

Case Study 5.E

Climate Change Mitigation in a Tropical City: Santo Domingo, Dominican Republic

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Keywords	Natural disasters, urban transportation, forestry conservation, urban planning and design
Population (Metropolitan Region)	3,020,000 (United Nations, 2016)
Area (Metropolitan Region)	427 km ² (Demographia, 2016)
Income per capita	US\$6,390 (World Bank, 2017)
Climate zone	Am – Tropical monsoonal (Peel et al., 2007)

Introduction

The Dominican Republic needs to justify the environmental impacts of climate change to ensure the country's future growth. As an island nation, threats will be experienced on the three coastal sides of the country as well as on its interior. It will experience increased population shifts as migration gravitates from rural communities to urban environments. Such influx will contribute to urban carbon emissions, and the city's infrastructure can be strained in regard to building operation, transportation, and energy provision. Urban projects will need to address such impacts and seek to reduce greenhouse gas (GHG) emissions.

Santo Domingo: The Oldest City in the New World

The impacts of climate change will affect cities in various ways and disturb current economic, cultural, and social balances. The city of Santo Domingo has been a model for other similar metropolitan areas in the Caribbean context. With its rapid growth and investment in economic sectors, the city has emerged rapidly as an economic center that attracts investment and development opportunities. This model has been considered by other countries (including Haiti) as an example of how smart investment can foster job growth and infrastructure investment within a short time span.

Santo Domingo is in a position to be a leader in the reduction of GHG emissions because internal investment and support is readily available to foster such initiatives. A framework and the necessary tools, such as those used by New York's PlaNYC 2030, can lead sustainability initiatives (New York City Office of Long-Term Planning and Sustainability, 2007).

Island in Context

The Dominican Republic shares the island with the neighboring country of Haiti, occupying two-thirds of the island territory. It has 49,000 square kilometers with 1,288 kilometers of coast lines. Forty percent of the land cover is forested. The Dominican Republic is strategically located between neighboring countries in the Caribbean, Central, South and North America.

Learning from History

The Dominican Republic was the first settlement in the new world, founded by Christopher Columbus during his first travels across the Atlantic Ocean. The City of Santo Domingo was founded in 1496; it is 519 years old and is the oldest functioning city in the Western Hemisphere.

Preserving and Ensuring the Island Economy

With a US\$61.6 billion gross domestic product (GDP; World Bank, 2013), the Dominican Republic maintains its economic growth primarily through its service industries that include business and finance investments. Its manufacturing industry includes mining of nickel, gold, and silver; and it hosts a textile industry. Its agricultural sector is a strong exporter of organic fruits and vegetables, tobacco, and sugar. The island maintains a strong tourism industry, with nearly 3 million foreign visitors on a yearly basis.

Population Growth and Forecast

Approximately 10.4 million people live in the Dominican Republic, and currently 70.8% of the population lives in urban areas (United Nations Statistics Division, 2013); 3 million people reside in Santo Domingo alone. It is estimated that the population will increase to 12.1 million by 2030 (Euromonitor International, 2013).

Sustainable Networks of Connectivity through Infrastructure

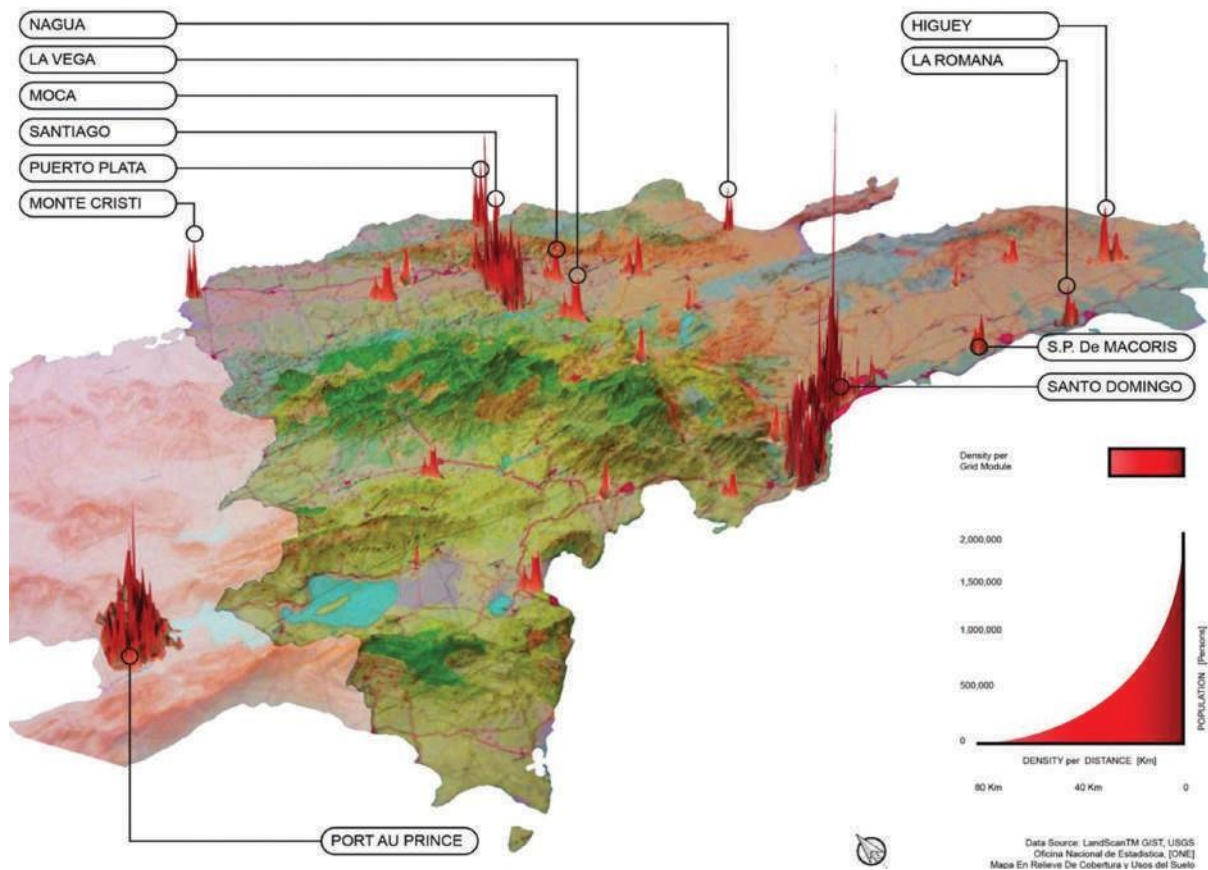
Since 1986, the country has sustained a resilient construction industry. Capital investment from both public and private sectors has focused on the transportation industry, primarily through road construction. The country has ten international airports with fourteen shipping ports along its coastal edges.

Natural Disasters: A Methodology for Resilience Planning

The Dominican Republic is a hot spot for natural disasters. The island has a history of floods, storms, earthquakes, landslides, and tsunamis (the last recorded tsunami occurred in the north province in 1946), tracked since record keeping began in the 1500s. The World Bank indicates the island is at risk to hurricanes, landslides, and earthquakes, in order of priority. About 33.75% of the land area is estimated to be affected, with 66% of the total population projected to be high risk (Dilley, 2005) in the aftermath of a disaster.

Urban Sprawl

Santo Domingo is a dense urban environment. Santo Domingo’s growth is directed toward the north and west of the city. These districts are bounded by waterfronts, fault lines, and steep terrain. The majority of commercial and higher end residential building construction is conducted under the rules and regulations required by local building codes, but there are also residential communities expanding through “automated construction,” a method whereby individuals utilize construction methods not coherent with local codes or building ordinances



Population density concentration spike mapping on the island of Hispaniola- Dominican Republic.

Image Credit: Richard Gonzalez, AIA

and subjective to individual knowledge. The control and oversight of these building structures remain of concern because many may vulnerable to impacts on life and safety.

Mitigation Strategies: The Shifting of GHG

The Dominican Republic aims to reduce GHG emissions by 25% with a targeted date of 2030 (International Partnership on Mitigation and MRV, 2014). This was announced at a UN Climate Change conference (COP18) hosted in Doha, Qatar. This incentive includes financial support, with the government

of Germany as a partner. The three task areas include economic development, reduction of poverty, and securing social inclusion (National Council on Climate Change, 2012). The Dominican Republic has also identified four sectors for the reduction of GHG: transportation, energy, forestry conservation, and water management.

The country is investing largely in its transportation infrastructure. Santo Domingo is expanding its mass transportation system with an underground metro subway. In its second phase of completion, the system will expand to service the east-west districts of the City, with future plans to expand toward the North.

Although the demand for energy outweighs the supply, the Dominican Republic is investing in several alternatives for energy production, including a focus on hydro plants near rivers and solar and wind farms in certain sectors of the country.

Forestry conservation plays a major role in the reduction of carbon. The Dominican Republic plans to conserve existing undisturbed parks and ecological habitats in a nationwide effort. There is also a tree planting initiative for the city of Santo Domingo (Office of the National District, 2010) and a GreenBelt project highlighting eight park areas linked via a series of pathways and water channels (Grupo Tierra Dominicana, 2008).

Water management plays a key issue in regards to catchment, processing, and distribution. The city of Santo Domingo has experienced water overflows and flooding in the aftermath of strong tropical storms. The public works department is planning on expanding the city's sewer lines, which currently services 40% of the city. The system will implement new street catchments,

distribution lines, and treatment plants. This system will also address waste mitigation because small items constantly congest the distribution of water in the underground piping.

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