



Climate Risk and Urban Valuation: The Case of Tuxtla Gutiérrez, Chiapas, Mexico

Annel Martínez Hernández^{1*} and Isaac Jonatan Cordero Hernández²

¹Faculty of Architecture, Autonomous University of Chiapas, ²Chiapas Committee of Mexican ICOMOS, Tuxtla Gutiérrez, 29050, Mexico

*Corresponding author. E-mail: annel.martinez@unach.mx

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Abstract

Climate change has become a critical challenge for contemporary cities due to its effects on urban infrastructure, territorial dynamics, and environmental sustainability. In recent years, Tuxtla Gutiérrez has experienced an increase in urban vulnerability associated with intense rainfall events, recurrent flooding, and accelerated urban growth processes. These conditions have generated significant impacts on the functionality of urban spaces, residential and commercial activities, as well as on the perception of environmental risk within the city. This study analyses the relationship between climate risk and urban valuation through a descriptive and documentary approach focused on urban resilience and spatial transformation. This study examines how recurrent flooding influences the perception, occupation, and economic valuation of vulnerable urban areas through descriptive, documentary research design on urban spatial transformation. Likewise, the study highlights the importance of integrating environmental criteria, climate adaptation strategies, and territorial resilience approaches into urban planning and land management processes. The findings suggest that climate change is progressively redefining urban spatial dynamics and the socioeconomic perception of the built environment, particularly in cities exposed to hydrometeorological risks. The case of Tuxtla Gutiérrez demonstrates the need to strengthen sustainable urban planning strategies capable of reducing environmental vulnerability and enhancing urban resilience in the face of future climate scenarios.

Keywords: Climate Change, Urban Valuation, Urban Resilience, Flood Risk, Sustainable Urban Planning, Tuxtla Gutiérrez

Introduction

Climate change is one of the greatest challenges currently facing cities due to its effects on the urban environment, infrastructure, and people's quality of life. Over recent decades, there has been an increase in extreme climate events such as intense rainfall and urban flooding. This has demonstrated the vulnerability of many cities as a result of rapid urbanization and insufficient territorial planning. [Unclear] Such events demonstrate the vulnerability of many cities, especially where there has been rapid urbanisation and insufficient urban planning. According to the Intergovernmental Panel on Climate Change (2022), these extreme events are becoming increasingly frequent.

Numerous studies indicate that climate change has a direct impact on urban functionality, public safety, and economic stability. Urban flooding is considered one of the most common risks associated with climate change, particularly in cities characterized by uncontrolled growth and inadequate drainage systems. When cities expand without proper planning, populations tend to settle in vulnerable areas, soil surfaces become increasingly impermeable, and unplanned urban expansion intensifies risks for both residents and properties. According to UN-Habitat (2022), many cities in Latin America remain highly vulnerable due to territorial pressure and the limited integration of environmental criteria into urban planning processes. The city of Tuxtla Gutiérrez has experienced significant urban flooding problems in recent years. These issues are associated with intense rainfall, accelerated urban growth, and increasing pressure on hydraulic infrastructure. Such conditions have caused damage to residential and commercial areas, highlighting the need to strengthen adaptation strategies and sustainable urban planning approaches.

Methods and Materials

This study was conducted to examine the relationship between climate conditions and urban valuation in Tuxtla Gutiérrez. The objective was to understand how urban flooding affects public perception of urban spaces and how it influences the real estate market.

Study Area

The research was carried out in Tuxtla Gutiérrez, the capital city of Chiapas. Located in southeastern Mexico, the city experiences a climate characterized by intense rainy seasons. Rapid urban expansion has altered land-use patterns, increasing the susceptibility of certain areas to flooding. These conditions have generated challenges related to infrastructure, traffic circulation, and land use management.

Urban and Environmental Analysis

The analysis focused on identifying the main factors contributing to the city's vulnerability to flooding, including soil impermeability, settlement in flood-prone areas, and insufficient hydraulic infrastructure. The study also examined how these factors may influence residents' perceptions of safety and quality of life in specific urban sectors.



Figure 1. Flood-prone area map of Tuxtla Gutiérrez.

Note: Prepared by the authors and published in the article *“Impact of Climate Change on Urban Expansion”* (2026).



The study also examines how environmental conditions and previous flooding events may influence the real estate market, particularly regarding public perceptions of property values located in risk-prone areas.

Results

The results obtained indicate that urban flooding represents one of the main factors of environmental vulnerability in Tuxtla Gutiérrez. Several studies have pointed out that accelerated urban growth and disordered land occupation increase the exposure of Latin American cities to extreme hydrometeorological events (IPCC, 2022; Satterthwaite, 2011). In this context, the combination of urban expansion, soil impermeabilization, and deficiencies in hydraulic infrastructure has contributed to the increase in urban impacts associated with recurrent flooding (Maskrey, 2011).

Table 1. Main Urban Factors Associated with Flood Vulnerability in Tuxtla Gutiérrez.

Urban Factor	Environmental Impact	Urban Consequence
Accelerated urban growth	Soil impermeabilization	Increased flood risk
Occupation of vulnerable zones	Exposure to hydrometeorological events	Damage to housing and infrastructure
Deficient drainage systems	Water accumulation	Urban mobility problems
Reduction of green areas	Lower natural infiltration	Environmental vulnerability
Climate change	Intense rainfall events	Recurring urban flooding

Note: Prepared by the author based on IPCC (2022), ONU-Habitat (2022), and UNDRR (2022).

The analysis makes it possible to state that urban areas with recurrent flooding records exhibit higher levels of physical, social, and environmental vulnerability. According to studies on urban resilience and territorial management, stormwater accumulation and the collapse of drainage systems are common problems in cities characterized by unplanned urban growth (UN-Habitat, 2022; Ahern, 2011).

In this context, climate risk is beginning to emerge as a new criterion within contemporary urban valuation processes, particularly in cities exposed to recurrent hydrometeorological phenomena (Vale & Campanella, 2005).

Discussion

The results obtained indicate that climate change has become a determining factor in the transformation of contemporary urban dynamics. Urban flooding not only represents a threat to infrastructure and public safety, but also generates changes in the social and economic perception of urban territory (IPCC, 2022). In this regard, the case of Tuxtla Gutiérrez demonstrates how environmental vulnerability is beginning to directly influence processes of occupation, habitability, and real estate valuation.



Urban Perception and Real Estate Dynamics

One of the most relevant aspects identified in this study is the influence of climate risk perception on urban real estate dynamics. The perception of insecurity associated with flooding can alter the residential and commercial attractiveness of certain urban areas, indirectly affecting real estate demand and investment processes (Leichenko, 2011).

Likewise, the recurrent impacts derived from extreme climate events generate transformation in the way residents perceive the quality and functionality of urban spaces. These conditions demonstrate that real estate value no longer depends solely on traditional physical or economic factors, but also on environmental and territorial variables associated with climate risk (Vale & Campanella, 2005).

Sustainable Urban Planning

This study demonstrates the need to strengthen urban planning strategies oriented toward sustainable and resilient development models. International organizations have emphasized that the integration of environmental criteria into territorial management is essential to reduce urban vulnerability to climate change (United Nations, 2023).

In this context, it is necessary to promote urban policies that consider appropriate land management, the protection of natural areas, the strengthening of hydraulic infrastructure, and the incorporation of urban resilience criteria into territorial planning and valuation processes (Organisation for Economic Co-operation and Development, 2010).

Conclusion

This study made it possible to understand that urban flooding associated with climate change no longer represents solely an environmental problem, but also a factor that directly influences the urban and economic dynamics of Tuxtla Gutiérrez. The increasing vulnerability of certain areas affects not only the functioning of the city, but also the way people perceive these spaces and the economic value they acquire within the urban context.

The findings show that climate risk is beginning to consolidate as an important variable within contemporary urban valuation processes. Recurrent impacts, the perception of insecurity, and the constant exposure to extreme hydrometeorological events are starting to influence decisions related to land occupation, urban growth, and real estate development in the most vulnerable sectors.

Likewise, this study highlights the need to incorporate climate adaptation and urban resilience strategies into territorial planning policies. Integrating environmental criteria into urban development processes can contribute not only to reducing vulnerability, but also to building more sustainable cities that are better prepared for future climate scenarios.



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