ISSN 1728-5445

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ECLAC SUBREGIONAL HEADQUARTERS FOR THE CARIBBEAN

# An assessment of urban expansion in Caribbean small island developing States

## The cases of Jamaica and Trinidad and Tobago

Jônatas de Paula
Tarick Hosein

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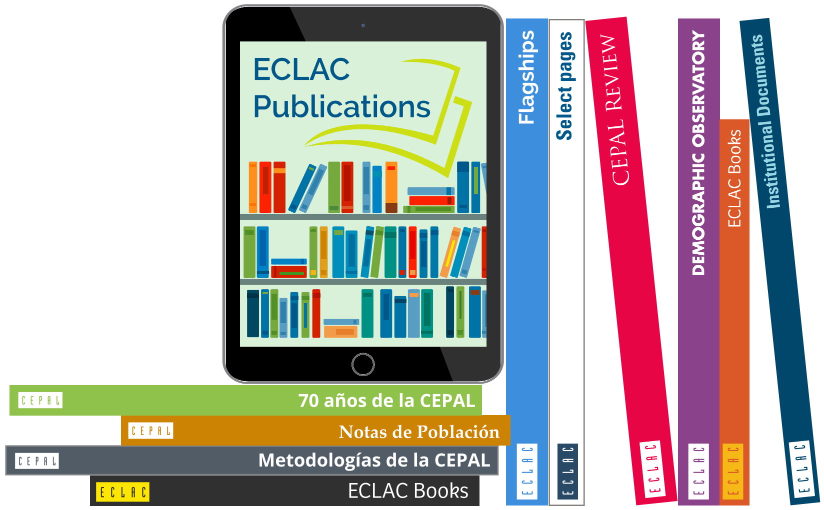


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This document was prepared by Jônatas de Paula, Associate Environmental Affairs Officer in the Sustainable Development and Disaster Unit of the Economic Commission for Latin America and the Caribbean (ECLAC) subregional headquarters for the Caribbean, and Tarick Hosein, consultant on geospatial data and analysis with the Unit, with the assistance of Esther Chong Ling, Programme Management Assistant, and other staff members of the same Unit.

The document was prepared with input from the following external reviewers: Lajoy Edghill, Ministry of Economic Growth and Job Creation of Jamaica; Luis Felipe Carvalho Lopes, ECLAC subregional headquarters in Mexico; and Ryan Darmanie, Darmanie Planning + Design. Special thanks are owed to Edwin Kochulem, Spatial Data Analyst, and Dennis Mwaniki, Spatial Data Expert, both of the Data and Analytics Unit of the United Nations Human Settlements Programme (UN-Habitat), for the data provided on Sustainable Development Goal (SDG) indicator 11.3.1 and related secondary indicators, and for their guidance and review of the implementation of the methodologies used in this study.



United Nations publication
ISSN: 1728-5445 (electronic version)
ISSN: 1727-9917 (print version)
LC/TS.2024/20
LC/CAR/TS.2024/3
Distribution: L

Printed at United Nations, Santiago
S.2301239[E]

This publication should be cited as: J. de Paula and T. Hosein, “An assessment of urban expansion in Caribbean small island developing States: the cases of Jamaica and Trinidad and Tobago”, *Studies and Perspectives series-ECLAC Subregional Headquarters for the Caribbean*, No. 126 (LC/TS.2024/20-LC/CAR/TS.2024/3), Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024.

# Abbreviations

| | |
|---|---|
| CARICOM | Caribbean Community |
| CIESIN | Center for International Earth Science Information Network |
| CUB | Cuba |
| DEGURBA | Degree of Urbanization |
| DOM | Dominican Republic |
| DUC | Dense Urban Cluster |
| GHSL | Global Human Settlement Layer |
| GoJ | Government of Jamaica |
| GoT&T | Government of Trinidad and Tobago |
| HTI | Haiti |
| JAM | Jamaica |
| LCR | Land consumption rate |
| LS | Land subsidence |
| LUE | Land use efficiency |
| OECD | Organisation for Economic Co-operation and Development |
| PGR | Population growth rate |
| SDG | Sustainable Development Goals |
| SIDS | Small island developing States |
| SSP | Shared socioeconomic pathways |
| TTO | Trinidad and Tobago |
| UC | Urban Centre |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UN-Habitat | United Nations Programme for Human Settlements |

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# Abstract

The disproportionate increase in urbanized areas in relation to populations resulting in the spread of low-density urban settlements is recognized as a sustainable development challenge globally, including in Caribbean SIDS. This phenomenon has numerous adverse effects on urban settlements' capacity to adapt to the impacts of climate change, such as the increased vulnerability of critical infrastructure to climate disasters; the formation of informal settlements in risk-prone areas; an increase in impervious surfaces affecting floods' spatial patterns and increasing related risks; and the destruction of ecosystems affecting natural services critical to climate change adaption. Cognisant of these challenges, the 2030 Agenda proposed the Sustainable Development Goal (SDG) indicator 11.3.1 —ratio of land consumption rate to population growth rate— as a global methodology to measure this phenomenon. This study utilizes this and other secondary indicators to measure urban expansion in Jamaica and Trinidad and Tobago between 2000 and 2020, and to compare urban densities with other regions and Caribbean SIDS. The study concludes that the Urban Centres in these two countries have been expanding their built-up surfaces at a faster rate than the growth of their respective populations. In addition, the built-up area per capita in these countries' urban settlements is significantly higher than in other selected Caribbean SIDS. The study concludes by suggesting critical implications of these findings for public policy in several sectors, and proposes additional questions for future research.

# Introduction

In 2018, around 70% of the Caribbean[1] population lived in urban areas, an indicator projected to reach 82.5% in 2050 (United Nations, 2018). Caribbean urban settlements[2] concentrate not only people, housing, and other critical infrastructure, but also vital economic sectors —such as commercial centres, tourism-related services, transportation hubs, government offices, and manufacturing enterprises— as well as employment opportunities, and public services. Given the demographic and economic relevance of Caribbean urban settlements, the challenges they face in the context of climate change need to be at the forefront of adaptation efforts.

One of these challenges is a disproportionate increase in urbanized areas in relation to their resepctive populations, leading to the spread of low-density urban settlements (ECLAC, 2017; McHardy and Donovan, 2017; Mycoo and Donovan, 2017; UN-Habitat, 2015). This phenomenon has numerous adverse effects on climate change adaptation. Firstly, it reduces the economic and operational efficiency of crucial infrastructure —roads, potable water distribution systems, sanitation, telecommunication, and power distribution, among others— and increases exposure to adverse events, leading to higher reconstruction and maintenance costs. Secondly, unplanned fast urban expansion can lead to the formation of informal settlements in high-risk areas, increasing the exposure of populations excluded from formal housing markets to natural hazards. Thirdly, fast urban development leading to an increase in impervious surfaces in previously natural areas negatively impacts water filtering and runoff-regulating functions, affecting aquifers and groundwater recharge, while potentially affecting spatial flood patterns, increasing flood risks at both local and city levels. Finally, uncontrolled urban

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1 Indicator "annual percentage of population residing in urban areas" of the subregion comprising the following countries and territories: Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, British Virgin Islands, Caribbean Netherlands, Cayman Islands, Cuba, Curaçao, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique, Montserrat, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Sint Maarten (Dutch part), Trinidad and Tobago, Turks and Caicos Islands, United States Virgin Islands. Section I.B. discusses a few of the complexities, gaps, and limits of the official definitions of urban population in the subregion.

2 The term urban settlements will be used throughout this study. It refers to any urbanized areas, including cities, towns, and villages. For more information on the diversity of types of urban and rural settlements, see box 1. The term Urban Centre will be reserved to address the areas identified as such according to the Degree of Urbanization (DEGURBA) methodology presented in Section II.

expansion often destroys important ecosystems such as mangroves, riverine floodplains, and forest coverage in mountainous areas, the natural services from which are essential for climate adaptation.

This phenomenon is acknowledged as a sustainable development challenge by national policies. Trinidad and Tobago's National Spatial Development Strategy states that "urban development has been rapid, extensive and very land-consuming in recent decades, causing loss of productive land, inefficient patterns of settlement, travel, service delivery, and infrastructure provision. A more sustainable approach is required, including more efficient urban forms and better urban design" (GoT&T, 2013). Jamaica's National Development Plan acknowledges that "poor spatial planning in the past has resulted in various problems as is evidenced by rundown town centres, urban sprawl, environmental degradation, unsafe and dilapidated housing, planned and unplanned development in ecologically-sensitive areas, crime and disorder, rural-urban migration, and poverty" (GoJ, 2013).

Recognizing that the uncontrolled expansion of urban settlements has become a major global sustainable development challenge, the 2030 Agenda has a dedicated indicator to measure the phenomenon: Sustainable Development Goal (SDG) indicator 11.3.1 —ratio of land consumption rate to population growth rate— also known as land use efficiency.

This study utilizes the SDG methodology of calculating land use efficiency and other secondary indicators to measure urban expansion in Jamaica and Trinidad and Tobago between 2000 and 2020. It also compares indicators of urban built-up density calculated for the case countries with global and regional averages and with other Caribbean SIDS. This approach therefore examines the relative density of the urban centres in these two countries with others in different regions and globally. While the study does not investigate the causes of urban expansion, it recognises this as a key topic for future research.

This paper is structured as follows:

- Section I explores urbanization trends globally and within Caribbean SIDS and the particular challenges of the subregion's urban settlements successfully adapting in the context of climate change;
- Section II summarizes the main methodologies employed to identify urban centres and assess urban expansion in the selected case studies;
- Section III presents the main findings and analyses of the geospatial data for the selected case studies;
- Section IV compares data produced by this study with international benchmarks of urban density, providing a comparative perspective of the phenomenon of urban expansion across Caribbean SIDS and other regions; and
- Section V presents the policy implications derived from the study's main findings and explores topics for future research to address questions raised by the present research.

# I. Caribbean small island developing States urbanization and challenges in the context of climate change

## A. Global and Caribbean small island developing States' urbanization trends

"The struggle for global sustainability will be won or lost in cities."[3] This idea became a motto among development agencies, national and local governments, civil society groups, and communities once the milestone of more than half of the world's population living in urban areas was reached around 2015. In the Caribbean subregion, this demographic threshold had already been reached in 1975. Urbanization and the slow decline of the share of rural and agricultural activities to national gross domestic products have been underlying characteristics of the subregion's development for decades, reflecting similar demographic and economic trends occurring globally.

Much attention has been given to the economic growth and the social and environmental challenges faced by large urban settlements where more than ten million inhabitants live.[4] However, the reality of an increasingly urbanizing world is that a large share of urban dwellers live, and will continue to do so, in small and middle-sized settlements in most developed and developing countries, with varying degrees of connections to rural areas. The 2018 Revision of the World Urbanization Prospects (United Nations, 2018) estimated that in 2020, 41% of the global urban population lived in urban settlements with fewer than 300,000 inhabitants. Apart from North America and Oceania, settlements of this size class are the most populous in most regions and across all income country classifications. These figures indicate a reality not far removed from that of Caribbean SIDS, where 59%

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3 This and similar statements have been repeated by United Nations officials and other actors since Secretary General Banki Ban Ki-moon's delivered those remarks to the High-level Delegation of Mayors and Regional Authorities, in New York, 23 April 2012. Source: https://press.un.org/en/2012/sgsm14249.doc.htm.

4 Often referred to as "megacities", 33 urban settlements with a population above this threshold were identified in 2018 (United Nations, 2018).

of the urban population live in settlements with fewer than 300,000 inhabitants.[5] The prominence of megacities is not an urban paradigm in the Caribbean or many other parts of the world. Small and middle-sized cities, towns, and villages are at the frontline of the battle for sustainable urban development as much as large world megacities.

Notwithstanding an urban majority at the subregional level, the percentages of the urban population calculated varied significantly across Caribbean SIDS in 2018. For example, The Bahamas reached a percentage of urban population of 83%, while Saint Lucia had 18.7% (see table 1). Most countries are projected to experience incremental increases in percentages of their urban populations until 2050, resulting in a subregion that will become increasingly urbanized.

**Table 1**
**Percentage of urban population in 2018 and projected average annual rate of change of the percentage of the urban population in the Caribbean until 2050**

| Country | Percentage of urban population | Projected average annual rate of change of the percentage of the urban population | | | | | |
|---|---|---|---|---|---|---|---|
| | 2018 | 2020–2025 | 2025–2030 | 2030–2035 | 2035–2040 | 2040–2045 | 2045–2050 |
| Anguilla | 100.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Antigua and Barbuda | 24.6 | - 0.06 | 0.35 | 0.74 | 1.12 | 1.32 | 1.28 |
| Aruba | 43.4 | 0.46 | 0.63 | 0.79 | 0.89 | 0.86 | 0.82 |
| Bahamas | 83.0 | 0.16 | 0.19 | 0.22 | 0.23 | 0.21 | 0.20 |
| Barbados | 31.1 | 0.32 | 0.67 | 1.00 | 1.17 | 1.13 | 1.09 |
| Belize | 45.7 | 2.30 | 2.23 | 2.17 | 2.04 | 1.85 | 1.68 |
| Bermuda | 100.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| British Virgin Islands | 47.7 | 0.84 | 0.85 | 0.81 | 0.77 | 0.73 | 0.70 |
| Caribbean Netherlands | 74.9 | 0.16 | 0.23 | 0.29 | 0.34 | 0.34 | 0.32 |
| Cayman Islands | 100.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cuba | 77.0 | 0.16 | 0.23 | 0.29 | 0.34 | 0.36 | 0.33 |
| Curaçao | 89.1 | 0.00 | 0.06 | 0.12 | 0.16 | 0.15 | 0.14 |
| Dominica | 70.5 | 0.43 | 0.42 | 0.41 | 0.39 | 0.37 | 0.35 |
| Dominican Republic | 81.1 | 0.71 | 0.51 | 0.37 | 0.26 | 0.18 | 0.15 |
| Grenada | 36.3 | 0.52 | 0.72 | 0.91 | 1.03 | 1.00 | 0.96 |
| Guadeloupe | 98.5 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| Guyana | 26.6 | 1.01 | 1.12 | 1.20 | 1.24 | 1.13 | 0.97 |
| Haiti | 55.3 | 1.41 | 1.16 | 0.94 | 0.74 | 0.62 | 0.57 |
| Jamaica | 55.7 | 0.65 | 0.74 | 0.80 | 0.82 | 0.76 | 0.70 |
| Martinique | 89.0 | 0.08 | 0.13 | 0.15 | 0.14 | 0.13 | 0.12 |
| Montserrat | 9.1 | 0.58 | 0.98 | 1.38 | 1.66 | 1.66 | 1.64 |
| Puerto Rico | 93.6 | 0.03 | 0.06 | 0.09 | 0.10 | 0.09 | 0.08 |
| Saint Kitts and Nevis | 30.8 | 0.34 | 0.66 | 0.96 | 1.17 | 1.14 | 1.10 |
| Saint Lucia | 18.7 | 0.64 | 0.92 | 1.19 | 1.40 | 1.41 | 1.38 |
| Saint Vincent and the Grenadines | 52.2 | 0.78 | 0.76 | 0.73 | 0.69 | 0.65 | 0.62 |
| Sint Maarten (Dutch part) | 100.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Suriname | 66.1 | 0.88 | 0.86 | 0.83 | 0.79 | 0.67 | 0.53 |
| Trinidad and Tobago | 53.2 | 0.19 | 0.40 | 0.60 | 0.73 | 0.70 | 0.67 |

5 Only four cities in the subregion are listed among those with a population over 1 million inhabitants: Havana (Cuba), Santo Domingo (Dominican Republic), Port-au-Prince (Haiti) and San Juan (Puerto Rico) (United Nations, 2018).

| Country | Percentage of urban population | Projected average annual rate of change of the percentage of the urban population | | | | | |
|---|---|---|---|---|---|---|---|
| | 2018 | 2020–2025 | 2025–2030 | 2030–2035 | 2035–2040 | 2040–2045 | 2045–2050 |
| Turks and Caicos Islands | 93.1 | 0.21 | 0.15 | 0.10 | 0.07 | 0.06 | 0.06 |
| United States Virgin Islands | 95.7 | 0.10 | 0.07 | 0.06 | 0.05 | 0.04 | 0.04 |

Source: United Nations, 2018.

This wide diversity in urbanization rates officially reported in the subregion provokes the question: what is urban? There is no universal answer, as each country may adopt a national definition (see box 1). In the Caribbean, a diversity of definitions is employed in different national contexts as depicted in annex 1, indicating that it is challenging to uniformly describe the urbanization process in the subregion.

**Box 1**
**What is urban? A continuum of geographies**

The definition of a city or urban may vary depending on different perspectives, even within a country. Administrative definitions, such as those that determine municipal or city boundaries, often do not coincide with a country's statistical definitions. Across borders and from a statistical perspective, a definition may be determined by National Statistical Offices, by which specific standards are set at a national level. When these are available, elements such as settlements' population size, density thresholds, the predominance of non-agricultural economic activities, provision of certain services and infrastructures, or a combination of these measures are often utilized to determine urban and rural areas. According to the United Nations Population Prospects, 103 countries use a minimum population size threshold to define their urban areas, and those thresholds vary considerably, ranging from a few hundred inhabitants to 100,000 inhabitants.

Urbanization is not a linear and uniform process across the globe. This calls attention to the vast diversity of urban settlements and the intricacies of interconnections across settlements and geographies at various scales. The dynamics driving the expansion of urban areas and the impacts of the transformation of economic value chains over geographies worldwide have gradually taken a central role in the design of development and environment policies. This includes considerations over how economic activities influence the built environment across the full spectrum of human settlements, including metropolitan areas, secondary cities, towns, villages, and the linkages of those areas with rural areas.

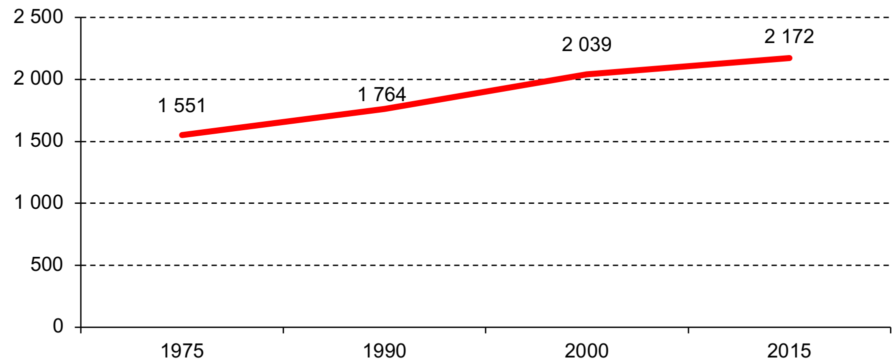
This understanding gave emergence to perspectives that depart from a polarized dual approach to territories. Sorokin and Zimmerman (1929) introduced the concept of an urban-rural continuum, suggesting the adoption of a spatial gradient —whereby certain spatial configurations share both urban and rural characteristics at the same time— allowing for a more nuanced understanding of geographical dynamics. From a planning perspective, the concept of urban-rural linkages (URLs) emphasizes the need for an integrated people and place-based policy approach to promote spatial development in consideration of geographies' interdependence and connections through flows of people, goods, financial and environmental services (UN-Habitat, 2021). The SIDS Accelerated Modalities of Action (SAMOA) Pathway also mentions the concept of URLs. OECD's (2020) functional areas acknowledge that those spatial connections, forged particularly by means of integration of labour markets, require that statistical production traditionally based on administrative units evolve to capture territories' functionalities, aiming to better inform territorial development policies. This concept is beneficial for promoting regional development policies beyond traditional urban-only development approaches. The emerging debate over new ruralities seeks to overcome the urban-rural duality by disassociating rural areas from the idea that they are simply the remnant of the urbanization process (Gaudin, 2019). While the loss of population and economic prominence of rural areas is acknowledged, the increasing growth of non-agricultural economic activities and the transformation of the agriculture sector have led to new dynamics in rural areas, creating more social and economic dynamism, diversity, and territorial integration.

The concepts of urban and rural can be fluid and contextual. The appreciation of the nature and patterns of flows, connections, and functionalities across geographies and the emergence of new settlement forms have become increasingly important to planning and sustainable development policies.

Source: Author's compilation.

Despite the statistical challenges of measuring, comparing, and projecting increasing urbanization rates in the subregion, there is indeed confirmed a progressive expansion of built-up areas in the subregion. This phenomenon can be associated with increasing levels of urbanization, as shown by evidence made available through the application of innovative methodologies and technologies that collect and process geospatial information. Data collected from the Global Human Settlement Layer (GHSL)[6] online platform for the period of 1975 to 2015 show an increase of 40% in the built-up area of urban clusters in Caribbean SIDS, as indicated in figure 1. This increase represents an expansion of 621.3 km² during the above period —an area larger than the island of Saint Lucia.

**Figure 1**
**Built-up area in Caribbean small island developing States urban clusters between 1975 and 2015**
*(Km²)*




Source: Author's compilation analysis of data from country fact sheets of the Global Human Settlement Layer (European Commission, 2023).
Note: The analysis included all independent countries and overseas territories in the Caribbean, except for the French overseas territories of Guadeloupe and Martinique, which did not have country profiles in the GHSL platform.

Angel et al. (2010) suggest that 15 CARICOM member states will increase their urbanized areas by two to five times before 2050, converting an area between 1,200 and 5,100 km² to urban uses. In Trinidad and Tobago alone, the authors predict an increase in urban areas up to seven times before 2050. McHardy and Donovan (2016) describe the pattern of urban development in the subregion by suggesting the development of region-cities and urban corridors, covering large portions of national territories, and connecting urban settlements with varying degrees of urbanization and densities. Census data indicate that secondary cities and peri-urban areas adjacent to established urban settlements have grown faster than established main urban centres in Barbados, Jamaica, Guyana, Trinidad and Tobago, and Suriname. In some cases, these established centres have even experienced a population decline (McHardy and Donovan, 2016). This points to a reduction in residential use in inner-city centres and the expansion of suburbs, which may not provide adequate urban infrastructure, such as public transportation, potable water supply, drainage systems, and sanitation services.

The uniqueness of Caribbean SIDS' challenges stemming from the inherent geographic characteristics of small islands and low-lying coastal states adds pressure to the process of allocation of land to urban and non-urban areas. Competing demands for non-urbanized land in coastal or

[6] The Global Human Settlement Layer (GHSL) is an open and free data platform that has implemented the methodology DEGURBA (Degree of Urbanization) at a global level. In figure 1, urban clusters refer to the sum of three different types of settlements classified by the GHSL platform following the Degree of Urbanization (DEGURBA) methodology: urban centre, dense urban cluster, and semi-dense urban cluster. For more on the DEGURBA methodology, see Section II.B.

non-coastal zones have increased as the population grows, new households are formed[7] and new urban development occurs. As a result, formal real-estate markets reflect the land scarcity by increasing housing and land prices, fuelling informal markets, and adding pressure to environmentally sensitive areas. In tourism-oriented economies, there will be an increasing dilemma in allocating land to socially strategic uses —such as housing and basic urban infrastructure— other economic productive activities, and the tourism industry, particularly in coastal zones.

## B. Urbanization and the challenges of climate adaptation in Caribbean small island developing States

Significant portions of the territories of Caribbean SIDS are already occupied by urban or quasi-urban[8] settlements. As a result, land is an increasingly limited resource and a key asset in adaption strategies for a climate change. Taking the examples of the case studies assessed by this study, urban and quasi-urban settlements already occupy 9% of the national territory of Jamaica and 15% in Trinidad and Tobago. In countries possessing large land masses in the Latin American region, these figures are minute: 0.54% in Brazil, 0.45% in Colombia, and 0.42% in Argentina (CIESIN, 2021). In addition to that, over 4 million Caribbean people, almost 10% of the population in the subregion, live in urban or quasi-urban areas up to 10 meters above sea level (CIESIN, 2021), which will be increasingly under pressure as sea levels rise due to the impacts of climate change (see figure 2). The concentration of a significant proportion of the population and infrastructure along a narrow coastal belt, the increasing need to build adaptation infrastructure that may require additional space, and rising sea levels creates a "coastal squeeze", as characterized by Mycoo and Donovan, 2017. This coastal squeeze is creating more constraining conditions for the development of resilient infrastructure.

An additional challenge to urbanization in coastal areas was shown by data assessed by Wu et al. (2022) from 99 cities worldwide. Soil or land subsidence[9] in urban coastal areas is causing cities to sink faster than the sea rises, resulting in more severe flooding events sooner than expected. In the two Caribbean cities assessed, soil subsidence rates are almost 2.5 to five times faster than the mean sea level rise: 8.98 mm per year in Santo Domingo (Dominican Republic) and 9.94 mm per year in San Juan (Puerto Rico).

Mycoo et al (2020) explore climate adaptation strategies which have been attempted by SIDS. Some of them seek to change the built and natural environments, therefore being directly or indirectly related to land use managed:

- Accommodation: adapting specific infrastructure to avoid the impacts of floods, e.g. raising of dwellings and construction of coastal roads above ground level;

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7 The formation of new households can also be a driver of demand of urbanized land. As a result of changing demographic dynamics, the number of private households has grown more significantly in the last intercensal period than the population in Trinidad and Tobago and Jamaica (GoJ, 2012; GoT&T, 2012).

8 Acknowledging the existence of an urban–rural continuum, this category helps classify areas that do not explicitly have inherently urban or rural characteristics. More information on the methodology applied to characterize the quasi-urban category can be found in the original paper by MacManus et al (2021).

9 UNESCO Land Subsidence International Initiative describes Land Subsidence (LS) as "the loss of land elevation is a major problem that threatens viability and sustainable economic development for many millions of people throughout the world, especially, but not restricted to coastal and highly urbanized areas." (UNESCO, 2023). Soil subsidence can be defined as the gradual or sudden sinking of surface land due to underground material movement. This process may be caused by several factors and varies from place to place. Therefore, it can be difficult to establish direct correlations, as described by Wu et al. Some of the factors described by the authors that could occur in the Caribbean SIDS are tectonic movement, sediment settling, and aquifer-system compaction —which can be aggravated by groundwater extraction in the context of fast urbanization and population growth— and new building loads.

- Hard engineering protection: construction of seawalls and breakwater structures and coastal protection units to protect communities and infrastructure placed along coastal areas;
- Advance: creation of new land by filling developments, reclaiming land from the ocean and other water bodies;
- Migration: planned resettlement of communities, both within national and over international boundaries, to respond or prepare for sea level rise;
- Ecosystem-based measures and other nature-based solutions: restoration and conservation of marine, coastal and in-land ecosystems, including the development of climate-smart development plans, to reduce the impacts of climate change on communities and the built environment.

While adaptation measures and strategies applied to existing infrastructure and human settlements are essential, they will be deployed in highly dynamic circumstances where built environments may be constantly changing. The identification, assessment, and reversal of current trends and policies that may be inadvertently contributing to infrastructure and human settlements' vulnerabilities to climate-related hazards is as urgent as the need to adapt them. The fast expansion of low-density urban areas is one of these detrimental trends. Low urban density can be defined as a characteristic of certain settlements in which relatively low-populated urbanized or built-up areas physically spread over large territories. This is directly connected with the indicator built-up area per capita, which will be presented in the subsequent sections.

Considering the adverse social, economic, and environmental effects of urban development that lead to low-density settlements, particularly in the context of the impacts of climate change and scarcity of land in Caribbean SIDS, it is critical to assess and quantity this phenomenon.

# II. Study methodology

## A. Indicator 11.3.1 of 2030 Agenda

This study adopted the methodology of SDG indicator 11.3.1 as the main framework to assess urban expansion.[10] This indicator is known as "ratio of land consumption rate to population growth rate" and can also be referred to as land use efficiency (LUE). It is calculated at the urban settlement[11] level as the ratio of two other secondary indicators: land consumption rate (LCR) and population growth rate (PGR). The main goal of LUE is to indicate whether an urban settlement's built-up area —or land consumption— is growing at a faster rate than its population, which could result in loss of population density per km² and overconsumption of land from other uses, such as farmland and natural habitats. The equation to calculate this indicator is expressed as:

$$\text{Land use efficiency (LUE)} = \frac{\text{Land consumption rate (LCR)}}{\text{Population growth rate (PGR)}}$$

A rationale for interpreting the values of this indicator is described below:

- LUE = 1: changes (if at all) in built-up area and population within the urban settlement boundaries are happening at the same pace over time.
- LUE > 1: the urban settlement's built-up area is growing faster than its population, potentially leading to a sprawling pattern of urban growth.

[10] The metadata containing the detailed explanation on the calculation of this indicator and other secondary indicators can be accessed here via this link: https://unstats.un.org/sdgs/metadata/files/Metadata-11-03-01.pdf.

[11] The methodology to determine the definition, boundaries, and classification of different types of urban settlements will be the subject of the next subsection.

- LUE < 1: the population inside the urban settlement has grown faster than its built-up area, suggesting that the urban settlement has become more compact.

While LUE is the main indicator used to assess urban expansion and is helpful in setting a baseline for monitoring purposes over a long period, it only offers a glimpse of a frame of a moving picture, thereby requiring additional context and data to be correctly interpreted. Urban settlements with a very compact urban form with a LUE value above one for a short period may not necessarily be growing in a sprawling pattern. On the other hand, urban settlements with very low-density that perform below one for a short period should aim to continue that path consistently over a more extended period in order to achieve more sustainable urban densities.

To support the appropriate interpretation of LUE of a given urban settlement, the calculation of a secondary indicator is recommended, namely built-up area per capita. The greater the value of built-up area per capita, the more built-up area one person occupies in that settlement; therefore, the less densely populated that area is. On the other hand, low values of built-up area per capita indicate a more compact urban form, consisting of a relatively smaller and more densely populated urbanized area. Considering that the analysis based on the indicator LUE developed in Section III covers only the periods of 2000 to 2010 and 2010 to 2020 —a short time to assess long-term changes of urban form— the indicator built-up area per capita will be utilized to compare urban densities across urban settlements within a country. Section IV will extend that comparative exercise to urban settlements in other SIDS, including global and regional built-up area per capita averages.

## B. The Degree of Urbanization (DEGURBA)

The indicators presented previously are all calculated at the level of the urban settlement. As discussed in Section I and illustrated in Annex I, there are substantial differences across countries on the criteria for classifying urban areas. Therefore, a harmonized methodological approach to delimit and classify urban settlements is required to calculate comparable indicators across settlements and countries. The Degree of Urbanization (DEGURBA) is a methodology that aims to create a globally comparable definition and classification of urban settlements utilizing a combination of built-up area and population density thresholds. The DEGURBA methodology is not intended to replace national definitions of urban and rural areas but to complement them by allowing analysis across national borders. A manual dedicated to its application was produced by OECD et al. in 2021[12] and was utilized in this study.

The methodology is operationalized by creating a population grid of 1 $km^2$ cells as the smallest population units. The benefit of using such a grid is that it downscales census population data, often produced at enumeration units that vary in shape and size. Figure 2 shows how census enumeration units (left image) with a large area can mask population concentrations that are only noticeable in a population grid where the population units are constant across the territory (right image).

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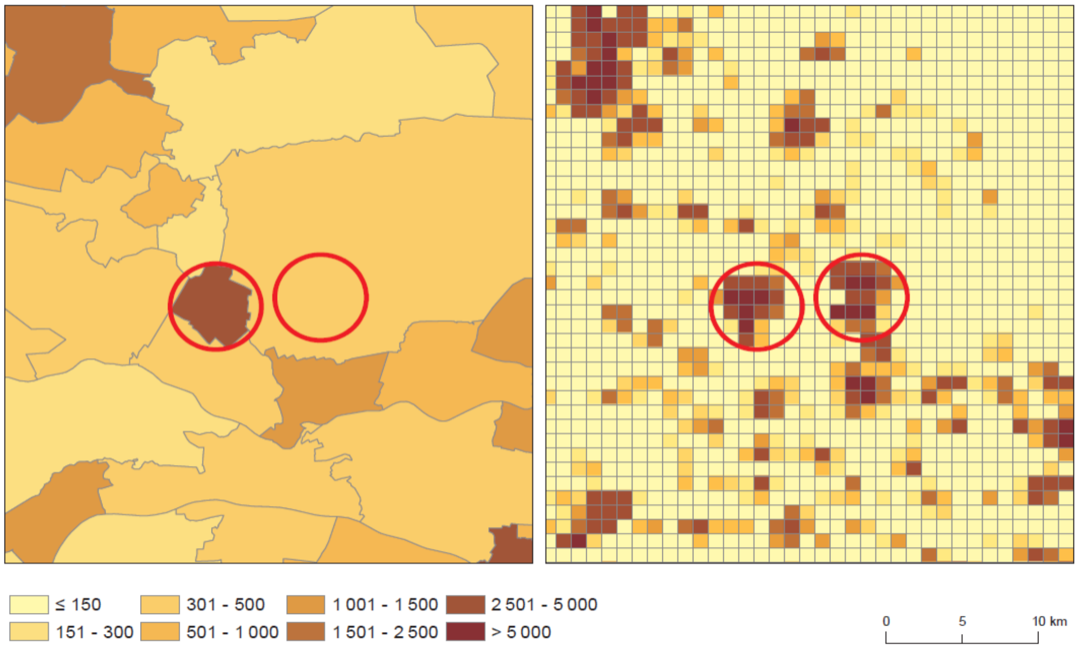
[12] A link to the publication can be accessed via this link: https://ec.europa.eu/eurostat/documents/3859598/15348338/KS-02-20-499-EN-N.pdf/0d412b58-046f-750b-0f48-7134f1a3a4c2?t=1669111363941.

**Figure 2**
**Representation of population densities utilizing census enumeration units (left) and a population grid (right)**
*(Inhabitants per km²)*




Source: OECD and others (2021).

Several approaches can be used to produce the population grid. For the present study, population data contained in georeferenced census enumeration units were projected onto satellite images utilizing geospatial data analysis and processing software and online tools. The population data was then distributed across 1 km² cells matching the built-up surfaces identified in these satellite images. The rationale behind this operation is the assumption that built-up areas concentrate population instead of natural habitats or farmland.

The next operation for implementing DEGURBA is identifying and classifying cells according to multi-variate criteria of population and built-up densities that may create clusters of cells with similar characteristics. When cells are clustered according to these and additional contiguity criteria, they can be classified as (i) Urban Centres, (ii) Dense Urban Clusters, (iii) Semi-dense Urban Clusters, and (iv) Rural Clusters.

The subsequent sections develop a detailed historical spatial analysis primarily focusing on Urban Centres (UCs) in each case study. UCs are the highest-density clusters, with a density of at least 1,500 inhabitants per km² and a minimum cluster population of 50,000 inhabitants. The approach of giving primary focus to UCs is due to their demographic prominence in these two countries. In addition, the high number of settlements classified under other types of clusters would not allow for a detailed spatial analysis in the scope of this study. Nonetheless, on the occasions where Dense Urban Clusters (DUCs) are situated near a UC, they will also be mentioned with the purpose of enriching the analysis of the relevant UCs. DUCs have a density of at least 1,500 inhabitants per km² and a settlement population between 5,000 and 50,000 inhabitants. As indicated before, other criteria are also applied to determine and classify urban clusters. The description of all the criteria utilized to determine a UC and a DUC can be accessed in detail in OECD et al. 2021.

## C. Data sources and population projections for 2020

The study has utilized official population data from the last two censuses from each case study: 2001 and 2011 for Jamaica and 2000 and 2011 for Trinidad and Tobago. As prescribed by the SDG indicator 11.3.1 metadata, built-up area data was extracted from historical satellite imagery dating from the same years of the censuses to calculate the LUE indicator for each of these specific years.

Neither country had finalized the 2020 round of the official census as of this study's finalization date. Therefore, a predictive population model for 2020 was developed. This model produced a 2020 population projection at the level of the census enumeration unit, which allowed the creation of a 2020 population grid. To accomplish that projection, three main data sources were utilized: (i) a population growth estimate at the national level,[13] (ii) the count of building structures retrieved from Google Building Footprints, and (iii) the average number of persons per household obtained from the 2011 census reports of each country. The last two data sources were required because applying equally a growth rate derived from the national population projection across all the enumeration units would not yield a realistic reflection of local population growth dynamics. This operation would denote an assumption that population growth was homogenous across the national territory. To successfully estimate the population at the level of each census enumeration unit, the average number of persons per household was multiplied by the count of building structures. This operation resulted in a realistic projection for residential areas, but it overestimated the population in non-residential areas. To achieve a realistic distribution of the population growth in these areas, a careful analysis of satellite imagery was employed to calibrate the multiplier used to allocate the population to the various census enumeration units. This calibration was carried out until the allocation of population in the various census enumeration units reached the total population growth estimated at the national level.

[13] For Trinidad and Tobago, this projection was calculated using figures from the United Nations World Population Projection, 2018 Revision. In the case of Jamaica, a projection was provided to ECLAC by the Statistical Institute of Jamaica.

# III. An assessment of urban expansion in Caribbean small island developing States – case studies

## A. Jamaica

### 1. National context

As indicated by Jamaica's last Population and Housing Census, the country had a population of 2,697,983 inhabitant in 2011. The country has an official criterion for classifying urban areas as places with a minimum population of 2,000 inhabitants that provide "amenities and facilities which in Jamaica indicate modern living" (GoJ, 2012). According to this classification, 54% of the population lived in areas classified as urban, an increase of 1.9 percentage points since the previous census.

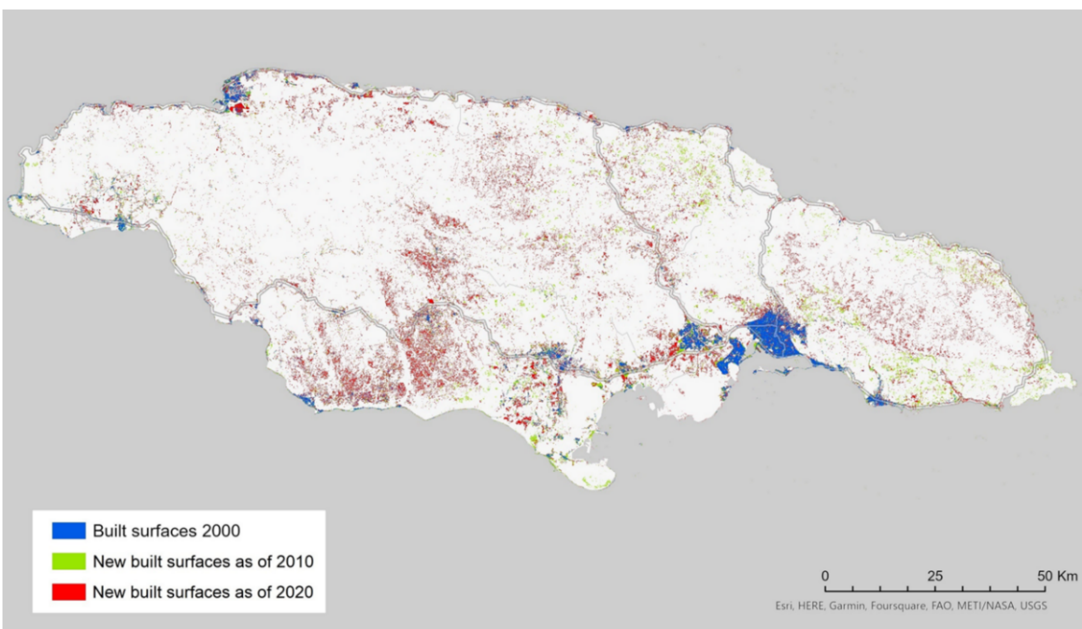
From an administrative perspective, Jamaica is divided into 14 parishes (see map 1). The largest parish capitals are the Kingston Metropolitan Area (Kingston & St. Andrew), Spanish Town (Saint Catherine), and Montego Bay (Saint James). Portmore (in the parish of Saint Catherine) was noted in the 2001 Census report for being the area outside a parish capital that underwent "the most outstanding growth witnessed over the past three decades" (GoJ, 2012). The total population living in parish capitals has increased by 5% since 2001.

Map 2 displays the evolution of built-up surfaces in Jamaica. The comparison of built-up surfaces as of 2000 (blue) and 2010 (green) with the new built-up surfaces as of 2020 (red) shows that growth in the period of 2010 to 2020 scattered across the whole country, even in rural areas. Special mention can be made to the developments in the parishes of Saint Elizabeth, Manchester, and Clarendon, located in the Southwestern portions of the island.

**Map 1**
**Parishes of Jamaica**


Source: Authors' elaboration.

**Map 2**
**Built-up surfaces in Jamaica as of 2000, 2010 and 2020**




Source: Authors' elaboration.

Various institutions at the national level exercise responsibilities that influence directly or indirectly the country's urban and physical planning, such as: the National Environment and Planning Agency, the Ministry of Economic Growth and Job Creation, the Ministry of Local Government and Community Development, the Planning Institute of Jamaica, the Urban Development Corporation, and the Office of The Prime Minister. The Town and Country Planning Authority, located within the National Environment and Planning Agency, is the statutory body responsible for promoting orderly development. Key national legislation concerning spatial and urban development planning in the country are the Town and Country Planning Act (1958), the Planning Institute of Jamaica Act (1984), and the Local Governance Act (2016). Two of the main national policy instruments related to urban and territorial planning aspects in the country are the National Land Policy of 1996 and Vision 2030 Jamaica–National Development Plan (ECLAC, 2023a).

## 2. Urban Centres identified: Montego Bay, Spanish Town, Portmore, and Kingston

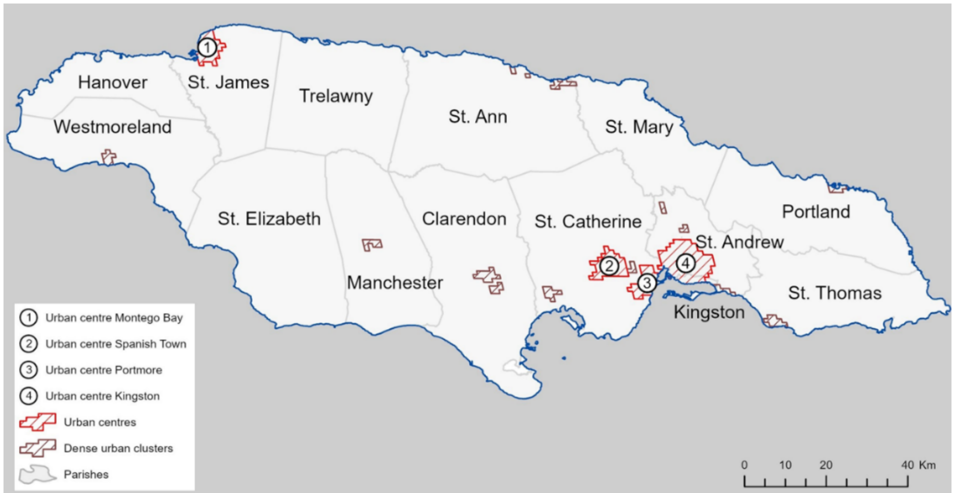
The application of the DEGURBA methodology allowed for the identification of four Urban Centres (UCs) and fourteen Dense Urban Clusters (DUCs) as of 2020 (map 3). The analysis developed in this subsection will focus on these four UCs and mention some of the DUCs located near UCs. A general description of the location of each UC utilizing the boundaries of the Jamaican parishes as references is provided below:

- Urban Centre Montego Bay: it is spread across the north-western coast of the parish of Saint James;
- Urban Centre Spanish Town: located in the parish of Saint Catherine and approximately three kilometres inland from the UC Portmore;
- Urban Centre Portmore: it is located on the eastern coast of the parish of Saint Catherine and one kilometre to the west of the UC Kingston;
- Urban Centre Kingston: the largest UC of Jamaica is spread across the area of the parishes of Kingston and Saint Andrew.

As shown on maps 3 and 5, the UC Portmore and UC Kingston are located in very close proximity, being connected by the Port Kingston Causeway. Historically, Portmore and Spanish Town have grown as commuter towns in connection with the growth of the capital Kingston. Considering that the only direct physical connection between the UC Kingston and UC Portmore consists of the abovementioned motorway, they are treated separately as two UCs, allowing for a more detailed assessment of the spatial dynamics particular to each UC.

The four UCs in Jamaica surpassed the required population and built-up density thresholds to be classified as UCs in 2000 and remained so in 2020. The UC Kingston was identified as the largest UC in population and total built-up area, around three times larger than the second-largest UC. It was followed by the UC Portmore in population size and by the UC Spanish Town in surface area size. The UC Montego Bay is the smallest UC in population and total built-up area. At a national level, all four UCs in Jamaica had a total built-up surface of 139 $km^2$ in 2020, with a projected population of 934,924 inhabitants, and an average of 149 $m^2$ occupied by each person.

**Map 3**
**Urban Centres and Dense Urban Clusters identified in Jamaica as of 2020**




Source: Authors' elaboration.

**Table 2**
**Population and total built-up area of each Urban Centre and at a national level in Jamaica**

| Indicator | Year | UC Montego Bay | UC Spanish Town | UC Portmore | UC Kingston | National UCs |
|---|---|---|---|---|---|---|
| Population *(Inhabitants)* | 2000 | 85 823 | 110 985 | 156 985 | 528 145 | 881 937 |
| | 2011 | 98 002 | 121 041 | 174 112 | 528 765 | 921 919 |
| | 2020 | 101 233 | 122 955 | 175 824 | 534 913 | 934 925 |
| Total built-up area *(Km²)* | 2000 | 12.98 | 14.63 | 16.88 | 63.91 | 108.40 |
| | 2011 | 16.68 | 20.02 | 19.20 | 69.07 | 124.98 |
| | 2020 | 23.84 | 20.95 | 22.08 | 72.52 | 139.39 |

Source: Authors' elaboration.

Table 3 shows the percentage variations of the indicators presented above over three time periods: 2000 to 2011 (11 years), 2011 to 2020 (9 years), and 2000 to 2020 (20 years).

**Table 3**
**Percentage changes of population and total build-up area of each Urban Centre and at a national level in Jamaica**

| Indicator | Period | UC Montego Bay | UC Spanish Town | UC Portmore | UC Kingston | National UCs |
|---|---|---|---|---|---|---|
| Population variation *(Percentages)* | 2000–2010 | 14.19 | 9.06 | 10.91 | 0.12 | 4.53 |
| | 2011–2020 | 3.30 | 1.58 | 0.98 | 1.16 | 1.41 |
| | 2000–2020 | 17.95 | 10.79 | 12.00 | 1.28 | 6.01 |
| Total built-up area variation *(Percentages)* | 2000–2010 | 28.49 | 36.84 | 13.77 | 8.08 | 15.29 |
| | 2011–2020 | 42.92 | 4.64 | 14.97 | 4.99 | 11.53 |
| | 2000–2020 | 83.63 | 43.19 | 30.80 | 13.48 | 28.59 |

Source: Authors' elaboration.

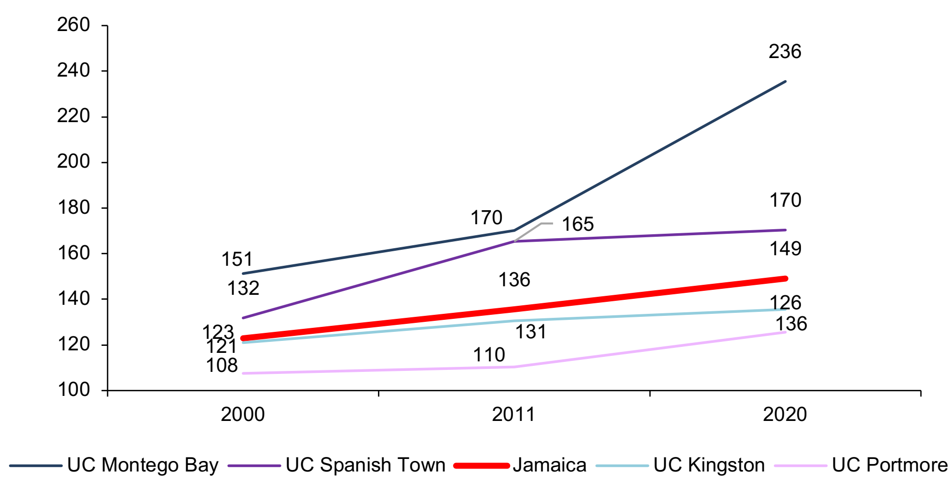
The percentage variations of the above indicators in Jamaica in the 20-year period show that the population growth has been consistently lower than the growth of the total built-up areas across all UCs. Population growth figures fluctuated around 18 to 11% in the UCs Montego Bay, Spanish Town, and Portmore. However, the population remained almost stable in the UC Kingston, with an annualized growth rate of just 0.12% in 20 years. At the national level, the population growth rate within all UCs in 20 years was only around 6%, much lower than in most UCs, due to the preponderance of the UC Kingston in the national scenario. In terms of total built-up areas, all UCs have experienced remarkable growth, with figures ranging considerably across UCs, from 13% in the UC Kingston to over 83% in the UC Montego Bay. The latter, the smallest UC in population and size, has undergone the highest percentage variations of population and total built-up are indicators among the four UCs in the 20-year period.

A closer look at the population and total built-up area growth within UCs in each of the two 10-year periods shows contrasting trends (see table 3). The UC Montego Bay and UC Portmore have undergone a more significant population growth in the first decade relative to the second decade but a higher increase in the total built-up area in the second decade relative to the first decade. Contrastingly, population growth figures observed in UC Kingston were higher in the second than in the first decade, and the UC's total build-up area expansion was lower in the second decade than the first. UC Spanish Town had population and total built-up areas growing at a more consistent pace in the two-decade period. An apparent mismatch of these indicators' growth rates in three UCs indicates that the dynamics leading to population and built-up growth are not directly connected. It is again important to emphasize the exceptional growth of UC Montego Bay in the second decade, with an increase in total built-up area of over 43%. At a national level, the total population within UCs increased more in the first decade than in the second, and the opposite happened with the variation of the total built-up area.

## 3. Comparative analysis of key indicators

Figure 3 shows how the built-up area per capita evolved over the two-decade period analysed in the four UCs and at national level. The figure indicates a speedy loss of built-up density of the UC Montego Bay over the years, the UC with the highest built-up area per capita in Jamaica as of 2020. This indicates this UC's fast population and built-up area growth, as will be explored below. The UC Spanish Town also underwent significant transformation, with built-up densities decreasing considerably in the same period. The trajectory of the indicators for these two UCs contrasts with the UC Kingston and UC Portmore. Both lost built-up density, but the magnitude and speed of that process were not as remarkable as in the other UCs. In conclusion, all four UCs in Jamaica increased built-up area per capita at varying scales, thereby losing built-up density in the 20 years of analysis. At a national level, the indicator's performance has reflected those local trends and shown an increase in the three years analyzed. The national variation in built-up area resembles that of Jamaica's largest UC —UC Kingston— due to its national preponderant proportional size and population.

**Figure 3**
**Variation of built-up area per capita in the four Urban Centres of Jamaica**
*($M^2$)*




Source: Authors' elaboration.

Table 4 shows the indicator LUE for Jamaica and the figures for the indicator built-up area per capita. With remarkable variations across UCs and periods of analysis, the LUE indicator shows that UCs in Jamaica are growing at a rate that increased their built-up area per capita over the 20-year period analysed. It is also worth noting how the extraordinary variations in population and total built-up area per capita explored above for UC Montego Bay resulted in the second-highest LUE (3.66) for the 20-year analysis period.

The astonishing figures observed at UC Kingston required careful interpretation. The UC's LUE reached an atypical value of 78 in the first decade, the highest among all UCs discussed in Section IV. This can be explained because its population remained almost unchanged in 20 years, whereas its total built-up area grew more than 13%, an additional 8 km² to the UC's total built-up surface. Since the LUE indicator is a ratio between the population and built-up area growth rates, the marginal population variation in the first decade in the UC explains this result. This does not justify that performance since that additional built-up surface alone represents almost 66% of the total built-up area that UC Montego Bay had in 2000. Given the relative size of that UC in the national scenario, the expansion of UC Kingston requires careful attention by planning authorities. Nonetheless, it is also worth noting that the UC Kingston achieved in 2020 the second lowest built-up area per capita, just behind the UC Portmore.

**Table 4**
**Built-up area per capita and land use efficiency of each Urban Centre and at the national level in Jamaica**

| Indicator | Year/period | UC Montego Bay | UC Spanish Town | UC Portmore | UC Kingston | National UCs |
|---|---|---|---|---|---|---|
| Built-up area per capita *(M²)* | 2000 | 151 | 132 | 108 | 121 | 123 |
| | 2011 | 170 | 165 | 110 | 131 | 136 |
| | 2020 | 236 | 170 | 126 | 136 | 149 |
| Land use efficiency *(Ratio)* | 2000–2010 | 1.89 | 3.61 | 1.24 | 78.00 | 3.23 |
| | 2011–2020 | 11.16 | 2.81 | 14.00 | 4.08 | 7.79 |
| | 2000–2020 | 3.66 | 3.51 | 2.35 | 10.5 | 4.33 |

Source: Authors' elaboration.

## 4. Description of Urban Centres' growth trends and spatial dynamics over time

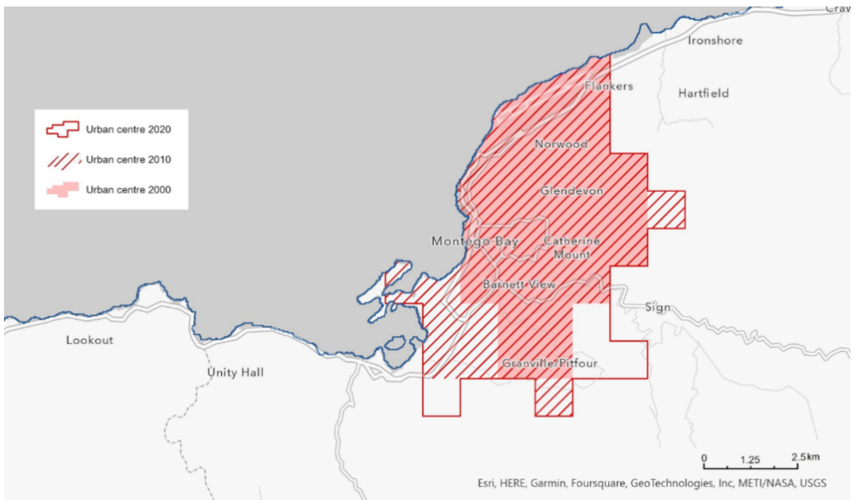
Map 4 shows the development of the UC Montego Bay over the 2000 to 2020 period.[14] The UC had already been identified in the analysis of the 2000 data. Three main observations could be made throughout the following two decades. Firstly, it underwent a slight eastward expansion in 2010, encompassing the neighbourhood of Cornwall Courts. Secondly, in that same year, the UC expanded south-wards following the development of large, planned housing extensions in previously greenfield sites. The UC's southward expansion also encompassed an area comprised of newly built commercial facilities closer to the coast of the UC. Thirdly, the UC expanded towards the south-east in 2020 as a result of large housing developments that, according to most recent satellite images, may still be under constructions. These developments can lead to further southeast-ward expansion of the UC in the near future.

Considering the proximity of the three remaining UCs, the following analysis will consider the three remaining UCs in Jamaica, depicted in map 5, which had all been identified in 2000. Although UC Kingston and UC Portmore are connected by motorways, natural and artificial barriers at the South of the Mandela Highway —such as the Soapberry Wastewater Treatment Plant, the Riverton City

[14] It is important to emphasize that, as indicated in the methodology section and following the global methodologies, this study has taken the most recent year of available data (2020) as the baseline year to delimitate the extension of all UCs and calculate all pertinent indicators. The discussion in the following paragraphs on the developments of each of the UCs over the years based on UC boundaries created for the years 2000 and 2010 are meant to facilitate a visual assessment of dynamics of population and built-up area growth over the study period within those UCs. No indicator was calculated using the boundaries of 2000 and 2010 depicted in the subsequent maps.

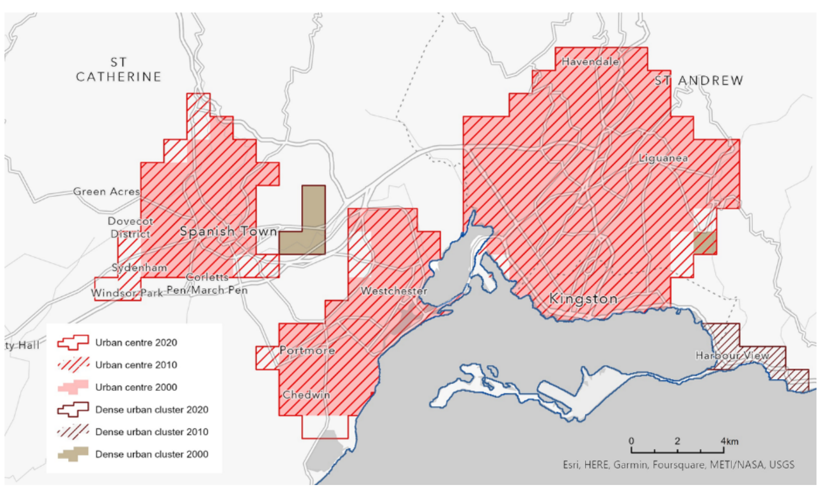
Landfill, and several water bodies and flood plains— seem to have prevented, until now, the complete merge of the two urban centres. Future developments north of that highway in Caymanas Estate lands can potentially lead to a future merger. A DUC was identified in 2000 in the area of Golden Spring. Further urban growth in this DUC can also lead to a future merging with UC Kingston, which could lead to a northward expansion of that UC to these mountainous regions. UC Spanish Town expanded to the north, west, and east —in that case, reaching the borders of the DUC identified since 2000 in Central Village. The further urban growth of that area can lead to the merger of UC Spanish Town and UC Portmore. In conclusion, the dynamism shown by these three UCs could soon result in a physical merger in the future

**Map 4**
**Boundaries of the UC Montego Bay in 2000, 2011, and 2020**




Source: Authors' elaboration.

**Map 5**
**Boundaries of the UC Spanish Town (left), UC Portmore (centre), and UC Kingston (right) and surrounding Dense Urban Clusters in 2000, 2011, and 2020**




Source: Authors' elaboration.

## B. Trinidad and Tobago

### 1. National context

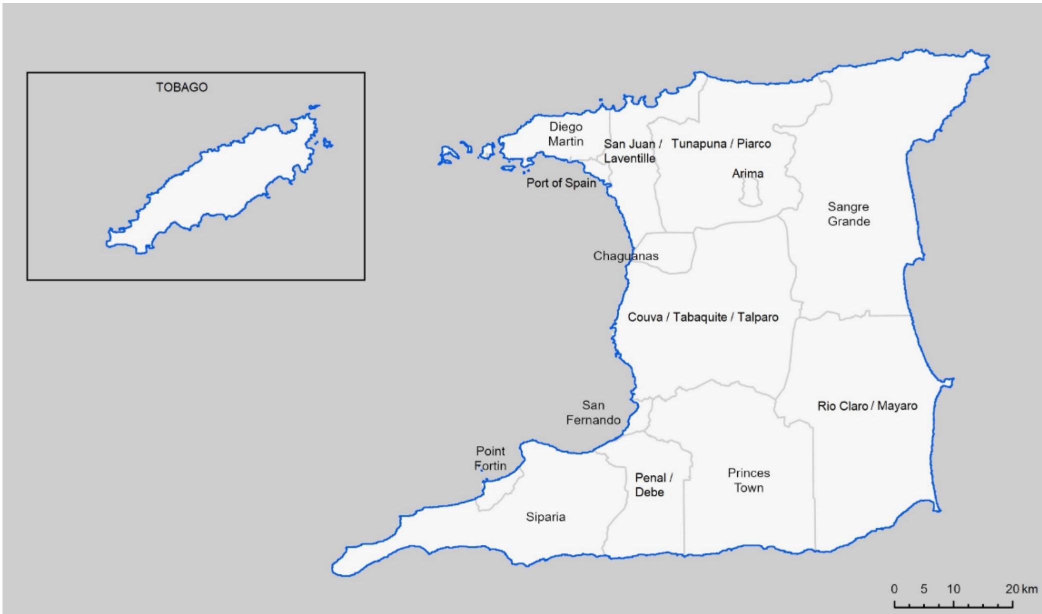
In 2011, Trinidad and Tobago had a total population of 1,328,019 inhabitants distributed between the island of Trinidad (1,267,145 inhabitants) and the island of Tobago (60,874 inhabitants). Trinidad is administratively divided into 14 municipal corporations (see map 6).[15] The last intercensal period (2000 to 2011) recorded an absolute population decrease in the City of Port of Spain, City of San Fernando, Diego Martin, and San Juan/Laventille, which are municipal corporations located in established urban areas of the country. The 2011 Census report indicates that this phenomenon is due to a "reversal of earlier public housing programmes that predominantly provided homes in the major urban areas" and that "the data clearly show a more dispersed pattern of housing allocations, whether public or private" (GoT&T, 2012).

Various institutions at the national level exercise responsibilities that directly or indirectly influence the country's urban and physical planning, such as the Ministry of Planning and Development, Ministry of Finance, Ministry of Housing and Urban Development, Ministry of Rural Development and Local Government, the Office of the Prime Minister, and the Tobago House of Assembly. The Town and Country Planning Division of the Ministry of Planning and Development is the primary national regulatory agency responsible for drafting land use regulations, assessing development applications, and enforcing land use legislation and development control. Key national legislation concerning spatial and urban development planning in the country are the Environmental Management Act (2000), the Municipal Corporations Act (1990), the Town and Country Planning Act (1960), the Tobago House of Assembly Act (1996), and the Planning and Facilitation of Development Act (10 of 2014), which is still to be fully proclaimed and operationalized. The country's main national policy instruments related to urban and territorial planning are the National Environmental Policy (2018), Vision 2030 —the National Development Strategy of Trinidad and Tobago 2016-2030, and the National Spatial Development Strategy (ECLAC, 2023b).

A visual analysis of built-up surfaces in Trinidad and Tobago (map 7) indicates the expansion of the built environment in the country over two decades. The comparison of new built-up surfaces as of 2010 (green) and new built-up surfaces as of 2020 (red) shows significant growth, particularly on the island of Tobago. While a significant portion of the built-up surfaces in Trinidad pre-date the year 2000 (blue), it is noticeable that Tobago has undergone significant changes since that year, given the predominance of new built-up surfaces as of 2010 (green) and 2020 (red).

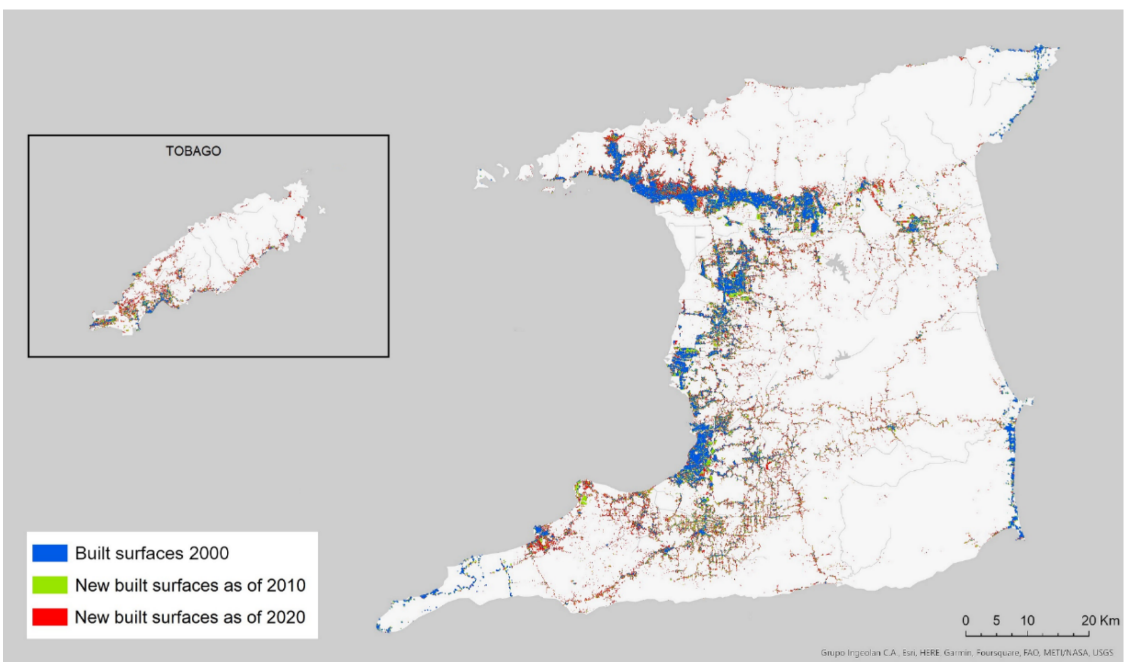
[15] Tobago enjoys greater autonomy as compared to the Municipal Corporations of Trinidad. The Tobago House of Assembly can propose and formulate policies pertaining to matters of the island. It does not have the power to create taxes, fees, duties, and levies. Revenue collected in the island by the local government is done on behalf of the central government and the island's budget is approved by the national Parliament (ECLAC, 2023).

**Map 6**
**Municipal corporations of Trinidad and Tobago**




Source: Authors' elaboration.

**Map 7**
**Built-up surfaces in Trinidad and Tobago as of 2000, 2010 and 2020**




Source: Authors' elaboration.

## 2. Urban Centres identified: East-West Corridor, San Fernando and Chaguanas

The study identified three UCs and ten DUCs in the island of Trinidad and one DUC in the island of Tobago as of 2020 (map 8). The analysis developed in this subsection focuses on the three UCs identified and address some of the DUCs in the vicinity of those UCs. Below follows a general description of the location of each using the municipal corporations as references:

- Urban Centre East-West Corridor: it covers the area of several municipal corporations, including the entire City of Port of Spain, nearly all of the Borough of Arima, a significant portion of Diego Martin, and portions of San Juan/Laventille and Tunapuna/Piarco.
- Urban Centre San Fernando: it covers most of the City of San Fernando, with a substantial spill over in Penal/Debe and a marginal spill over the west of Princes Town.
- Urban Centre Chaguanas: it spreads across the western portion of the Borough of Chaguanas, with marginal spillover to Couva/Tabaquite/Talparo.

The UC East-West Corridor was identified as the largest UC in terms of population and total built-up area in 2020, followed respectively by the UC San Fernando and the UC Chaguanas. While the first two UCs were already classified as Urban Centres in 2000 and 2010, the area corresponding to the UC Chaguanas was a DUC until 2010. After surpassing the required population and built-up density thresholds to be classified as a UC, that area became Trinidad and Tobago's third UC in 2020. At a national level, the three UCs in Trinidad and Tobago had a combined built-up area of more than 154 km² in 2020, with a projected population of 674,115 inhabitants and an average of 230 m² occupied by each person.

Table 5 shows some of the key indicators for each UC and national indicators representing the sum of population and built-up area in these UCs, including the calculated built-up area per capita at a national level.

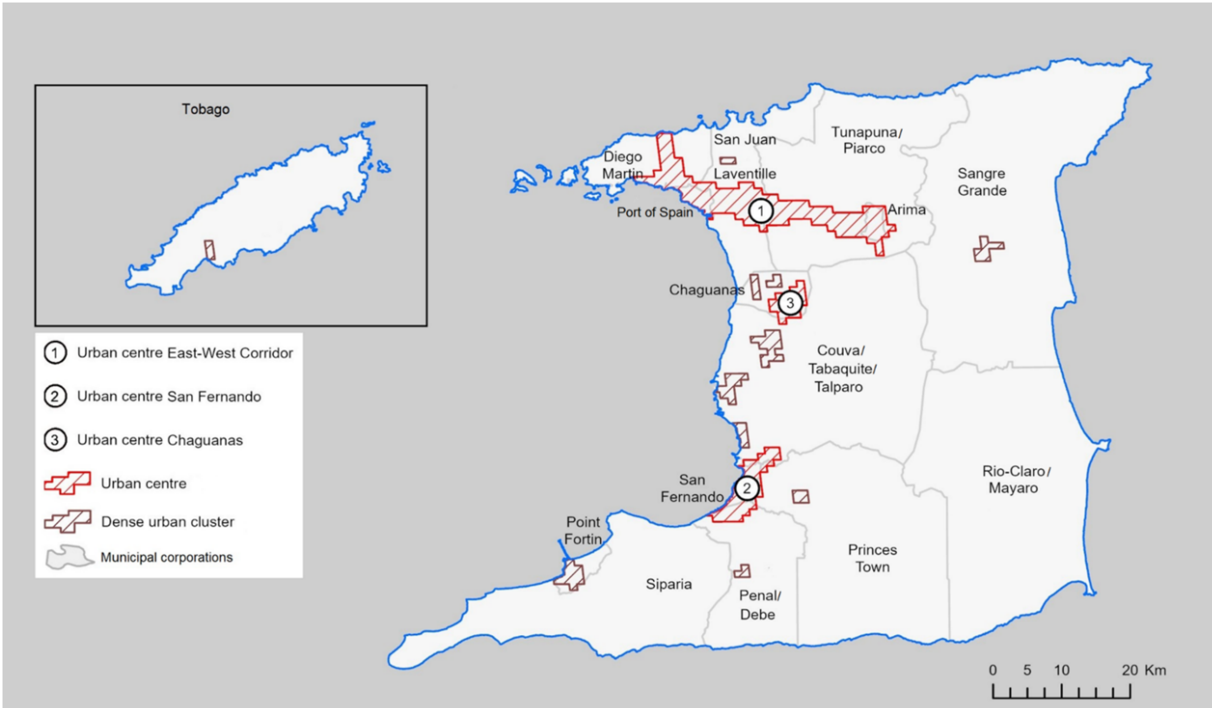
**Table 5**
**Population and total built-up area per capita of each Urban Centre and at a national level in Trinidad and Tobago**

| Indicator | Year | UC East-West Corridor | UC San Fernando | UC Chaguanas | National UCs |
|---|---|---|---|---|---|
| Population *(Inhabitants)* | 2000 | 389 532 | 82 746 | 39 592 | 511 871 |
| | 2010 | 436 990 | 87 808 | 49 484 | 574 282 |
| | 2020 | 498 795 | 113 826 | 61 494 | 674 115 |
| Total built-up area *(Km²)* | 2000 | 69.34 | 20.89 | 9.88 | 100.11 |
| | 2010 | 81.68 | 27.07 | 13.49 | 122.24 |
| | 2020 | 106.97 | 31.88 | 15.86 | 154.71 |

Source: Authors' elaboration.

An analysis of the percentage changes displayed in the table above indicates a consistent trend across UCs evidencing that their population growth is lower than the growth of their total built-up areas. While all UCs have experienced growth above 52% of their total built-up areas over the 20-year period, the population growth varied across UCs and remained below those levels in the UC East-West Corridor (28.05%), the UC San Fernando (37.56%), and at a national level (31.70%). The UC Chaguanas, the smallest UC in population and size, has undergone the highest percentage changes in population and total built-up area among the three UCs in the 20-year period, reaching a 55.3% population growth and a 60.5% of total built-up area growth.

**Map 8**
**Urban Centres and Dense Urban Clusters identified in Trinidad and Tobago as of 2020**




Source: Authors' elaboration.

Table 6 below shows the percentage variations of the indicators discussed above over three time periods: 2000 to 2010 (10 years), 2010 to 2020 (10 years), and 2000 to 2020 (20 years).

**Table 6**
**Percentage changes in population and total build-up area of each Urban Centre and at a national level in Trinidad and Tobago**

| Indicator | Period | UC East-West Corridor | UC San Fernando | UC Chaguanas | National UCs |
|---|---|---|---|---|---|
| Population variation *(Percentages)* | 2000–2010 | 12.18 | 6.12 | 24.99 | 12.19 |
| | 2010–2020 | 14.14 | 29.63 | 24.27 | 17.38 |
| | 2000–2020 | 28.05 | 37.56 | 55.32 | 31.70 |
| Total built-up area variation *(Percentages)* | 2000–2010 | 17.79 | 29.61 | 36.54 | 22.11 |
| | 2010–2020 | 30.97 | 17.76 | 17.53 | 26.56 |
| | 2000–2020 | 54.27 | 52.62 | 60.49 | 54.54 |

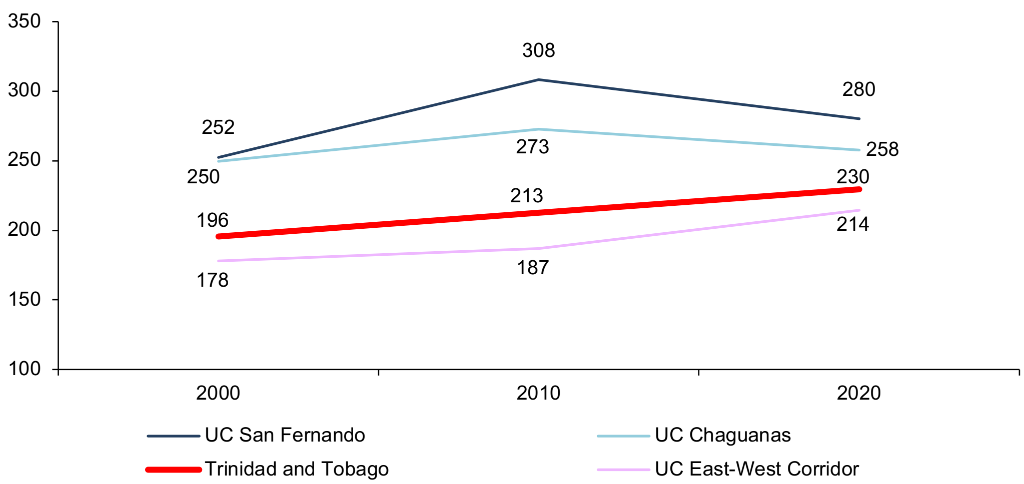
Source: Authors' elaboration.

Breaking down the analysis of the 20-year into two 10-year periods shows contrasting changes across UCs over these two periods. In terms of population growth, the UC Chaguanas had the highest and similar variations in the two 10-year periods – approximately 25% in each period – a trend that was also observed in the UC East-West Corridor but reaching lower figures (around 13% in each period). Contrastingly, the UC San Fernando has undergone a much higher variation in the 2010 to 2020 period (29.63%) than in the previous period (6.12%). As for the variations in built-up areas, the UC San Fernando and the UC Chaguanas have undergone a similar trend, with more substantial expansion levels in the first 10-year period than in the second. The UC East-West Corridor experienced the opposite trend, with a higher change in its built-up area in the second 10-year period.

## 3. Comparative analysis of key indicators

Figure 4 shows that the UC East-West Corridor has sustained an increase in the average number of km² occupied by each inhabitant, while the other two UCs peaked in 2010 and then experienced a decrease. The UC San Fernando was identified as the UC sustaining the highest built-up area per capita in all years analysed. The evolution of this indicator at a national level shows an increase in the three years studied. This trend resembles that of the UC East-West Corridor because of the UC's preponderant proportional size and population.

**Figure 4**
**Variation of built-up area per capita in the three Urban Centres of Trinidad and Tobago**




Source: Authors' elaboration.

Table 7 shows the indicator LUE and the built-up area per capita. With considerable variations across UCs and periods of analysis, the LUE indicator shows that UCs in Trinidad and Tobago are generally growing at a rate that increased their built-up area per capita over the 20-year period analysed. Although the UC San Fernando and UC Chaguanas achieved a LUE below 1 in the second decade analysed, perhaps suggesting that this trend could be reversing, that achievement followed a period of expansion between 2000-2010—which was particularly strong in the case of UC San Fernando. The results calculated for that UC are particularly concerning, considering that it already has the highest built-up area per capita among all UCs. The steady increase of built-up area per capita in the UC East-West Corridor, coupled with the highest LUE among all three UCs, also requires attention, especially given its preponderant weight as the largest UC in the country.

**Table 7**
**Build-up area per capita and land use efficiency of each Urban Centre and at a national level in Trinidad and Tobago**

| Indicator | Year/period | UC East-West Corridor | UC San Fernando | UC Chaguanas | National UCs |
|---|---|---|---|---|---|
| Built-up area per capita *(M²)* | 2000 | 178 | 252 | 250 | 196 |
| | 2010 | 187 | 308 | 273 | 213 |
| | 2020 | 214 | 280 | 258 | 230 |
| Land use efficiency *(Ratio)* | 2000–2010 | 1.43 | 4.39 | 1.39 | 1.74 |
| | 2010–2020 | 2.05 | 0.63 | 0.75 | 1.48 |
| | 2000–2020 | 1.75 | 1.33 | 1.08 | 1.58 |

Source: Authors' elaboration.

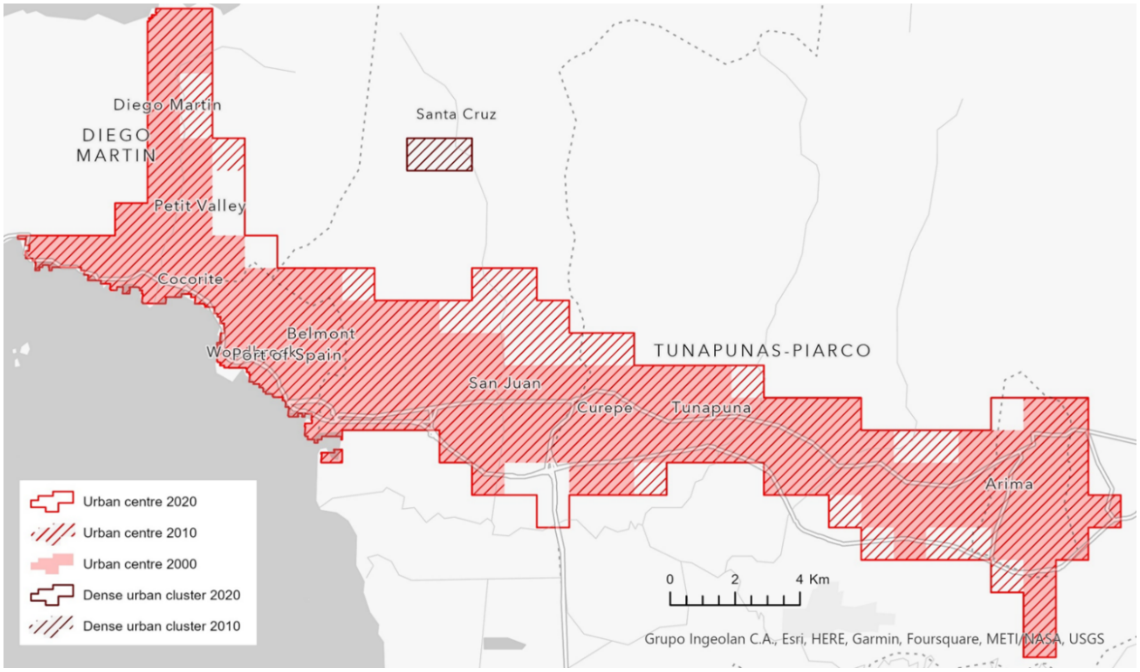
## 4. Description of Urban Centres' growth trends and spatial dynamics over time

The following paragraphs will zoom in on each specific UC and discuss some visible developments and trends with the support of maps. Map 9 shows the development of the UC East-West Corridor and surrounding DUCs over a 20-year period, depicting significant changes in the UC's overall extension. Regarding these developments, three main observations can be made. Firstly, the UC substantially expanded towards hillside areas in the Northern Range of Trinidad, particularly from 2000 to 2010. This expansion includes areas in Diego Martin located east of the UC boundaries as of 2000, large areas in central portions of San Juan/Laventille, and centre-east portions of Tunapuna/Piarco. The development of impervious surfaces into previously forested mountainous regions requires careful attention. Besides leading to the loss of natural habitats, such development can lead to severe repercussions to human settlements, including landslides, and the potential to exacerbate and disrupt established patterns of flood occurrences within its immediate downstream vicinity. Secondly, substantial developments around and west of the Borough of Arima but not to its immediate east indicate a westward consolidation of the UC East-West Corridor. Notwithstanding that, it is important to note that important developments in the east of Trinidad and outside the UC East-West Corridor boundaries —namely in the areas of the towns of Valencia and Sangre Grande— may lead to a future eastward expansion of that UC into those towns. Finally, over the years 2010 and 2020, there has been the formation of a DUC separated from the UC in the area surrounding the town of Santa Cruz, which triggers the same concerns expressed before over the development of built-up surfaces in hillside areas.

Map 10 depicts the UC San Fernando and surrounding DUCs. In 2000, the UC already covered the entire City of San Fernando area. In the subsequent analysis periods, it underwent a fast expansion into the northern portions of the Penal/Debe corporation. It also incorporated the area around the town of Gasparillo in 2020, which had been previously classified as a DUC in 2000 and 2010. Two coastal areas to the north of the City of San Fernando corporation, located in Claxton Bay and Point Lisas, and a third one in Chase Village, were identified as DUCs. These DUCs have gradually expanded since 2000 to surrounding areas, with the third one showing exponential growth southwards in the second decade. This trend of expansion of DUCs in several areas between the UC San Fernando and UC Chaguanas suggests the occurrence of a growing north-south axis along the Sir Solomon Hochoy Highway, with various settlements and towns between these two UCs. Finally, a DUC also emerged for the first time in Princes Town, according to the 2020 data.

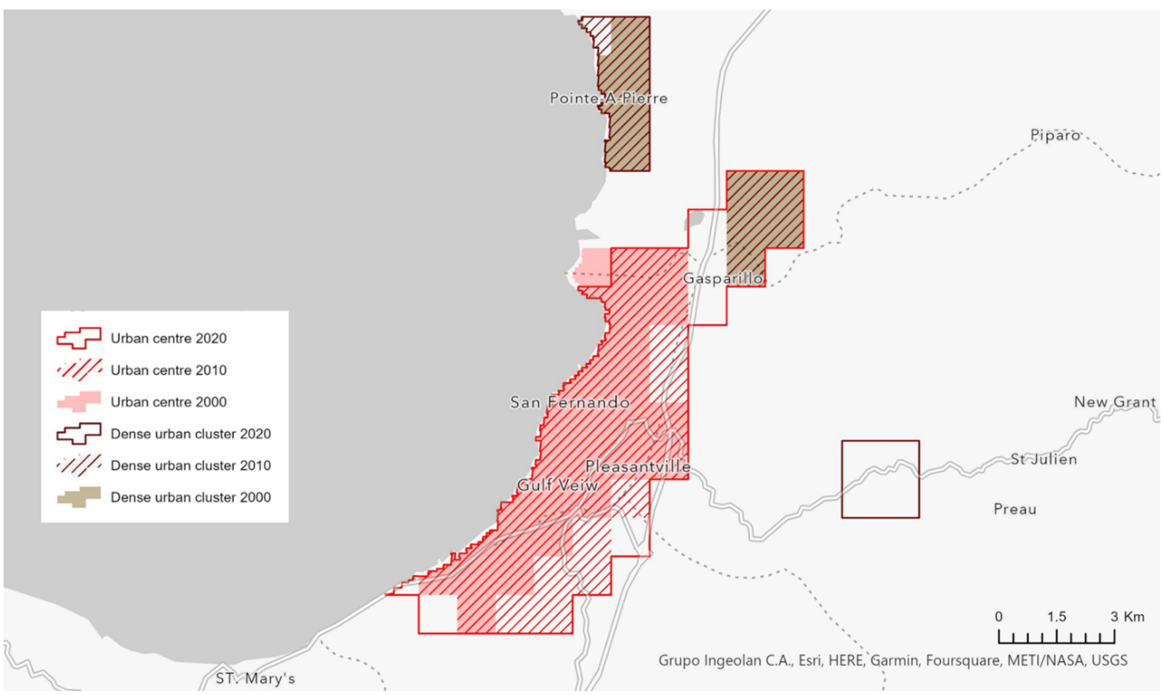
Map 11 shows the development of the UC Chaguanas and surrounding DUCs. The area currently comprised by that UC had been identified since 2000 as a DUC; it expanded its coverage in 2010 and reached the population and built-up density thresholds required to be classified as a UC in 2020. One nearby DUC was identified in the area of the community of Felicity in 2000, which expanded northwards; another DUC was identified in the community of Charlieville in 2020. Considering the fast urban growth of the area in the two decades analyzed, these two DUCs could merge into the UC Chaguanas, consolidating the area as a large urban centre south of the Caroni Bird Sanctuary, an area of high environmental sensitivity.

**Map 9**
**Boundaries of the UC East-West Corridor and surrounding Dense Urban Cluster in 2000, 2010, and 2020**



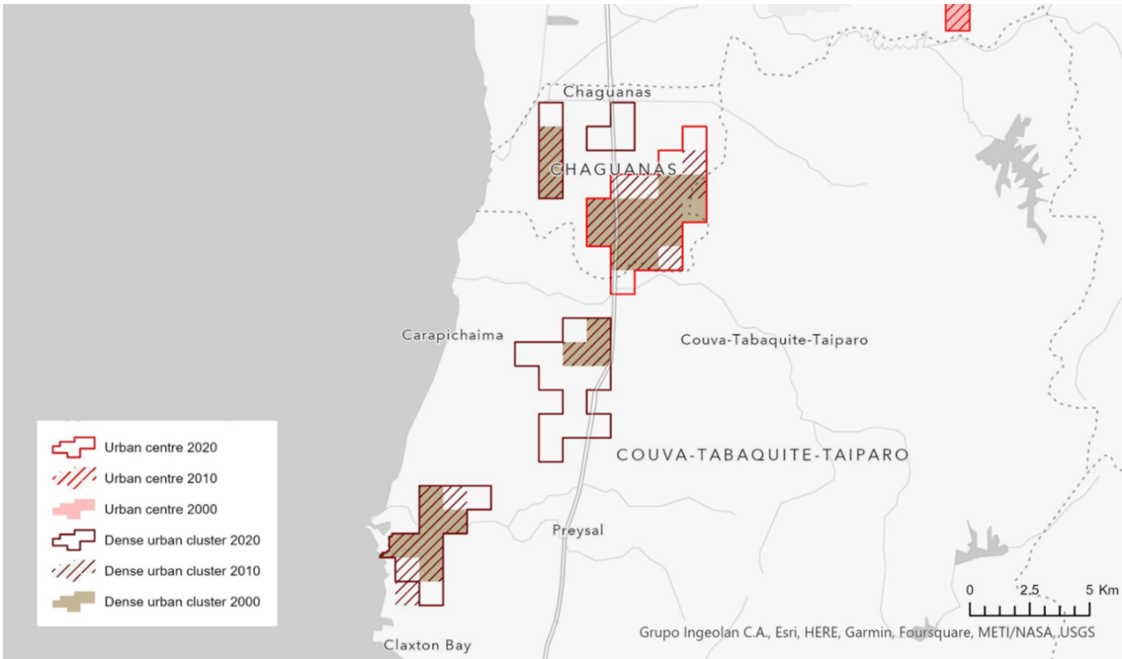

Source: Authors' elaboration.

**Map 10**
**Boundaries of the UC San Fernando and surrounding Dense Urban Clusters in 2000, 2010, and 2020**




Source: Authors' elaboration.

**Map 11**
**Boundaries of the UC Chaguanas and surrounding Dense Urban Clusters in 2000, 2010, and 2020**




Source: Authors' elaboration.

# IV. Comparative analysis with international data

Assessing patterns of urban expansion that can lead to unsustainable urban development is one of the main goals of SDG indicator 11.3.1. As indicated in Section II.A, one of the challenges of monitoring this indicator is that it cannot, on its own, provide grounds for international comparison across UCs because there is not a single recommended LUE value. Calculating a UC's LUE allows setting a baseline that can be used at the local level to monitor urban expansion over time. UCs consistently performing at a LUE above one must closely monitor their expansion and deploy appropriate planning measures to ensure that they do not incur patterns of land consumption that are detrimental to the costs and the provision of urban services, to the effects of agglomeration economies, and the conservation of ecosystems services, and environmentally sensitive and risk-prone areas.

The report Rescuing SDG 11 for a Resilient Urban Planet, produced by the United Nations Programme for Human Settlements (UN-Habitat) (2023), compiled and compared data from 681 cities[16] collected from 1990 to 2020. It concludes that cities across the globe are showing a sprawling growth pattern, although the pace of that expansion has slowed down in recent years. The report compiled regionally and globally aggregate cities' data on secondary indicators required for calculating the SDG indicator 11.3.1 and included global and regional built-up area per capita averages. This Section will adopt this last indicator to provide a comparison across national borders. While the secondary indicators PGR and LCR express data related to a time interval and must always be interpreted side-by-side, the indicator built-up area per capita offers an intuitive interpretation of a city's degree of urban density, which can facilitate comparisons. It can be read simply as the average built-up surface allocated to one person in an urban settlement in a given year.

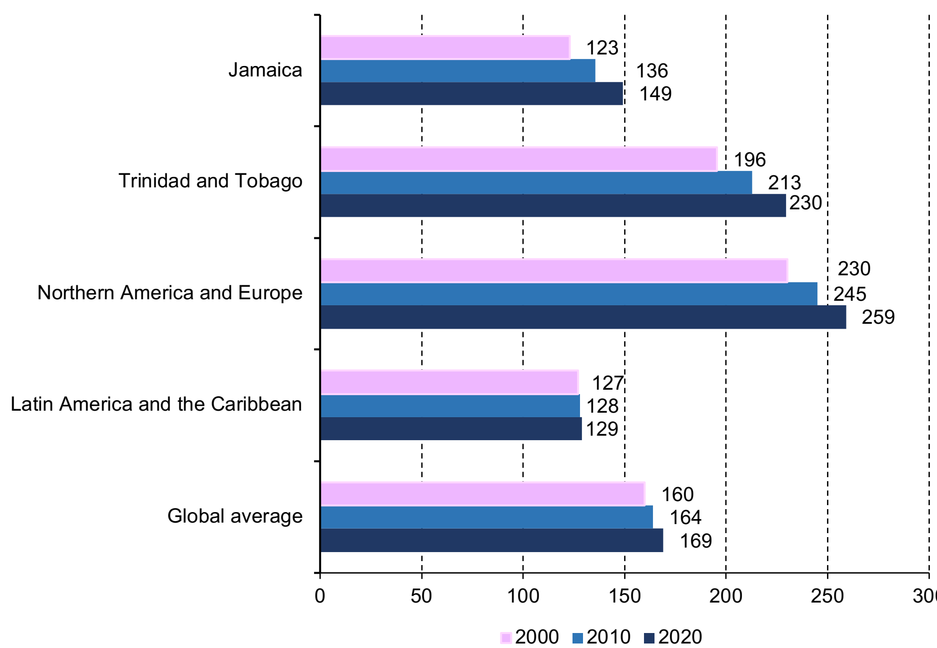
The report mentioned above concludes that, in general, built-up areas per capita increased globally from an average of 161 m² in 1990 to 169 m² per person in 2020. This slight change at a global

[16] The report brings regionally aggregate data from 681 cities drawn from 124 countries: 24 cities in Australia and New Zealand, 117 in Central Asia and Southern Asia, 43 in Eastern Asia and South-Eastern Asia, 156 in Latin America and the Caribbean, 149 in Northern America and Europe, 97 in Sub-Saharan Africa, and 95 in Western Asia and Northern Africa.

level contrasted with more dramatic increases in Northern America and Europe, while Latin America and the Caribbean performed more closely to the trend observed at a global level.[17] Considering the contrasts of this indicator trajectory in these two regions, this Section has adopted them, alongside the global average, as benchmarks for comparison with the results achieved for Trinidad and Tobago and Jamaica.[18] UN-Habitat's Data and Analytics Unit provided data for other Caribbean UCs, allowing for a more SIDS-contextualized comparison. Data from other Caribbean SIDS utilized in this Section were collected from the Dominican Republic's UCs La Romana, Santiago de los Caballeros, and Santo Domingo, from the Cuban UCs Holguin and Las Tunas, and the Haitian UCs Cap-Haitien and Saint-Marc.

Figure 5 shows the indicator's averages for the abovementioned regions compared with the national aggregations for Trinidad and Tobago and Jamaica. The trend over the two decades indicates a fast growth of built-up area per capita in both countries. In the case of Jamaica, the country departed from a baseline indicator slightly below the figures calculated for the Latin American and Caribbean region in the same year, and it moved closer to the global average in 2020. In the case of Trinidad and Tobago, the baseline year 2000 was already well above the average calculated in the region. In 2020, it reached the figures observed in North America and Europe. As the figure shows, the speed of change in both countries was very different than that observed globally and in Latin America and the Caribbean. In these cases, the indicator had only a slight upward variation by less than 10 m².

**Figure 5**
**Built-up area per capita by region and in Trinidad and Tobago and Jamaica**
*(M²)*



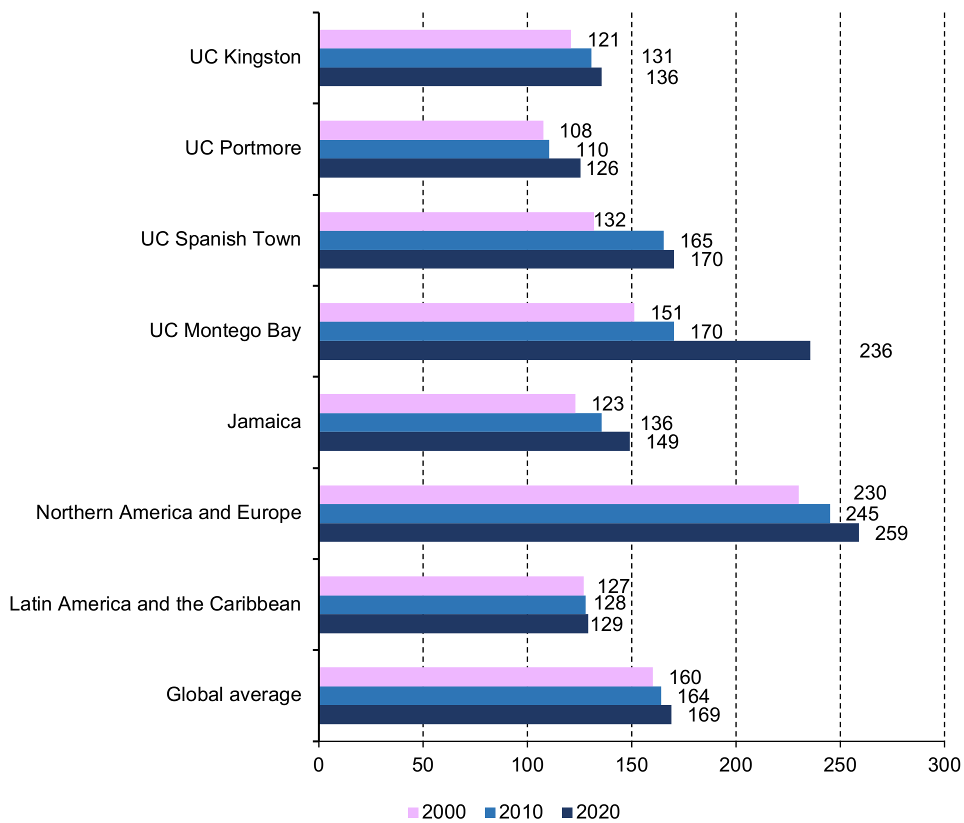

Source: Author's compilation utilizing study data and data from UN-Habitat (2023).

[17] The values of built-up area per capita produced by this study for the seven UCs located in Trinidad and Tobago and in Jamaica were not included in the Latin America and Caribbean regional average calculated and published earlier by the 2023 UN-Habitat report.

[18] Although the two regional aggregations made available in the report produced by UN-Habitat (2023) show that the average built-up areas per capita of developed regions are higher than those of developing regions, larger built-up are per capita figures do not necessarily correlate with any measure of development. There is a great degree of variation of results of the indicator across developing regions. For instance, the built-up are per capita in Sub-Saharan Africa is higher than in Latin America and Eastern and Southeastern Asia.

The figures below show the case of each UC in Jamaica (figure 6) and in Trinidad and Tobago (figure 7). In Jamaica, the indicator in the two largest UCs —Kingston and Portmore— performed much closer to Latin American and Caribbean levels in the analysis period. However, UC Kingston's increase in the second decade brought it slightly closer to the global average. UC Montego Bay and UC Spanish Town quickly departed from a situation not very different from the Latin American and Caribbean region and evolved to levels much higher than the global average and closer to the averages observed in North America and Europe.

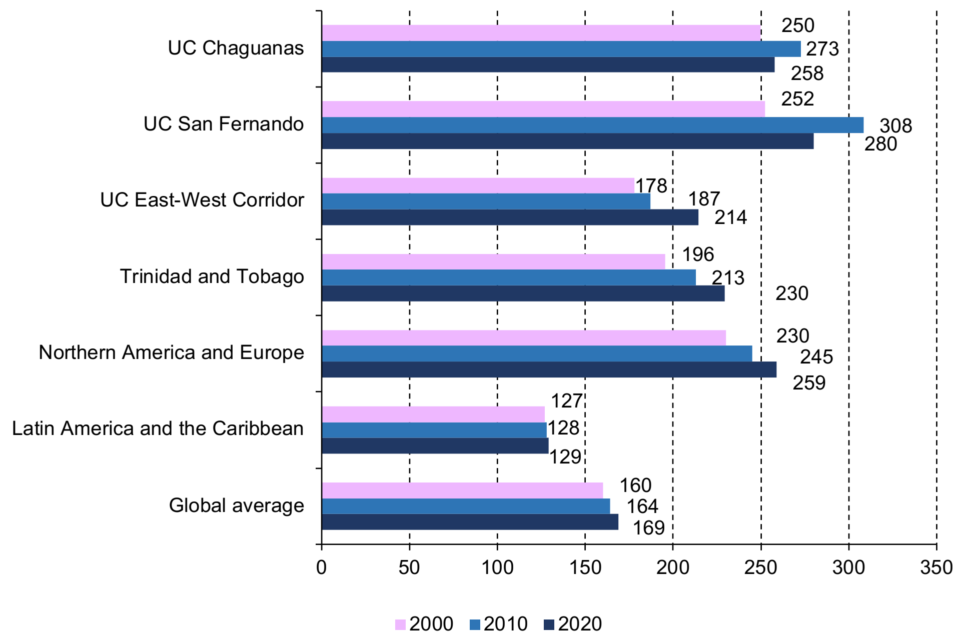
**Figure 6**
**Built-up area per capita by region and in Urban Centres in Jamaica**
*(M²)*




Source: Author's compilation utilizing study data and data from UN-Habitat (2023).

In Trinidad and Tobago, the UC East-West Corridor departed from a situation in 2000 not very far from the global average. In the two subsequent decades, the UC reached much higher levels of built-up per capita; the fast increase in the second decade could lead to the UC achieving figures closer to North America and Europe in the near future. In contrast, despite a retraction in the second decade of analysis, the UCs Chaguanas and San Fernando reached built-areas per capita similar to and above the averages calculated for those two regions. However, they never reached the same levels observed in the world's least urban dense regions —Australia and New Zealand (366 m² per person in 2020) (UN-Habitat, 2023).

**Figure 7**
**Built-up area per capita by region and in Urban Centres in Trinidad and Tobago**
*(M²)*




Source: Author's compilation utilizing study data and data from UN-Habitat (2023).

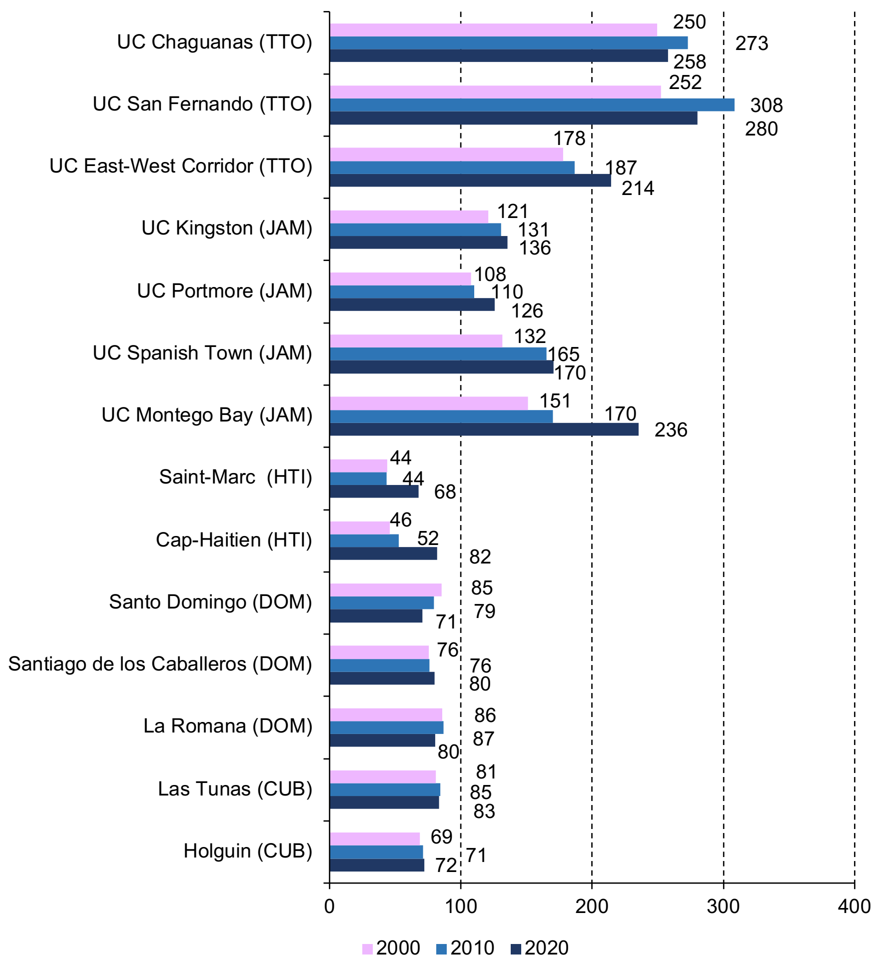
Table 8 shows selected indicators for all the UCs located in Caribbean SIDS for which data were available, and figure 8 shows the fluctuation of the indicator built-up area per capita in each of these UCs in two decades.

**Table 8**
**Selected indicators for each Urban Centre in small island developing States**

| Country | UC name | Population size in 2020 *(Inhabitants)* | Total built-up area in 2020 *(Km²)* | Built-up area per capita in 2020 *(Km²)* | Variation of built-up area per capita 2000–2020 *(Percentages)* |
|---|---|---|---|---|---|
| Cuba | Holguin | 289 474 | 20.90 | 72 | 4.67 |
| | Las Tunas | 190 740 | 15.87 | 83 | 2.69 |
| Dominican Republic | La Romana | 208 881 | 16.77 | 80 | -6.56 |
| | Santiago de los Caballeros | 643 131 | 51.37 | 80 | 5.58 |
| | Santo Domingo | 4 167 141 | 294.19 | 71 | -17.39 |
| Haiti | Cap-Haitien | 235 790 | 19.35 | 82 | 78.04 |
| | Saint-Marc | 156 768 | 10.60 | 67 | 53.39 |
| Jamaica | Montego Bay | 101 233 | 23.84 | 236 | 55.68 |
| | Spanish Town | 122 955 | 20.95 | 170 | 29.24 |
| | Portmore | 175 824 | 22.08 | 126 | 16.79 |
| | Kingston | 534 913 | 72.52 | 136 | 12.05 |
| Trinidad and Tobago | East-West Corridor | 498 795 | 106.97 | 214 | 20.47 |
| | San Fernando | 113 826 | 31.88 | 280 | 10.95 |
| | Chaguanas | 61 494 | 15.86 | 258 | 3.33 |

Source: Author's compilation utilizing study data and data provided by the Data and Analytics Unit, UN-Habitat.

**Figure 8**
**Built-up area per capita in urban centres in Cuba, Dominican Republic, Haiti, Jamaica, and Trinidad and Tobago**
*(M²)*




Source: Author's compilation utilizing study data and data provided by the Data and Analytics Unit, UN-Habitat.

Although the sample of cities is small, the table and figure below contain cities of very different population sizes and total built-up areas in 2020. It suggests a wide diversity of patterns of urban densities across countries in the subregion. However, national circumstances, local urban development, and planning traditions seem to influence each urban centre's built-up area per capita. Notably, the indicator fluctuated around 70 to less than 90 metres per person in Cuba, the Dominican Republic, and Haiti, levels much lower than the regional and global average. In these countries, as shown in table 8, the indicator variation from 2000 to 2020 either varied slightly or negatively, suggesting that these countries have adopted a more compact pattern of urban development whereby the increase of total built-up area responds more proportionally to population increases. In all cases analysed in these three countries, there were population increases in the analysis period. On the other hand, a more land-consuming development pattern is evident in Jamaica and especially in Trinidad and Tobago, when comparing both countries to other Caribbean SIDS.

# V. Policy implications

This study concluded that Urban Centres in Jamaica and Trinidad and Tobago are increasing built-up surfaces at a faster rate than the population growth. As a result, built-up area per capita is increasing in these two countries, surpassing regional and Caribbean SIDS averages. These findings have implications or impacts on several sectors of public policies that should be considered across all geographic levels of planning. This last section will explore some of these implications. The consideration of these implications needs to take into account national and local circumstances so that specific and concrete policy actions can be formulated to address the impacts of these findings.

- Climate change and adaptation policies: strategies and policies that seek to halt the physical spread of low-density urban settlements are climate adaptation policies. The increasing expansion of impervious surfaces in and around urban centres directly impacts freshwater provision —as this phenomenon impacts aquifers recharge— rainwater drainage dynamics, and flood patterns. These will all be affected by the expected overall drier climate and more frequent climate events in the Caribbean in the next decades. Moreover, protecting vagricultural land and natural habitats will be fundamental to promoting ecosystems that can support nature-based solutions. Although the carbon footprint of Caribbean SIDS is minute, a more compact urban form also contributes to the reduction of energy consumption and carbon emissions by mobility systems, especially those heavily dependent on private vehicles.

- Development and enforcement of land use control policies in areas surrounding existing urban settlements: deploying such policies is critical when there has been a consistent expansion of settlements' boundaries or in urban peripheral areas with increasing population and built-up densities. It is worth noting that this is particularly the case of UCs situated outside the countries' corresponding capitals, which have demonstrated a more dynamic growth of their boundaries and relatively higher built-up area per capita. Areas identified as DUCs and that underwent extension of boundaries could also further expand in the next ten years, calling for an assessment of whether development control measures are in place and how adequately they are enforced.

- Public and private housing provision in intra-urban areas: identifying suitable areas inside consolidated urban settlements where additional development can happen is crucial to avoid the reclamation of agricultural and environmentally sensitive areas for residential or other types of urban development. Mapping and creating policy and market mechanisms and incentives to promote the use of vacant, underdeveloped, and underused lots or properties can promote urban densities and delay or stop the expansion of urban footprints. It is equally important to explore how inner-city areas, which may have lost population over the years, becoming exclusively oriented to commercial activities and other non-residential uses, can be rejuvenated and considered attractive and safe to live again by urban dwellers. Revising zoning and urban planning legislation that does not promote mixed-uses in consolidated urban centres is also essential to boosting housing provision in these areas while allocating adequate spaces for green public area public and recreational facilities.

- Provision and costs of services and exposure of key infrastructure: providing services to a small customer base dispersed across large areas is more costly and more subject to disruption due to lack of maintenance, and climate and other hazards, than in more compact and dense urban areas. Urban settlements that are consistently undergoing expansion and increasing built-up area per capita may face financial challenges to adequately provide those services —such as water supply, wastewater treatment, drainage systems, energy provision, early disaster warning systems, public healthcare and educational facilities, mobility systems, and many others— which can be detrimental to the challenge of universalization of coverage of those services, particularly to low-income households. Therefore, unplanned urban expansion can be detrimental to policies addressing spatial segregation of the poor and poverty reduction in all its dimensions.

- Geospatial institutional capacities and cross-sectoral cooperation: incorporating spatial considerations into all policies and how they can negatively impact the growth of urban areas is a requirement in the context of fast urban expansion. More than ever, sectoral plans must include spatial variables in decision-making. This necessity calls for promoting cooperation between government bodies that possess geospatial analytic capacities and the agencies responsible for making sectoral policy decisions, as well as in-house capacity-building initiatives in these sectoral agencies. These measures can boost governments' overall capacity to plan and implement place-specific policies and interventions.

- Access and production of timely geospatial information and statistics disaggregated at sub-national levels: monitoring land consumption at the urban settlement level requires creating, strengthening, and implementing institutional mechanisms to produce and update urban data at a sub-national level. This can ensure that the dynamics of land use and land use change —as the population grows and natural environments change due to the impacts of climate change— are incorporated into evidence-based and place-specific climate adaptation policies.

This is a non-exhaustive list of policy implications that can be derived from this study. Additional considerations regarding how land use change impacts different geographies can be formulated within specific government agencies once spatial and demographic dynamics are further incorporated into policy design, planning, implementation, monitoring, and reporting mechanisms.

## A. Way forward – questions for future research

This study assessed and quantified urban expansion at national and local levels, setting baseline assessments that are useful for monitoring the phenomenon in the future in Jamaica and in Trinidad and Tobago. As the Introduction indicates, the research was not designed to measure how policies and land market characteristics may drive or contribute to urban expansion. The findings of this study can prompt additional analyses, including how policies and other dynamics may be correlated with urban expansion. Some of the topics and questions that arise from this research are listed below:

- Can satellite imagery and population data retrieved from periods predating the year 2000 indicate whether this is a new or ongoing phenomenon?
- Once 2020 census demographic data is made available, will it confirm the findings and trends proposed by the 2020 population projection utilized in this study?
- How can spatial information on past disasters and risk-prone zones be crossed with urban expansion areas to design measures to mitigate place-specific vulnerabilities?
- How are the land and property tax systems and housing market incentives in different countries linked to the expansion of urban areas?
- How has the expansion of transportation infrastructure within and in the surrounding areas of urban settlements, particularly roads that promote the use of privately owned automobiles, contributed to urban expansion and the loss of urban densities?
- Considering that the loss of urban densities tends to increase the costs of delivery of urban and social services, has the fast expansion of urban settlements hampered the delivery of basic services? How much more do low-density urban settlements cost?
- What implication can the impact of climate change projections have on land use planning for the future, particularly in urban settlements?

These questions and research topics can be addressed in future investigations on urban expansion in Jamaica and Trinidad and Tobago.

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# Annex

# Annex 1

**Table A1**
**Source and adopted definition of urban population by the United Nations population prospects in Caribbean small island developing States**

| Country | Source | Definition |
|---|---|---|
| Anguilla | UN Estimates for 1960, 1974, 1984, 1992, 2001 and 2011. | In the absence of more detailed information the entire population is considered urban. |
| Antigua and Barbuda | Censuses of 1960, 1970, 1991, 2001 and 2011; UN Estimate for 2015. | St. John's (capital). |
| Aruba | Censuses of 1991, 2000 and 2010; Estimate for 1965; UN Estimate for 2011. | Oranjestad (capital) and San Nicolaas. |
| Bahamas | Censuses of 1963, 1980, 1990, 2000 and 2010; Estimate for 1953. | For 1980 and later, sum of the cities. |
| Barbados | Censuses of 1970, 1980, 1990, 2000 and 2010. | Bridgetown (capital). |
| Belize | Censuses of 1960, 1970, 1980, 1991, 2000 and 2010. | Belize City and all towns. |
| Bermuda | Censuses of 1950, 1960, 1970, 1980, 1991, 2000 and 2010. | Entire population. |
| British Virgin Islands | Census of 2001; UN Estimates for 1960, 1970, 1980 and 1991. | Road Town (capital). |
| Caribbean Netherlands | Censuses of 1960, 1972, 1981, 1992 and 2001; Estimate for 2013. | The island of Bonaire. |
| Cayman Islands | Censuses of 1960, 1970, 1979, 1989, 1999 and 2010; Sample Survey of 2007. | Entire population. |
| Cuba | Censuses of 1953, 1970, 1981, 2002 and 2012; Estimates for 1990, 1996 and 2016. | Administrative centers of municipalities and provinces and settlements of 2,000 inhabitants or more with urban characteristics, such as streets, street lighting, water-supply and sewerage systems, waste management, planned public spaces, medical centres, educational facilities, communication services and trade. |
| Curaçao | Censuses of 1992, 2001 and 2011; UN Estimate for 1960. | Willemstad (capital). |
| Dominica | Censuses of 1960, 1970, 1981, 1991, 2001 and 2011. | Cities and villages with 1,000 inhabitants or more. |
| Dominican Republic | Censuses of 1950, 1960, 1970, 1981, 1993, 2002 and 2010; Estimate for 2017. | Administrative centres of communes and municipal districts. |
| Grenada | Censuses of 1960, 1970, 1981, 1991, 2001 and 2011. | No official definition available. In the present publication, the parish of St. George. |
| Guadeloupe | Estimates for 1999 and 2006; UN Estimate for 1950. | For 1999 and 2006, communes with 2,000 inhabitants or more. |
| Guyana | Censuses of 1950, 1960, 1970, 1980, 2002 and 2012; UN Estimate for 2011. | City of Georgetown (capital), and four other towns. |
| Haiti | Censuses of 1950, 1971, 1982 and 2003; Estimates for 1992, 1996, 2000 and 2015. | Administrative centres of communes. |
| Jamaica | Censuses of 1960, 1970, 1982, 1991, 2001 and 2011. | Kingston metropolitan area and selected main towns. |

| Country | Source | Definition |
| --- | --- | --- |
| Martinique | Censuses of 1954, 1961, 1982, 1999 and 2006; Estimate for 1967. | For 1990 and 1999, total population of the Commune of Fort-de-France plus the agglomerations of other communes with 2,000 inhabitants or more. |
| Montserrat | Censuses of 1960, 1970, 1980, 1991 and 2011; UN Estimates for 1950, 1955, 1997, 1997 and 2001. | Brades Estate/Plymouth (capital). Due to volcanic activity, Plymouth was abandoned in 1997. The government premises have been established at Brades Estate, in the Carr's Bay/Little Bay vicinity at the northwest end of Montserrat. |
| Puerto Rico | Censuses of 1950, 1960, 1970, 1980, 1990, 2000 and 2010. | Densely settled territory 2,500 inhabitants or more. A change in the definition for the 2000 census from place-based to density-based affects the comparability of estimates before and after this date. |
| Saint Kitts and Nevis | Censuses of 1960, 1970, 1980, 1991, 2001 and 2011. | Basseterre (capital) and Charlestown. |
| Saint Lucia | Censuses of 1991, 2001 and 2010; UN Estimate for 2012. | No official definition available. In the present publication, the urban agglomeration of the city of Castries, its suburbs and three towns (Gros Islet, Soufrière, and Vieux Fort). |
| Saint Vincent and the Grenadines | Censuses of 1960 and 2001; Estimate for 1991. | No official definition available. |
| Sint Maarten (Dutch part) | Censuses of 1960, 1972, 1981, 1992, 2001 and 2011. | Entire population. |
| Suriname | Censuses of 1950, 1964, 1971, 1980, 2004 and 2012. | The district of Paramaribo (capital) and Wanica district. |
| Trinidad and Tobago | Censuses of 1980, 2000 and 2011. | Estimated based on the population of the City of Port of Spain, City of San Fernando, Borough of Arima, Borough of Chaguanas, Borough of Point Fortin, Diego Martin, San Juan/Laventille, Tunapuna/Piarco, St Andrew. |
| Turks and Caicos Islands | Censuses of 1960, 1970, 1980, 1990, 2001 and 2012; UN Estimate for 1950. | The islands of Grand Turk and Providenciales. |
| United States Virgin Islands | Censuses of 1950, 1960, 2000 and 2010. | For 2000 and 2010, densely settled territory that meets minimum population density requirements and with 2,500 inhabitants or more. For 1950 and 1960, estimates were adjusted for consistency with the new definition. |

Source: United Nations, 2018.

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