of the questionnaires applied to the workers of the beach huts revealed a relevant overview of the impacts of the verticalization of the southern shore of Ilhéus. The main results are presented below, organized by theme and expressed in percentages related to the four interviews conducted:

Acting time in the huts

- 100% of the interviewees have been working for more than 6 years in their respective tents, which reinforces the credibility of the perceptions reported, as they are experienced observers of the daily life on the beach.

Customer movement in recent years

- 50% reported an increase in movement;
- 50% indicated a decrease.

This shows a divided perception, possibly associated with the location of the stalls in relation to the vertical buildings.

Influence of tall buildings on the movement

- 75% believe that buildings hinder the movement of customers;
- 25% consider that there is no interference, precisely the hut that has no buildings around it.

Occurrence of shade on the beach in the afternoon

- 75% perceive that the beach is clearly in the shade due to the buildings;

- 25% do not perceive any change, again related to the absence of tall buildings in the vicinity.

Impact of shade on the functioning of huts

- 75% said that the shade of buildings hinders the movement and comfort of customers;
- 25% said there is no interference.

Current thermal sensation compared to the past

- 75% said that the beach is warmer or muggier than before;
- 25% said it remains the same.

Problems with water or sewage

- 100% reported that they eventually face problems, especially with sanitary sewage and energy supply.

Has the construction of buildings brought more people to the beach?

- 75% consider that yes, it brought more people (although this does not necessarily reflect an increase in consumption);
- 25% said there was no difference.

valuation of the impact of buildings on local commerce

- 100% considered that the impact is small or medium, being observed in a subtle but consistent way.

Workers' participation in waterfront decisions

- 100% of the interviewees were never asked to give an opinion on the urban changes underway on the waterfront.

According to the images below, figures 01 and 02, we can see that these data reinforce the perception that verticalization significantly interferes with thermal comfort, environmental quality and economic performance of part of the beach huts, especially those located directly in the shadow cast by the buildings. In addition, the lack of popular participation in the process of urban transformation is evident, which raises concerns about the equity and social function of the coastal space.

Figure 1

Shading on the southern edge of islets



Source: project data, Ilhéus, 2025.

Figure 2

Shading in the commerce of the southern shore of Ilhéus



Source: project data, Ilhéus, 2025.

5 CONCLUSION

The analysis of the data obtained through the questionnaires applied to the workers of the beach huts on the south shore of Ilhéus reveals significant impacts of urban verticalization on the daily life of these spaces. Most of the interviewees, with extensive experience in the area, reported negative effects associated with the presence of tall buildings, such as increased shade on the strip of sand, reduced thermal comfort and decreased movement of customers in certain areas. These factors directly compromise the economic performance of the tents, especially those located under the shadow cast by the buildings. In addition to the

environmental and economic impacts, the study highlights a worrying gap in popular participation: none of the interviewees was invited to give their opinion on the ongoing urban transformations. This exclusion reinforces the need to rethink urban planning processes, incorporating active listening to affected communities and promoting a more democratic and equitable management of coastal space.

This study showed us that the disorderly verticalization in the southern zone of Ilhéus has caused important impacts on the strip of sand on the beaches, especially due to the prolonged shading generated by the tallest buildings. This shade reduces the thermal comfort of visitors and reduces the tourist attractiveness of the region, which depends on the sun and the movement of visitors to maintain themselves.

Although verticalization may attract more residents to the waterfront, the shadow cast by the buildings has caused discomfort and a drop in movement in some tents, which demonstrates the need for more careful urban planning. In addition, a lack of dialogue between the population and public managers was identified. For future research we propose to make a quantitative study of the temperature, humidity, wind speed and solar radiation in these strips of sand by the sea.

6 FINAL CONSIDERATIONS

This work culminated in the curricularization of the extension of the Faculty of Ilhéus, with a presentation using banner, model and oral presentation, in addition to this publication. We came to the conclusion that from an environmental point of view, vertical growth can also aggravate the phenomenon of heat islands, due to the waterproofing of the soil and the configuration of buildings, which reinforces the need to think of solutions that contemplate the environment and the well-being of residents and tourists. Thus, it is recommended that the city's public policies consider limits for the height of buildings near the beach, encourage the preservation of green areas and promote community participation in urban decisions. In this way, it will be possible to seek a balance between economic development, environmental protection and quality of life, ensuring that the south zone of Ilhéus continues to be an attractive and sustainable place for residents, merchants and visitors.

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